

# TOSHIBA

勝特力材料 886-3-5753170

勝特力电子(上海) 86-21-54151736

勝特力电子(深圳) 86-755-83298787

[Http://www.100y.com.tw](http://www.100y.com.tw)

2005-3

## PRODUCT GUIDE

# Power MOSFETs

semiconductor  
<http://www.semicon.toshiba.co.jp/eng>



# POWER MOSFETs

## POWER MOSFETs

### POWER MOSFETs

#### POWER MOSFETs

##### POWER MOSFETs

###### POWER MOSFETs

###### POWER MOSFETs

###### POWER MOSFETs

###### POWER MOSFETs

勝特力材料 886-3-5753170  
勝特力电子(上海) 86-21-54151736  
勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)

## C O N T E N T S

<b>1</b>	Features and Structure .....	4
<b>2</b>	New Power MOSFET Products .....	5
<b>3</b>	Selection Guide .....	6 to 9
<b>4</b>	Power MOSFET Characteristics	
	1. SOP Series .....	10 to 15
	2. STP Series .....	16
	3. VS and PS Series.....	17 to 18
	4. U-MOS III Series (Trench Type) Series.....	19
	5. $\pi$ -MOS VII Series.....	20
	6. High-Speed $\pi$ -MOS V Series ( $V_{DSS} = 450$ to $600$ V).....	21
	7. TO-220SIS / TO-3PN $\pi$ -MOS IV / VI Series .....	22 to 23
	8. $\pi$ -MOS Series Lineup .....	24 to 28
<b>5</b>	Power Modules.....	29
<b>6</b>	Product List .....	30 to 33
<b>7</b>	Superseded, Final-Phase and Discontinued Product List....	34 to 35
<b>8</b>	Package List.....	36 to 43

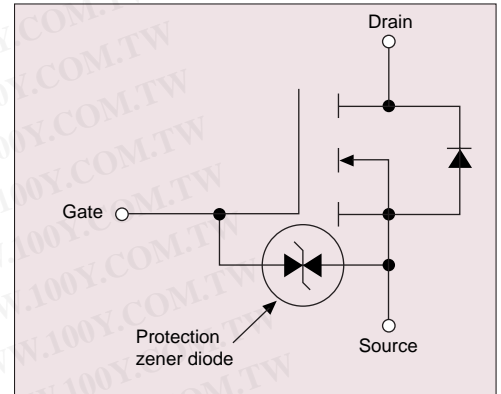


# 1 Features and Structure

## Power MOSFETs

All power MOSFETs have the following features:

- 1) No carrier storage effect; superior frequency and switching characteristics
- 2) Ruggedness, without current concentration
- 3) Voltage-controlled device, hence low drive power
- 4) Easy parallel connection



■ Toshiba Power MOSFETs have the following additional features:

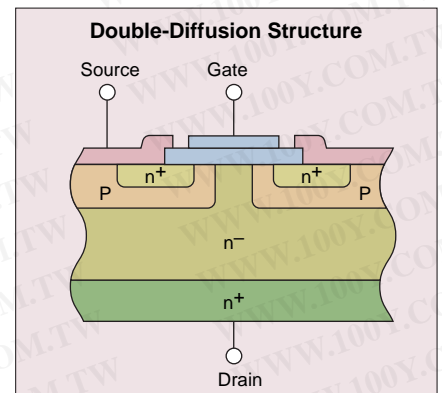
- |  |   |
|--|---|
| 1) Guaranteed avalanche withstand capability | ⇒ No absorber circuit required                            |
| 2) Improved functioning of built-in diodes   | ⇒ Greatly expanded circuit design possibilities           |
| 3) High ruggedness                           | ⇒ Better margin for circuit design                        |
| 4) High-speed switching                      | ⇒ Higher-speed equipment operation                        |
| 5) Low $R_{(DS)ON}$                          | ⇒ Reduced equipment power consumption                     |
| 6) Downsized packages                        | ⇒ Slimmer, more compact equipment                         |
| 7) Low drive loss                            | ⇒ Reduced equipment power consumption                     |
| 8) Zener diode between gate and source       | ⇒ Improved electrostatic immunity between gate and source |

### ■ Structure of Toshiba Power MOSFETs

#### ● $\pi$ -MOS

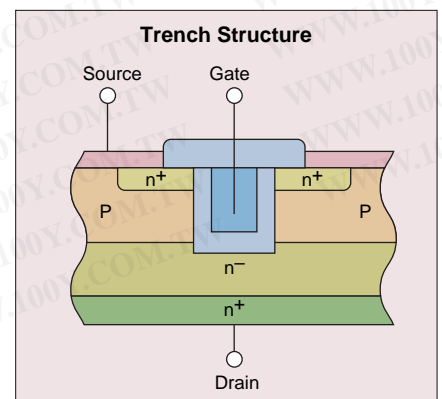
Toshiba Power MOSFETs use a double-diffusion MOS (D-MOS) structure, which produces high-withstand voltage, to form channels. This structure is especially well-suited to high-withstand voltage and high-current devices.

A high level of integration yields a high-performance power MOSFET with low On-resistance and low power loss.



#### ● U-MOS

Higher channel density is achieved by connecting channels vertically to form a U-groove at the gate region, a structure that yields a lower On-resistance than other MOSFET structures.



勝特力材料 886-3-5753170  
勝特力电子(上海) 86-21-54151736  
勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)

## 2 New Power MOSFET Products

### New Power MOSFET Products

All products have a protection zener diode between gate and source. And the latest line-up guarantees avalanche withstand capability in both single and series power MOSFET products.

#### SOP Series $V_{DSS} = 20\text{ V to }60\text{ V}$

The SOP Series products are compact and thin, and require only a small mounting area. They are suitable for lithium-ion secondary battery protection and for notebook PCs.

##### Applications

- Lithium-ion secondary battery protection circuits
- Notebook PCs
- Portable electronic devices

#### $\pi$ -MOS VII Series $V_{DSS} = 100\text{ V}$

By employing submicron technology and reducing gate charge, this latest Series realizes extremely high speed and low  $R_{DS(ON)}$ .

##### Applications

- Digital amps
- DC-DC converters
- Motor drivers

#### STP Series

The STP Series is housed in an ultra-small and slim package and is suitable for use in lithium-ion secondary battery protection circuits in various portable electronic devices.

##### Applications

- Lithium-ion secondary battery protection circuits

#### High-Speed $\pi$ -MOS V Series $V_{DSS} = 250\text{ V to }600\text{ V}$

The new  $\pi$ -MOS V High-Speed Series achieves higher switching speed than the  $\pi$ -MOS V Series, currently well-established in the marketplace. Two types of series are available: High-Speed Switching Series, High-Speed Diode Series

##### Applications

- Inverters
- AC adapters
- Motor drivers
- Switching power supplies

#### VS and PS Series $V_{DSS} = 12\text{ V to }30\text{ V}$

The VS and PS Series products are very compact and thin, and are suitable for various uses in portable electronic devices.

##### Applications

- Portable phones
- Notebook PCs
- Portable electronic devices

#### TO-220SIS / TO-3PN Series $V_{DSS} = 450\text{ V to }900\text{ V}$

This series reduces package height by 2.8 mm compared with the existing package, the TO-220NIS. Moreover, optimization of chip design enables this new package to accommodate the  $\pi$ -MOS IV / VI Series, which offers lower Qg characteristics.

##### Applications

- DC-DC converters
- Switching power supplies
- Motor drivers
- AC adapters

#### U-MOS III Series $V_{DSS} = 40\text{ V to }100\text{ V}$

High-integration is achieved using a trench structure technique. Low-voltage driving ( $V_{GS} = 4\text{ V}$ ) is possible due to ultra-low On-resistance.

##### Applications

- Motor drivers
- Solenoids and lamp drivers

勝特力材料 886-3-5753170  
勝特力电子(上海) 86-21-54151736  
勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)



# 3 Selection Guide

V <sub>DS</sub> (V) I <sub>D</sub> (A)	12	16	20	30	40	50	60	100	150	180	200	250	400	450	500	600	700	800	900	1000	V <sub>DS</sub> (V) I <sub>D</sub> (A)			
0.5															▲2SK2998(20)② ☆2SK3302(18)② ◇2SK3471(18)②						0.5			
1							◇2SJ360(0.73)④ ▲2SJ507(0.7)④	◇2SK2963(0.7)④ ▲2SK2962(0.7)④ ◇2SJ508(1.9)④ ▲2SJ509(1.9)④	▲2SK3670(1.7)	◆2SJ313(5.0) ▼2SJ338(5.0) ◆2SK2013(5.0) ▼2SK2162(5.0)	◇2SK2992(3.5)②		▼2SK3498(5.5)②	☆2SK3374(4.6)② ▼2SK3472(4.6)②		▼2SK3371(9)② ▽2SK4026(9)②				■2SK2733(9.0)① ▽2SK2845(9)① ▼2SK3301(20)①		1		
1.3																					1.3			
1.7																						1.7		
1.8																						1.8		
1.9																						1.9		
2		#◇2SJ465(0.71)② #◇2SK2549(0.29)②		◇2SK2964(0.18)④ ◇2SJ511(0.45)④			◇2SK2615(0.3)④ ▲2SK2961(0.3)④ ◇2SK3658(0.3)④							▼2SJ610(2.55)②	◆2SK3543(2.45)② ◎2SK3757(2.45)③ ◎2SK3766(2.45)③	☆2SK2599(3.2)② ▼2SK3373(3.2)②	☆2SK2846(5.0)② ▼2SK2865(5.0)② ◆2SK3067(5.0)② ◎2SK3767(4.5)③ ▽2SK4002(5)②					2		
2.1																						2.1		
2.5																						2.5		
2.7																						2.7		
3																						3		
3.2																						3.2		
3.4																						3.4		
3.5																						3.5		
3.9																						3.9		
4																						4		
4.2																						4.2		
4.5																						4.5		
5		#▼2SJ439(0.2)② #▼2SK2493(0.1)②	★TPC8208(0.05)⑥ I TPC8209(0.03)⑥ N# I TPC8205(0.045)⑥ N# I TPC8210(0.03)⑥ P# I TPC8303(0.021)⑥ P# I TPC8305(0.03)⑥ P I TPC8302(0.035)⑥	☆2SJ525(0.12) CN★TPC8402(0.05)⑥ I TPC8209(0.05)⑥ N I TPC801(0.032)⑥ P★TPC8104-H(0.065)⑥ ★TPC8209(0.04)⑥	▲2SK2989(0.15)④ ▲2SJ537(0.19)④	▼2SJ668(0.17)④ ▼2SJ315(0.25) ▼2SJ377(0.19)④ ☆2SJ378(0.19)④ ☆2SJ669(0.17)④ ◆2SJ438(0.19)④ ☆2SK2229(0.16)④ ▼2SK2231(0.16)④ △2SK2741(0.16)④ ▽2SK4017(0.1)⑥ ▼2SK4033(0.1)⑥	▼2SK2399(0.23)④ ☆2SK2400(0.23)④ ▽2SK4019(0.23)④	▼2SK3205(0.52)					◆2SJ407(1.0)② ◆2SK2381(0.8)② ☆2SK2835(0.8)② ▼2SK2920(0.8)② ▽2SK4020(0.8)②	◆2SJ512(1.25)②	◆2SK2662(1.5)② ◆2SK2661(1.5)② ○2SK2991(1.5)② ¥◆2SK3316(1.8)② ◆2SK3466(1.5)② ◎2SK3563(1.5)③ ◎2SK3868(1.7)③ ■2SK3758(1.5)③		◆2SK2274(1.7)	○2SK2604(2.2)① ◆2SK2605(2.2)① ○2SK2884(2.2)①	◆2SK2717(2.5)① ◎2SK3565(2.5)③ ○2SK3700(2.5)③ ◎2SK3742(2.5)③	○2SK1159(3.8)	5			
5.5	P★TPC6103(0.035)⑥ PD★TPC8401(0.038)⑥		P★TPC6104(0.04)⑥	N★TPC8211(0.036)⑥																		5.5		
6	P★TPCF8101(0.028)⑥ P★TPCA8105(0.033)⑥		N○TPCT4201(0.0255)⑥ N★TPC6001(0.03)⑥ N#TPC6004(0.024)⑥ P★TPCF8102(0.030)⑥ ★TPC8207(0.02)⑥ I TPC8102(0.02)⑥ I TPC8211(0.024)⑥ I TPC8204(0.017)⑥ P# I TPC8102(0.02)⑥ P# I TPC8302(0.035)⑥ N# I TPC8212(0.024)⑥ N# I TPC8208(0.017)⑥ N I TPC8213(0.013)⑥	N○TPCT4202(0.038)⑥ N★TPC6002(0.03)⑥ N#TPC6003(0.024)⑥ N#TPC6005(0.028)⑥ PD★TPC8101(0.035)⑥ P I TPC8101(0.025)⑥ P I TPC8104(0.028)⑥ N I TPC8214(0.135)⑥ NS★TPC8A01(0.025)⑥ ★TPC8203(0.021)⑥ CN★TPC8401(0.021)⑥ CN★TPC8403(0.033)⑥ N○TPCT4201(0.031)⑥																				6
6.5																						6.5		
7																						7		
7.2																						7.2		
7.5																						7.5		
8																						8		
8.5																						8.5		
9																						9		

勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)

**New product series code** ①: π-MOSIII ③: π-MOSVI ⑤: L<sup>2</sup>-π-MOSVI ⑦: π-MOSVII  
 ②: π-MOSV ④: L<sup>2</sup>-π-MOSV ⑥: U-MOS ⑧: π-MOSIV  
**Package code** ◇POWER-MINI ♪VS-8 ♥VS-6 ♣PS-8 ⊕STP  
 ◎SOP-8 Lead clamp ▶SOP Advance ◆TO-220(NIS) ◎TO-220SIS  
 ▲TO-92MOD ▼POWER-MOLD ♪NEW PW-MOLD2 ▽DP ☆TPS ◀TSSOP Advance ✕TSSOP-8 ★SOP-8  
 ■TO-220AB ♣TFP ○TO-220FL/SM □TO-3P(N) ◎TO-3P(N)IS ●TO-3P(L) ◎TO-3P(SM)

Notes:  
 ( ) = R<sub>DS(on)</sub> max  
 \$ = 10-V drive  
 # = 2.5-V drive  
 \* = 1.8-V drive  
 † = High-speed diode  
 N = N-ch  
 P = P-ch  
 CN = Complementary N-ch  
 CP = Complementary P-ch  
 NS = N-ch + SBD  
 PS = P-ch + SBD  
 PD = P-ch + Driver (load switch)  
 [ ] = Under development

# 3 Selection Guide

V <sub>DS</sub> (V)	20	30	40	50	60	100	150	180	200	250	300	400	450	500	600	700	900	1000	V <sub>DS</sub> (V)	
I <sub>D</sub> (A)																				I <sub>D</sub> (A)
10	P★TPC8115(0.01)⑥	△2SK2839(0.04)④ P★TPC8109(0.02)⑥				▼2SK3669(0.125)⑦		□2SJ200(0.83) ○2SJ440(0.83) □2SK1529(0.83) □2SK3497(0.15) □2SJ618(0.37)				■2SK2841(0.55)② ○2SK2949(0.55)② ◆2SK3499(0.55)②	○2SK3309(0.65)② ◆2SK3310(0.65)② ◆2SK3407(0.65)② ○2SK3869(0.68)③	□2SK2601(1.0)②	◆2SK2843(0.75)② ■2SK2866(0.75)② ○2SK2889(0.75)② ◆2SK2996(1)② ◆2SK3438(1.0)② ○2SK3437(1.0)② ○2SK3399(0.75)② ○2SK3569(0.75)③	◆2SK3265(1.0)③ ○2SK3453(1.0)③	□2SK2968(1.25)①			10
11		N★TPC8014(0.014)⑥ P★TPC8108(0.013)⑥ P★TPC8113(0.01)⑥ P★TPC8105(0.0135)⑥ P★TPC8104(0.012)⑥							◆2SK2965(0.26)②											11
12						◆2SJ380(0.21)④			●2SJ201(0.625) ●2SK1530(0.625) ○2SK3625(0.082)②					◆2SK2842(0.52)② ○2SK3068(0.52)② ¥◆2SK3313(0.62)② ◆2SK3398(0.52)② ○2SK3568(0.52)③	□2SK2699(0.65)②			●2SK1489(1.0)	12	
13		N★TPC8003(0.007)⑥ N★TPC8020-H(0.009)⑥ P★TPC8107(0.007)⑥ P★TPC8112(0.006)⑥							◆2SK2508(0.25)② ○2SK2598(0.25)②				◆2SK3743(0.4)② ○2SK3403(0.4)② ◆2SK3544(0.4)②		◎2SK3797(0.43)③					13
14					◆2SJ304(0.12) ○2SJ312(0.12)									○2SK2916(0.4)②	□2SK3903(0.44)③					14
15		N★TPC8013-H(0.0065)⑥ N★TPC8017-H(0.0066)⑥							◆2SK2382(0.18)② ○2SK2401(0.18)②					□2SK2698(0.4)② ¥□2SK3314(0.48)② ◎2SK3934(0.3)③	◎2SK2953(0.4)②					15
16		NS★TPC8A02-H(0.0056)⑥				○2SJ412(0.21)④ ◆2SJ619(0.21)④										□2SK2915(0.4)②				16
17													◎2SK3935(0.25)③	□2SK3905(0.31)③						17
18		P★TPC8114(0.0045)⑥ N★TPC8018-H(0.0046)⑥				◆2SJ464(0.12)④ ◆2SJ620(0.09)④ ▶TPCA8006-H(0.067)	◆2SK2882(0.12)② ◆2SK3387(0.12)④									○2SK2917(0.27)②				18
19													□2SK3904(0.26)③							19
20				▽2SK2614(0.046)④ N★TPCM8001-H(0.0095)⑥	◆2SJ349(0.045)④ ○2SJ401(0.045)④ ▽2SK2782(0.055)④	◆2SK2391(0.085)④			○2SK2993(0.105)② ◆2SK3388(0.105)② ◆2SK3445(0.105)②					□2SK2837(0.27)② ◎2SK3117(0.27)② □2SK3911(0.32)③ □2SK3906(0.33)③					20	
23														□2SK3907(0.23)③ □2SK3936(0.25)③						23
25				◆2SK2507(0.046)④	◆2SK2232(0.046)④ ○2SK2311(0.046)④ N▶TPCA8016-H(0.021)⑥				◆2SK3444(0.082)② ○2SK3625(0.082)②					●2SK1544(0.2)						25
26					◆2SK3846(0.018)④															
27		N▶TPCA8005-H(0.009)⑥				■2SK2314(0.085)④ ○2SK2789(0.085)④														27
30					N▶TPCA8014-H(0.009)⑥				◆2SK3443(0.055)②	□2SK3176(0.052)②			□2SK2967(0.068)② ◎2SK2995(0.068)②							30
32					○2SK3847(0.018)⑥									●2SK1486(0.095)						32
35		■2SK2844(0.022)④ N▶TPCA8003-H(0.0066)⑥			N▶TPCA8015-H(0.0054)⑥	◆2SK3236(0.02) ◆2SK3662(0.0125)⑥ ◆2SK2385(0.03)④														35
36						P▶TPCA8104(0.016)⑥														36
40		○2SK3089(0.03)② N▶TPCA8004-H(0.0046)⑥ P▶TPCA8101-H(0.007)⑥ P▶TPCA8102-H(0.006)⑥ P▶TPCA8103(0.0042)⑥																		40
45		○2SK3090(0.02)② ○2SK3127(0.011)⑤ \$□2SK3506(0.02)		\$□2SK2550(0.03)④ ◆2SK2886(0.02)④ \$□2SK2744(0.02)④ \$○2SK3051(0.03)④	□2SK2233(0.03)④ ○2SK2266(0.03)④ ◆2SK2312(0.017)④ ○2SK2376(0.017)④ \$□2SK2398(0.03)④ ◆2SK3844(0.0058)⑥															45
50				\$□2SK2551(0.011)④ □2SK2745(0.0095)④	◆2SK3440(0.008)④ □2SK2173(0.017)④ \$□2SK2445(0.018)②	□2SK1381(0.032) ◆2SK3442(0.020)⑥												¥◆2SK3131(0.11)② ●2SK3132(0.09)②		50
60		◎2SK3125(0.007)⑤ □2SK3128(0.011)⑤		□2SK3129(0.007)③	●2SK2267(0.011)③ □2SK2313(0.011)④	●2SK1382(0.020)														60
70		◆2SK3397(0.006)			□2SK3845(0.0058)⑥															70
75		\$◆2SK3389(0.005)⑤ ◆2SK3439(0.005)⑥			◆2SK3843(0.0035)⑥	◆2SK3441(0.0058)⑥ ◆2SK3842(0.0058)⑥														75

勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)

**New product series code** ①: π-MOSIII ③: π-MOSVI ⑤: L<sup>2</sup>-π-MOSVI ⑦: π-MOSVII  
 ②: π-MOSV ④: L<sup>2</sup>-π-MOSV ⑥: U-MOS ⑧: π-MOSIV  
**Package code** ◇POWER-MINI ♪VS-8 ♥VS-6 ♣PS-8 ⊕STP  
 ⚙SOP-8 Lead clamp ▶SOP Advance ◆TO-220(NIS) ◎TO-220SIS  
 ▲TO-92MOD ▼POWER-MOLD ♪NEW PW-MOLD2 ▽DP ☆TPS ◀TSSOP Advance ▼TSSOP-8 ★SOP-8  
 ■TO-220AB ♣TFP ○TO-220FL/SM □TO-3P(N) ◎TO-3P(N)IS ●TO-3P(L) ◎TO-3P(SM)

Notes:  
 ( ) = R<sub>DS(on)</sub> max \* = 1.8-V drive P = P-ch NS = N-ch + SBD PD = P-ch + Driver  
 \$ = 10-V drive ¥ = High-speed diode CN = Complementary N-ch PS = P-ch + SBD (load switch)  
 # = 2.5-V drive N = N-ch CP = Complementary P-ch [ ] = Under development



## 1. SOP Series

— New Power MOSFET Products —

### ① Ultra-High-Speed U-MOS III Series **NEW**

#### ■ Features

- Low gate switch charge: 14% reduction compared to high-speed U-MOS III
- Low On-resistance (Al straps): 34% reduction compared to high-speed U-MOS III
- Housed in SOP Advance, high current, low profile and excellent heat dissipated package

▶ **43% RDS(ON) × Qsw reduction**  
 (Compared to high-speed U-MOS III)

#### ■ Reference Board

An evaluation kit is configured with a 3-phase synchronous rectification buck converter and provided for evaluating ultra-high-speed power MOSFETs.

- Input/output voltage range  
 : Input = 5 V to 19 V  
 : Output = 1.075 V to 1.850 V
- Maximum output current: 60 A (3-phase)
- High efficiency
- 3-phase
- Switching frequency: 250 kHz, 300 kHz or external frequency

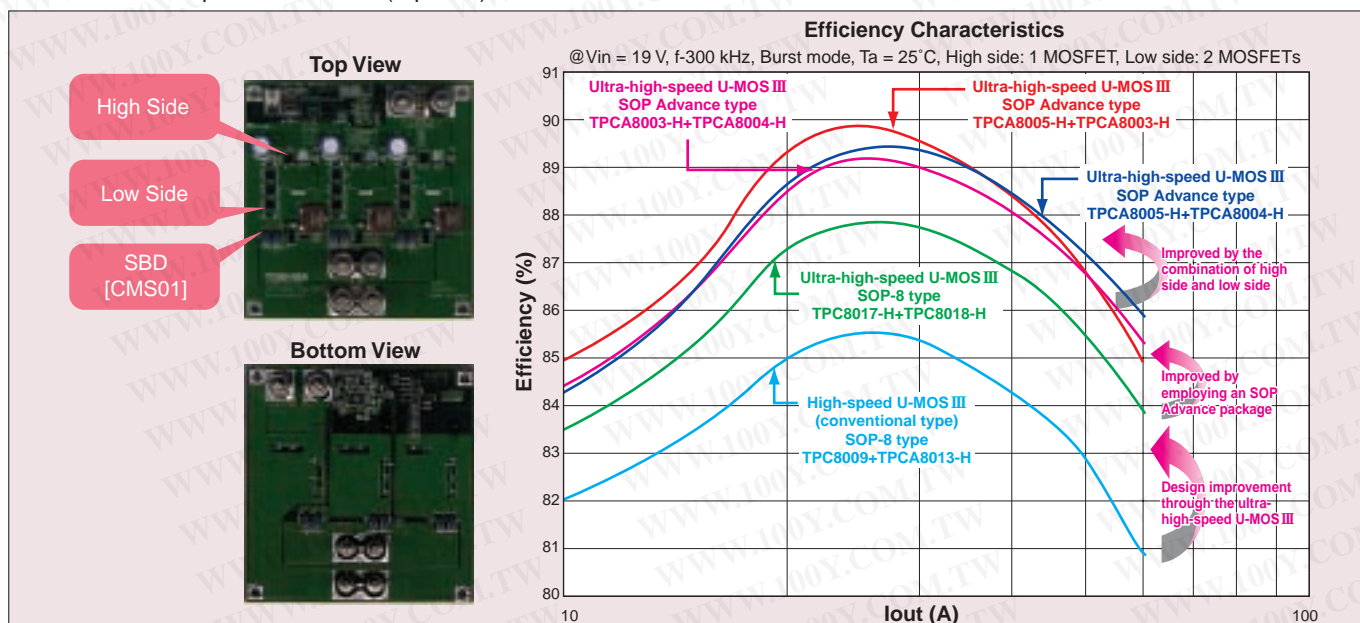
#### ■ Electrical Characteristics Comparison

	High-Speed U-MOS III TPC8009-H	Ultra-High-Speed U-MOS III TPC8017-H
RDS (ON) (mΩ)	11	<b>7.3</b>
Qsw (nC)	9.1	<b>7.8</b>
Cgd (pF)	250	<b>175</b>
Cgs (pF)	1210	<b>1290</b>
RDS (ON) × Qsw (mΩ·nC)	100.1	<b>56.9</b>
Capacitance ratio (Cgd/Cgs)	20.7%	<b>13.6%</b>

\* RDS(ON): VGS = 4.5 V typ.  
 Qsw: VDS = 24 V typ.  
 Cgd/Cgs: VDS = 10 V typ.

Reduced capacitance  
 ▶ Shoot-through current control

Performance Index:  
 improved 43%



#### ■ Product Lineup

Part Number	Maximum Ratings		RDS(ON) max (mΩ)		Qsw typ. (nC)	Package
	VDS (V)	ID (A)	VGS = 4.5 V	VGS = 10 V		
TPCA8011-H	20	40	3.5	7.5 *	16	SOP Advance (N-ch Single)
TPCP8001-H	30	7.2	25	16	3.6	PS-8 (N-ch Single)
TPCM8001-H	30	20	14	9.5	6.0	TSSOP Advance (N-ch Single)
TPC8021-H	30	8	25	17	3.6	SOP-8 (N-ch Single)
TPC8020-H	30	13	13	9	6.9	
TPC8017-H	30	15	9.5	6.6	7.8	
TPC8018-H	30	18	6.2	4.6	12	SOP-8 (N-ch includes SBD)
TPC8A02-H	30	16	8.5	5.6	11	
TPCA8005-H	30	27	13	9	7.7	SOP Advance (N-ch Single)
TPCA8003-H	30	35	9.5	6.6	8.4	
TPCA8004-H	30	40	6.2	4.6	12.7	
TPC8022-H	40	7.5	35	27	3.5	SOP-8 (N-ch Single)
TPCA8014-H	40	30	14	9	7.4	SOP Advance (N-ch Single)
TPCA8015-H	40	35	7.9	5.4	13	
TPCA8016-H	60	25	26	21	6.6	

\*: VGS = 2.5 V

## ② MOSBD (MOSFET with SBD)



### ■ Features

#### • Downsizing

Integrating a MOSFET, which is used for the low side, and an SBD in a single package

#### • High-efficiency

Reduced wire inductance through the use of a monolithic structure that combines a MOSFET and an SBD

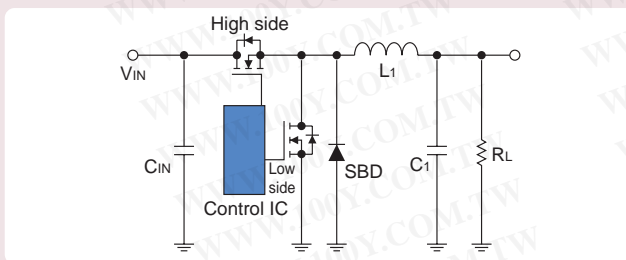
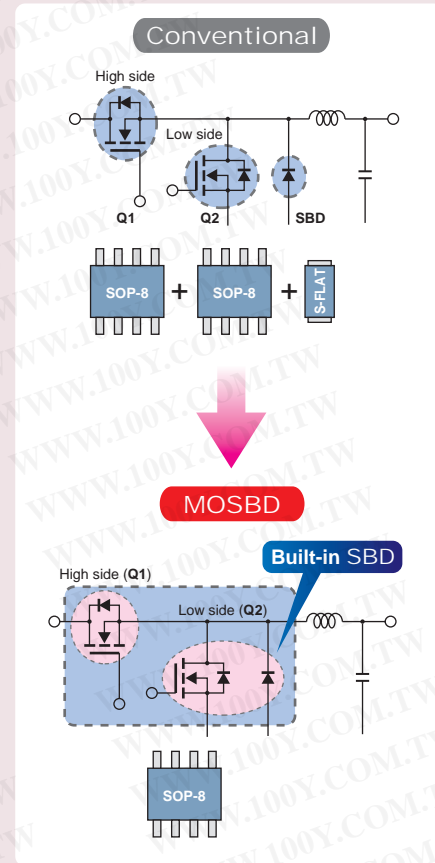
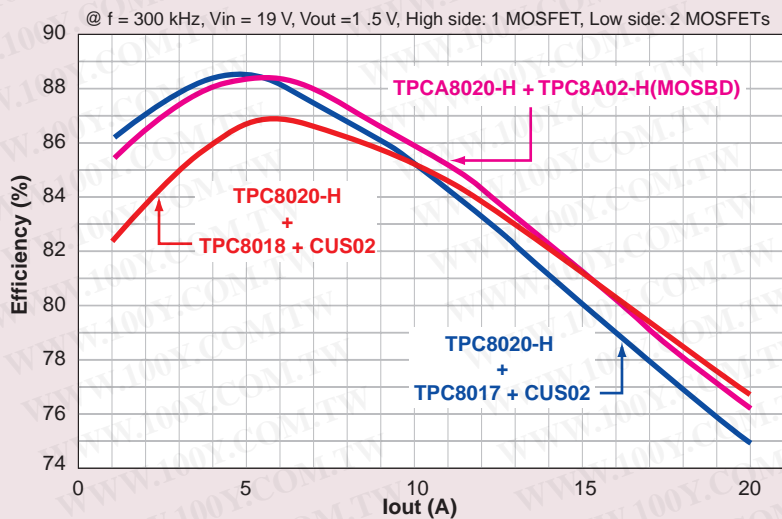
A MOSFET that uses the ultra-high-speed U-MOS III process

#### • Operating temperature

Channel temperature: guaranteed 150°C

Guaranteed avalanche immunity

### ■ Efficiency Characteristics



		R <sub>DS(ON)</sub> (mΩ) @ V <sub>GS</sub> = 4.5 V	Q <sub>sw</sub> (nC)
High side	TPC8020-H	9.5	6.9
	TPC8A02-H	6.2	11
Low side	TPC8017-H	11.0	9.1
	TPC8018-H	5.0	12.0
	CUS02	0.45 (Note)	—

Note: VDSF

### ■ Applications

- Portable devices: DC-DC converters for notebook PCs

### ■ Product Lineup

Part Number	Maximum Ratings		R <sub>DS(ON)</sub> (mΩ) @ V <sub>GS</sub> = 4.5 V		Q <sub>g</sub> (nC)	V <sub>DSF</sub> (V) @ V <sub>GS</sub> = 0V	I <sub>DSS</sub> (μA) @ V <sub>GS</sub> = 0V	Package	Remark
	V <sub>DSS</sub> (V)	I <sub>D</sub> (A)	typ.	max					
TPC8A02-H	30	16	6.2	8.5	34	-0.6	100	SOP-8	New
TPC8A01	High side (MOSFET)	30	6	23	17	-1.2	10	SOP-8	3-in-1 type
	Low side (MOSBD)	30	8.5	16	21	-0.6	100		



# 4 Power MOSFET Characteristics

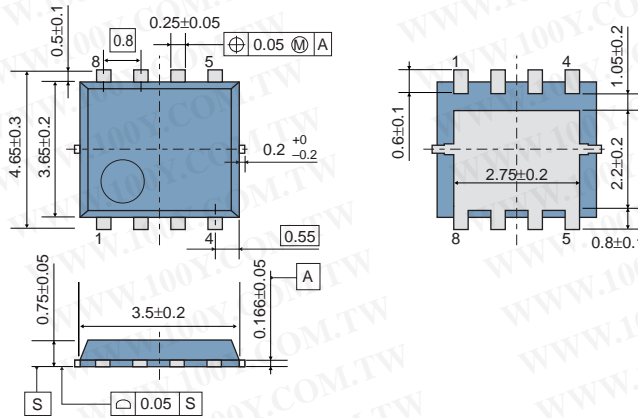
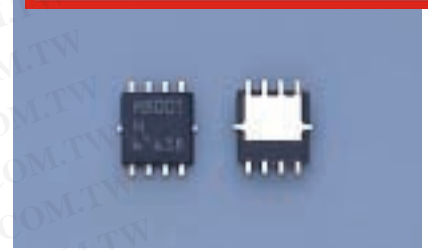
勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)

## ③ TSSOP Advance

**NEW**

### ■ Features

- On-resistance reduction and thin package (0.8 mm max) achieved by employing flat leads and Al straps
- High-current and high-power dissipation achieved by equipping the bottom of the package with an exposed heat sink ( $I_D(\text{DC}) = 20 \text{ A}$ ,  $\text{PD} = 30 \text{ W}$ )



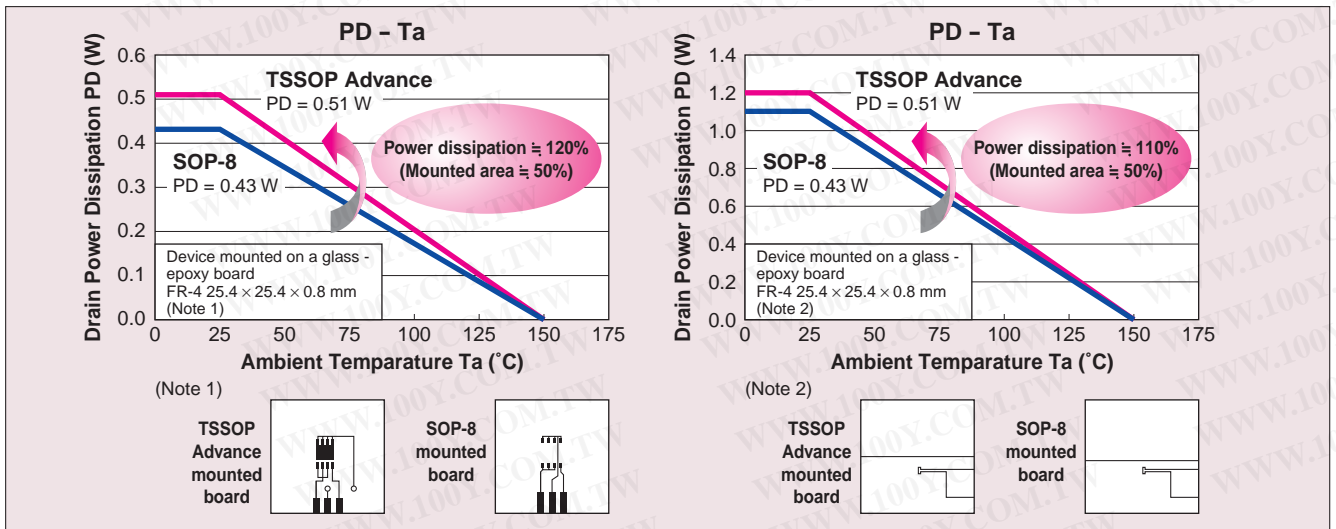
1,2,3: Source  
 4: Gate  
 5,6,7,8: Drain

		SOP-8	TSSOP Advance	Features of SOP Advance
PCB area	(mm <sup>2</sup> )	30	16.3	46% reduction
Total height (max)	(mm)	1.9	0.8	Low profile, t = 0.9 mm
rth (ch-a) (t = 10s) (Note 1)	(°C/W)	65.8	54.3	High-power dissipation
rth (ch-c)	(°C/W)	—	4.2	
Current rating	(A)	18	30	High-current guarantee
Package resistance (Note 2)	(mΩ)	1.6	0.5	Al strap structure

Note 1: When mounted on a glass epoxy board (25.4 mm × 25.4 mm × 1.6 mm)  
 Note 2: Without chip resistance

### ■ High Power Dissipation

- This new package, almost half the mounting area of the SOP-8, offers approximately 1.1 times higher power dissipation than that of the SOP-8 package with attaching an exposed heat sink on the bottom of the package.



### ■ Product Lineup

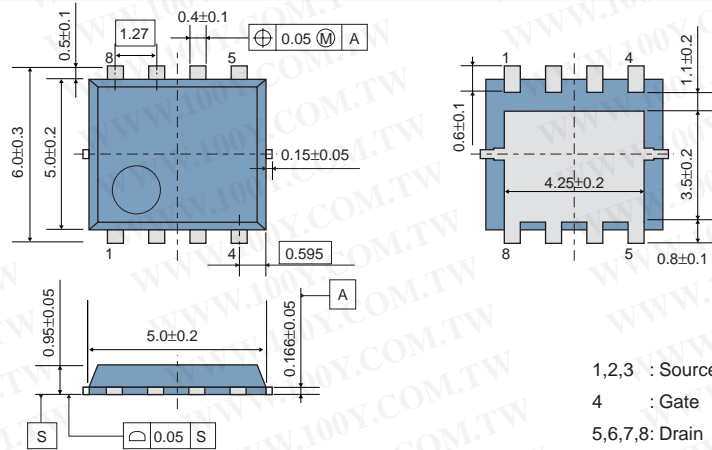
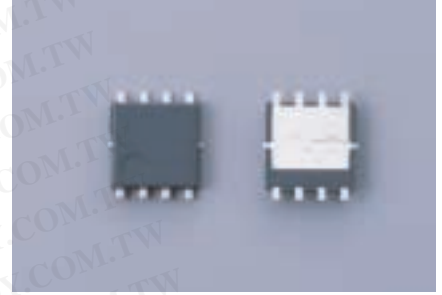
Part Number	Maximum Ratings		$R_{DS(\text{ON})}$ max (mΩ)		$Q_{\text{sw}}$ typ. (nC) $V_{\text{DS}} = 24 \text{ V}$	Remark
	$V_{\text{DSS}}$ (V)	$I_D$ (A)	$V_{\text{GS}} = 4.5 \text{ V}$	$V_{\text{GS}} = 10 \text{ V}$		
TPCM8001-H	30	20	14	9.5	6.0	Ultra-high-speed U-MOS III

## ④ SOP Advance

NEW

### ■ Features

- Mounting area identical to that of the SOP-8 Series
- On-resistance reduction and thin package (1.0 mm max) achieved by employing flat leads and Al straps
- High-current and high-power dissipation achieved by equipping the bottom of the package with an exposed heat sink ( $I_D(\text{DC}) = 40 \text{ A}$ ,  $P_D = 45 \text{ W}$ )



		SOP-8	SOP Advance	Features of SOP Advance
PCB area	(mm <sup>2</sup> )	30	30	Same PCB area as SOP-8
Total height (max)	(mm)	1.9	1.0	Low profile, t = 0.9 mm
rth(ch-a) (t = 10s) (Note 1)	(°C/W)	65.8	44.6	High-power dissipation
rth(ch-c)	(°C/W)	—	2.78	
Current rating	(A)	18	0	High-current guarantee
Package resistance (Note 2)	(mΩ)	1.6	0.5	Al straps

Note 1: When mounted on a glass epoxy board (25.4 mm × 25.4 mm × 1.6 mm)

Note 2: Without chip resistance

### ■ Applications

- Portable devices: DC-DC converters for notebook PCs

### ■ Product Lineup

Part Number	Maximum Ratings		Circuit Configuration	R <sub>DS(ON)</sub> max (mΩ)				Q <sub>g</sub> typ. (nC)	C <sub>iss</sub> typ. (pF)	Remark
	V <sub>DSS</sub> (V)	I <sub>D</sub> (A)		10 V	4.5 V	4.0 V	2.5 V			
TPCA8011-H	20	40	N-ch Single	—	3.5	—	7.5	16	2800	Ultra-high-speed U-MOS III
TPCA8005-H	30	27		9	13	—	—	24	1395	Ultra-high-speed U-MOS III
TPCA8003-H	30	35		6.6	9.5	—	—	25	1465	Ultra-high-speed U-MOS III
TPCA8004-H	30	40		4.6	6.2	—	—	37	2265	Ultra-high-speed U-MOS III
TPCA8014-H	40	30		9	14	—	—	22	1365	Ultra-high-speed U-MOS III
TPCA8015-H	40	35		5.4	7.9	—	—	37	2155	Ultra-high-speed U-MOS III
TPCA8016-H	60	25		21	26	—	—	22	1375	Ultra-high-speed U-MOS III
TPCA8006-H	100	18		67	—	—	—	12	780	π-MOS VII
TPCA8009-H	150	7		350	—	—	—	10	600	π-MOS V MACH II
TPCA8010-H	200	5.5		450	—	—	—	10	600	π-MOS V MACH II
TPCA8008-H	250	4	580	—	—	—	10	600	π-MOS V MACH II	
TPCA8105	-12	-6	P-ch Single	—	33	—	51	18	1600	U-MOS III
TPCA8102	-30	-40		6	—	14	—	109	4600	U-MOS III
TPCA8103	-30	-40		4.2	—	6.8	—	184	7880	U-MOS IV
TPCA8104	-60	-40		16	—	24	—	90	4300	U-MOS III

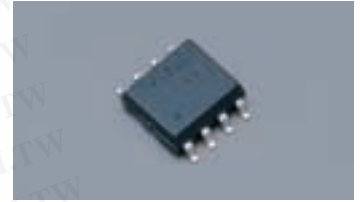


# 4 Power MOSFET Characteristics

## ⑤ SOP-8 Series

### ■ Features

- A line-up of low On-resistance and high-speed switching products  
 Low-resistance Series: U-MOS III / IV  
 High-speed switching Series: high-speed U-MOS III, ultra-high-speed U-MOS III
- On-resistance reduction employing Al straps



### ■ Product Lineup

Part Number	Maximum Ratings		Circuit Configuration	R <sub>DS(ON)</sub> max (mΩ)				Q <sub>g</sub> typ. (nC)	C <sub>iss</sub> typ. (pF)	Remark
	V <sub>DSS</sub> (V)	I <sub>D</sub> (A)		10 V	4.5 V	4 V	2.5 V			
TPC8021-H	30	8	N-ch Single	17	25	—	—	11	640	Ultra-high-speed U-MOS III
TPC8014	30	11		14	22	—	—	39	1860	U-MOS III
TPC8003	30	13		7	—	13	—	90	4380	U-MOS II
TPC8020-H *	30	13		9	13	—	—	23	1395	Ultra-high-speed U-MOS III
TPC8017-H *	30	15		6.6	9.5	—	—	25	1465	Ultra-high-speed U-MOS III
TPC8018-H *	30	18		4.6	6.2	—	—	38	2265	Ultra-high-speed U-MOS III
TPC8022-H	40	7.5		27	35	—	—	11	650	Ultra-high-speed U-MOS III
TPC8012-H	200	1.8		400	—	—	—	11	440	π-MOS V
TPC8208	20	5	N-ch Dual	—	—	50	70	9.5	780	U-MOS III
TPC8207	20	6		—	—	20	30	22	2010	U-MOS III
TPC8209	30	5		40	—	60	—	15	600	U-MOS II
TPC8211	30	5.5		36	44	—	—	25	1250	U-MOS III
TPC8212-H ★	30	6		21	27	—	—	16	840	Ultra-high-speed U-MOS III
TPC8210	30	8		15	20	—	—	75	3530	U-MOS III
TPC8206	60	5		50	—	75	—	17	800	U-MOS II
TPC8109	—30	—10		20	—	30	—	45	2260	U-MOS III
TPC8108	—30	—11	P-ch Single	13	—	23	—	77	3510	U-MOS III
TPC8111	—30	—11		12	—	18	—	107	5710	U-MOS IV
TPC8113	—30	—11		10	—	18	—	107	4500	U-MOS IV
TPC8107	—30	—13		7	—	15	—	130	5880	U-MOS III
TPC8112 *	—30	—13		6	—	14	—	130	5880	U-MOS III
TPC8114 *	—30	—18		4.5	—	6.8	—	180	7480	U-MOS IV
TPC8115	—20	—10		—	10	—	14	115	9130	U-MOS IV
TPC8110	—40	—8		25	—	35	—	48	2180	U-MOS III
TPC8305	—20	—5	P-ch Dual	—	30	—	50	24	2030	U-MOS II
TPC8303	—30	—4.5		35	—	65	—	28	970	U-MOS II
TPC8405	30	6	N-ch/ P-ch	26	33	—	—	27	1240	U-MOS III
	—30	—4.5		33	42	—	—	40	1540	U-MOS IV
TPC8A01	30	6	N-ch/ N-ch+SBD	25	30	—	—	17	940	High-speed U-MOS III
	30	8.5/1		18	21	—	—	49	2295	U-MOS III
TPC8A02-H	30	16/1	N-ch+SBD	5.6	8.5	—	—	34	1970	Ultra-high-speed U-MOS III

\*: Al straps ★: Under development

勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)

## ⑥ TSSOP-8 Series

### ■ Features

- Achieved  $R_{DS(ON)} = 17 \text{ m}\Omega$  for TPCS8204 employing U-MOS III design
- Common-drain types are available:  
Ideal for use in lithium-ion battery protection and reverse current prevention circuits

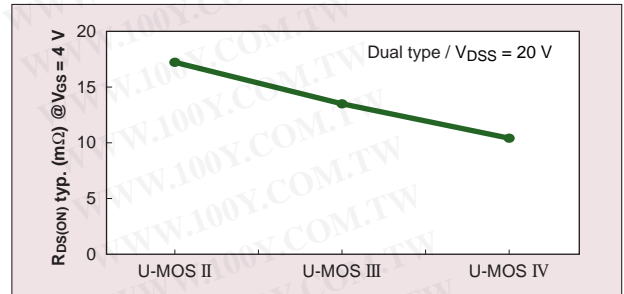


### Low On-resistance

#### ★ N-channel 20-V products (TSSOP-8 / dual type)

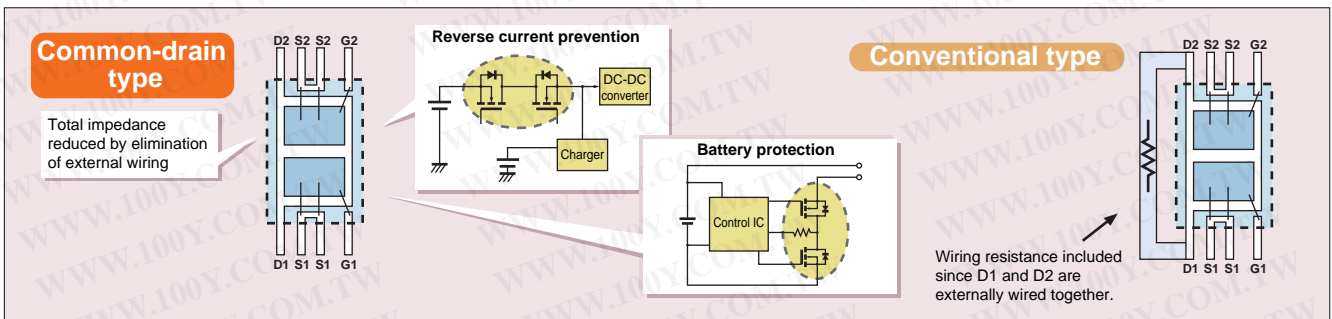
### ■ Features

- Application of third-generation design of ultra-high cell density trench technology ( $18 \text{ Mcell/cm}^2$ )
- On-resistance reduced by 25% compared with that of conventional products (in comparison with Toshiba U-MOS II)



### Common-Drain Type

#### ★ Common-drain series suitable for reverse current prevention in mobile devices and lithium-ion secondary battery protection



### ■ Product Lineup

Part Number	Maximum Ratings		Circuit Configuration	$R_{DS(ON)}$ max (mΩ)				$Q_g$ typ. (nC)	$C_{iss}$ typ. (pF)	Remark
	$V_{DSS}$ (V)	$I_D$ (A)		10 V	4 V	2.5 V	2.0 V			
TPCS8010-H ★	30	8	N-ch Single	11	16	—	—	21	1300	U-MOS III
TPCS8004	200	1.3		800	—	—	—	12	380	$\pi$ -MOS V
TPCS8009-H	150	2.1		350	—	—	—	10	600	$\pi$ -MOS V MACH II
TPCS8007-H	200	1.9		450	—	—	—	10	600	$\pi$ -MOS V MACH II
TPCS8008-H	250	1.7		580	—	—	—	10	600	$\pi$ -MOS V MACH II
TPCS8102	-20	-6	P-ch Single	—	20	38	—	37	2740	U-MOS II
TPCS8101	-30	-6		25	40	—	—	37	1810	U-MOS II
TPCS8104	-30	-11		12	18	—	—	107	5710	U-MOS IV
TPCS8105	-30	-11		13.5	19.5	—	—	107	5710	U-MOS IV
TPCS8205	20	5	N-ch Dual	—	45	60	90	11	760	U-MOS II
TPCS8209	20	5		—	30	40	60	15	1280	U-MOS III
TPCS8210 *	20	5		—	30	40	60	15	1280	U-MOS III
TPCS8204	20	6		—	17	22	35	22	2160	U-MOS III
TPCS8208 *	20	6		—	17	22	35	22	2160	U-MOS III
TPCS8211	20	6		—	24	29	45	20	1590	U-MOS III
TPCS8212 *	20	6		—	24	29	45	20	1590	U-MOS III
TPCS8213 ★	20	6		—	—	13	18	49	3140	U-MOS IV
TPCS8214	30	6		—	—	13.5	18.5	42	3240	U-MOS IV
TPCS8302	-20	-6		P-ch Dual	—	35#	60	95	28.5	1590
TPCS8303	-20	-5	—		21#	30	80	33	2560	U-MOS IV

\*: Drain-common type ★: Under development

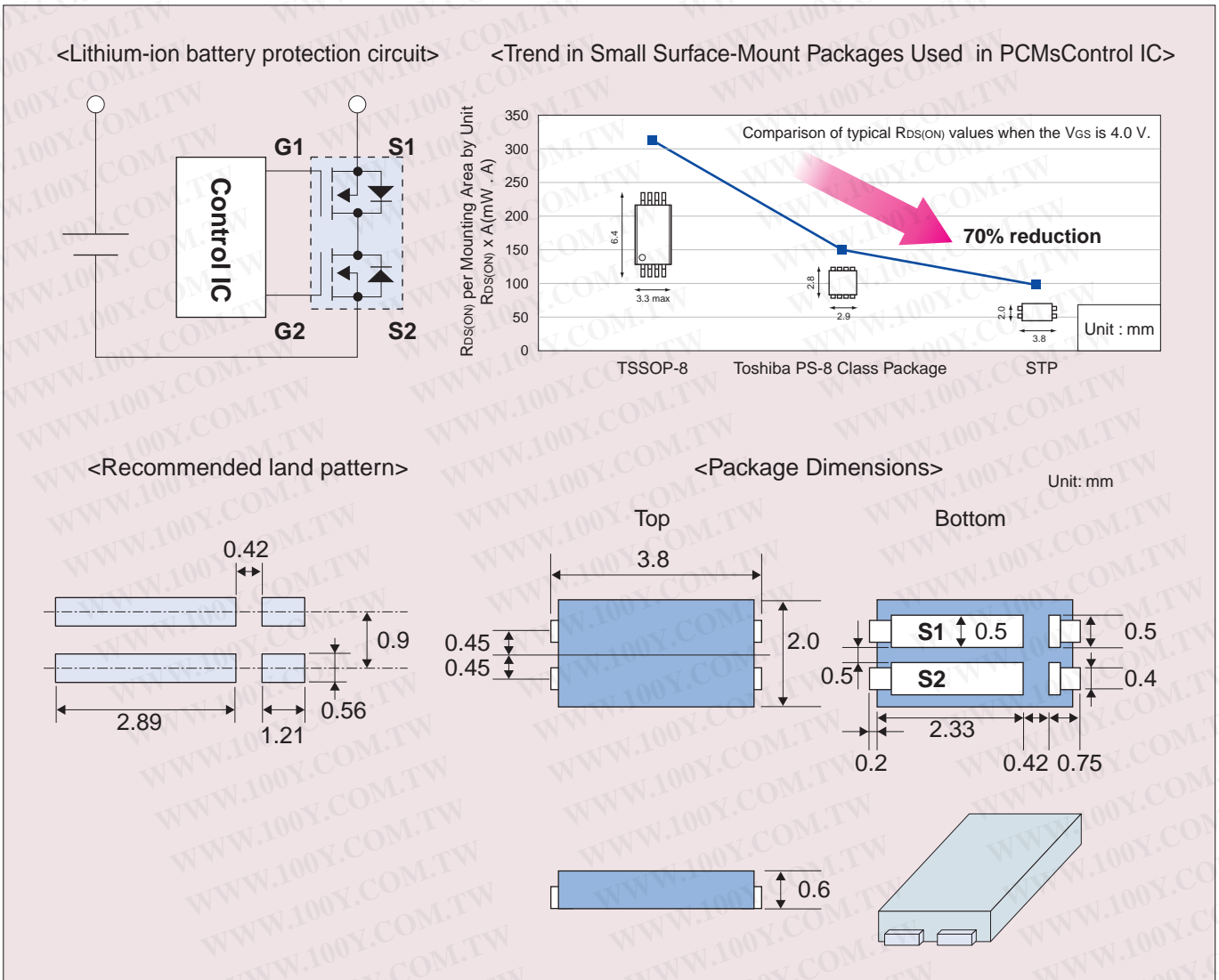


## 2. STP Series

### ■ Features

- Achieves the smallest mounting area per unit On-resistance (a 64% reduction in area ratio compared to TSSOP-8 packages).
- The slimmest package (a 0.3 mm reduction in mounting height compared to TSSOP-8 packages)
- Compatible with an On-resistance range that can be used in overcurrent protection circuits.

### ■ Overview of the Smart Thin Package



### ■ Product Lineup

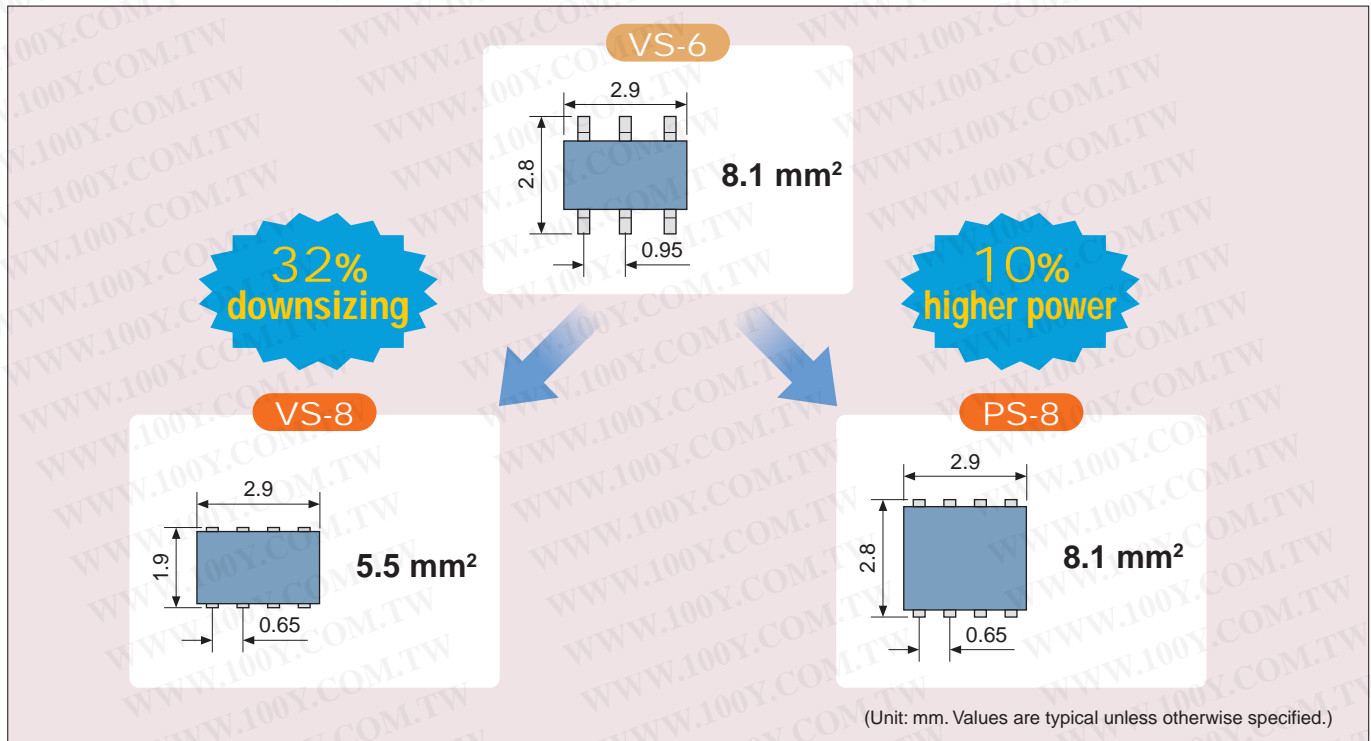
Part Number	$V_{SSS}(V)$	$I_S(A)$	$R_{SS(ON)}$ typ. ( $m\Omega$ )			$Q_g$ typ. (nC)	$C_{iss}$ typ. (pF)	Remark
			$V_{GS} = 2.5 V$	$V_{GS} = 4 V$	$V_{GS} = 4.5 V$			
TPCT4201	20	6	37	27	25.5	21	1740	U-MOS III
TPCT4202	30	6	40	32	30.5	21	1540	

### 3. VS and PS Series

#### ■ Packages

★ The VS Series achieves one of the industries thinnest class packages (height: 0.85 mm max).

- VS-6 Series: Standard size (2.9 mm x 1.6 mm) suitable for general-purpose use.
- VS-8 Series: This high-density flat package offers a 32% reduction in mounting area, a 20% reduction in On-resistance, and a 14% improvement in power dissipation compared with the VS-6.
- PS-8 Series: Achieving the same mounting area as the VS-6 Series, the PS-8 offers improved chip mounting capability and increased mold width using flat leads. This Series also reduces the On-resistance by 70%.



#### ■ Main Applications

- **DC-DC converters** : Notebook PCs, LCDs, PDAs
- **Switches** : Portable phones, notebook PCs, USB Switches
- **Motor drives** : HDDs





# 4 Power MOSFET Characteristics

勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)

## ① VS-6 Series

### ■ Features

- Ultra-low On-resistance achieved employing U-MOS III design
- Zener diode between gate and source for all products
- Thin package, with a height as low as 0.85 mm (max) on a board

### ■ Product Lineup

Part Number	Maximum Ratings		Circuit Configuration	R <sub>DS(ON)</sub> max (mΩ)					Q <sub>g</sub> typ. (nC)	C <sub>iss</sub> typ. (pF)	Marking	Remark
	V <sub>DSS</sub> (V)	I <sub>D</sub> (A)		10 V	4.5 V	2.5 V	2.0 V	1.8 V				
TPC6001	20	6	N-ch Single	—	30	45	60	—	15	755	S2A	U-MOS II
TPC6004	20	6		—	24	32	37	—	17	1400	S2C	U-MOS III
TPC6002	30	6		30	50	—	—	—	13	610	S2B	U-MOS II
TPC6003	30	6		24	32	—	—	—	25	1250	S2D	U-MOS III
TPC6005	30	6		—	28	35	41	—	19	1420	S2E	U-MOS III
TPC6103	-12	-5.5	P-ch Single	—	35	55	—	90	20	1520	S3C	U-MOS III
TPC6105	-20	-2.7		—	110	160	—	300	6	470	S3E	U-MOS III
TPC6107	-20	-4.5		—	55	100	180	—	9.8	680	S3G	U-MOS IV
TPC6104	-20	-5.5		—	40	60	—	120	19	1430	S3D	U-MOS III
TPC6108	-30	-4.5		60	100	—	—	—	13	570	S3H	U-MOS IV
TPC6106	-40	-3.9		75	120	—	—	—	12	460	S3F	U-MOS II
TPC6201	30	2.5		N-ch Dual	95	145	—	—	—	4.7	170	S4A



## ② VS-8 Series

### ■ Features

- Ultra-low On-resistance achieved employing U-MOS III design
- Zener diode between gate and source for all products
- Thin package, with a height as low as 0.85 mm (max) on a board
- 32% mounting area reduction compared to the VS-6 (TSOP-6) Series, employing flat package with high cell density
- PD = 2.5 W @ t = 5 s when the device is mounted on a glass epoxy board

### ■ Product Lineup

Part Number	Maximum Ratings		Circuit Configuration	R <sub>DS(ON)</sub> max (mΩ)					Q <sub>g</sub> typ. (nC)	C <sub>iss</sub> typ. (pF)	Marking	Remark
	V <sub>DSS</sub> (V)	I <sub>D</sub> (A)		10 V	4.5 V	2.5 V	2.0 V	1.8 V				
TPCF8001	30	7	N-ch Single	23	31	—	—	—	25.4	1270	F2A	U-MOS III
TPCF8101	-12	-6	P-ch Single	—	28	40	—	85	18	1600	F3A	U-MOS III
TPCF8103	-20	-2.7		—	110	160	—	300	6	470	F3C	U-MOS III
TPCF8102	-20	-6		—	30	41	—	90	19	1550	F3B	U-MOS III
TPCF8104	-30	-6		28	38	—	—	—	34	1760	F3D	U-MOS IV
TPCF8201	20	3	N-ch Dual	—	49	66	100	—	7.5	590	F4A	U-MOS III
TPCF8301	-20	-2.7	P-ch Dual	—	110	160	—	300	6	470	F5A	U-MOS III
TPCF8302	-20	-3		—	59	95	200	—	11	800	F5B	U-MOS IV
TPCF8303	-20	-3		—	58	87	—	250	11	860	F5C	U-MOS IV
TPCF8304	-30	-3.2		72	105	—	—	—	14	600	F5D	U-MOS IV
TPCF8402	30	4	N-ch+P-ch	48	77	—	—	—	10	470	F6B	U-MOS III
	-30	-3.2		72	105	—	—	—	14	600		U-MOS IV
TPCF8A01	20	3.0	N-ch+SBD	—	49	66	100	—	7.5	590	F7A	U-MOS III
TPCF8B01	-20	-2.7	P-ch+SBD	—	110	160	—	300	6	470	F8A	U-MOS III



## ③ PS-8 Series

### ■ Features

- Mounting area the same as the VS-6 (TSOP-6) Series
- Using flat leads and the latest U-MOS process (U-MOSIV), the VS-6 Series is able to offer a 70% R<sub>DS(ON)</sub> reduction compared to the VS-6 Series.
- Zener diode between gate and source for all products

### ■ Product Lineup

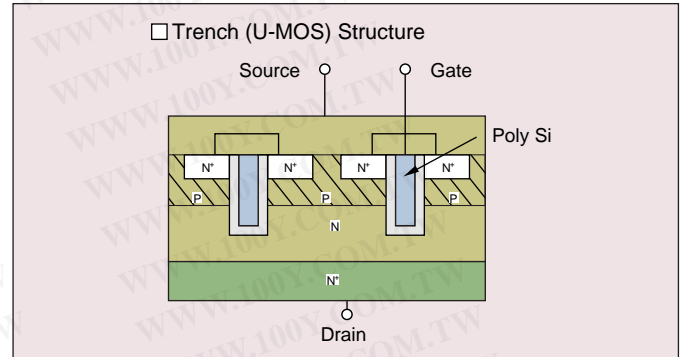
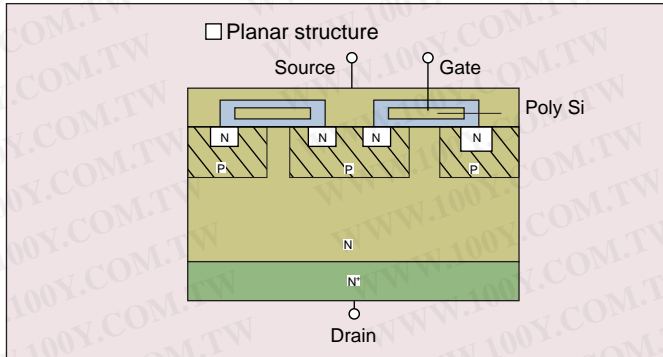
Part Number	Maximum Ratings		Circuit Configuration	R <sub>DS(ON)</sub> max (mΩ)				Q <sub>g</sub> typ. (nC)	C <sub>iss</sub> typ. (pF)	Remark
	V <sub>DSS</sub> (V)	I <sub>D</sub> (A)		10 V	4.5 V	2.5 V	1.8 V			
TPCP8002	20	9.1	N-ch Single	10	13.7	—	—	48	3700	U-MOS IV
TPCP8001-H	30	7.2		16	25	—	—	11	640	Ultra-high-speed U-MOS III
TPCP8201	30	4.2	N-ch Dual	50	77	—	—	10	470	U-MOS III
TPCP8401	20	0.1	N-ch / P-ch Load Switch	—	3*	4	—	—	9.3	π-MOS VI
	-12	-5.5		—	38	58	103	20	1520	U-MOS III
TPCP8402	30	4.2	N-ch + P-ch	50	77	—	—	10	470	U-MOS III
	-30	-3.4		72	105	—	—	14	600	U-MOS IV
TPCP8J01	-32	-6.0	N-ch + NPN	35	49*	—	—	34	1762	U-MOS IV
	50	0.1		—	—	—	—	—	—	NPN



\*: V<sub>GS</sub> = 4 V

## 4. U-MOS III (Trench Type) Series

High-integration is achieved using trench structure technique. Low-voltage driving ( $V_{GS} = 4\text{ V}$ ) is made possible by ultra-low On-resistance.



### ■ Feature

- High density through submicron technology (phase I = 10 M cell / inch<sup>2</sup>, phase II = 30 M cell / inch<sup>2</sup>)
- 60 %  $R_{DS(ON)}$  reduced by per unit area (as compared to the maximum  $R_{DS(ON)}$  of the L<sup>2</sup>- $\pi$ -MOS V)
- Operation by logic level voltage ( $V_{GS} = 4\text{ V}$ ) possible
- Avalanche withstanding capability guarantee and progress in di/dt capability
- Protection zener diode between gate and source

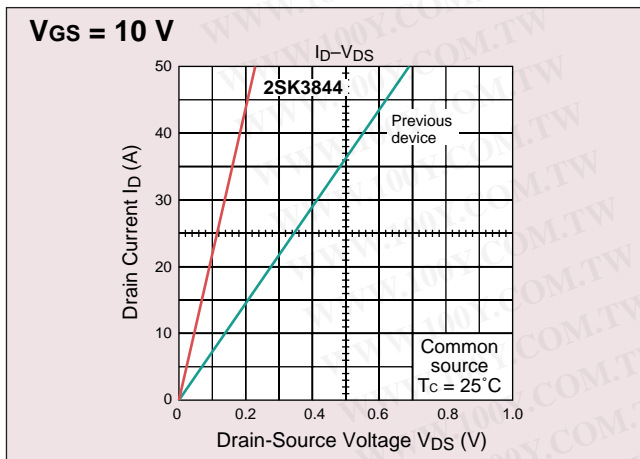
### ■ Product Lineup

Applications	Part Number	Maximum Ratings			Package	$R_{DS(ON)}$			$R_{DS(ON)}$			Qg typ. (nC)
		$V_{DSS}(V)$	$I_D(A)$	$P_D(W)$		$R_{DS(ON)max}(m\Omega)$	$V_{GS}(V)$	$I_D(A)$	$R_{DS(ON)max}(m\Omega)$	$V_{GS}(V)$	$I_D(A)$	
Motor drive solenoids Lamp drivers DC-DC converters	2SJ668	-60	-5	20	PW-Mold	170	-10	-2.5	250	-4	-2.5	15
	2SJ669	-60	-5	1.2	TPS	170	-10	-2.5	250	-4	-2.5	15
	TPCA8104	-60	-40	40	SOP Advance	16	-10	-20	24	-4	-20	90
	2SK3846	40	26	25	TO-220NIS	18	10	13	28	4.5	13	40
	2SK3847	40	32	30	TO-220SM	18	10	16	28	4.5	16	40
	2SK3843	40	75	125	TFP	3.5	10	38	8.0	4.5	38	210
	2SK3662	60	35	35	TO-220NIS	12.5	10	18	19	4	18	91
	2SK3842	60	75	125	TFP	5.8	10	38	—	—	—	196
	2SK3844	60	45	45	TO-220NIS	5.8	10	23	—	—	—	196
2SK3845	60	70	125	TO-3P(N)	5.8	10	23	—	—	—	196	

### ■ Features of U-MOS III

[1] 60 %  $R_{DS(ON)}$  reduced by per unit area

- $R_{DS(ON)} = 5.8\text{ m}$  (max) MOSFET housed in TO-220 package



勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)



## 5. $\pi$ -MOS VII Series

By employing submicron technology and reducing gate charge, this latest series realizes extremely high speed and low  $R_{DS(ON)}$ .

### ■ Features

- Low  $R_{DS(ON)}$
- Total gate charge (Qg) reduction
- High-speed switching
- High avalanche withstanding capability

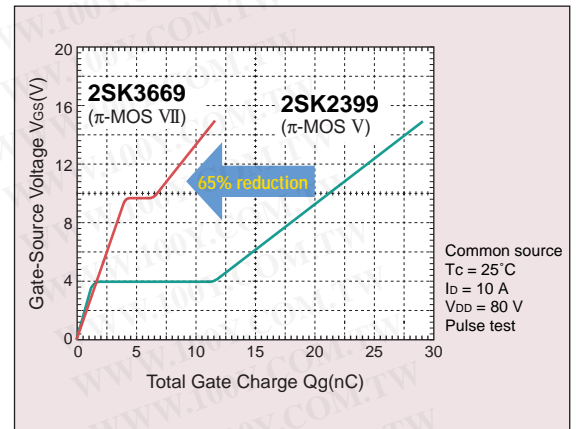
### ■ Applications

- DC-DC converters
- Motor drives

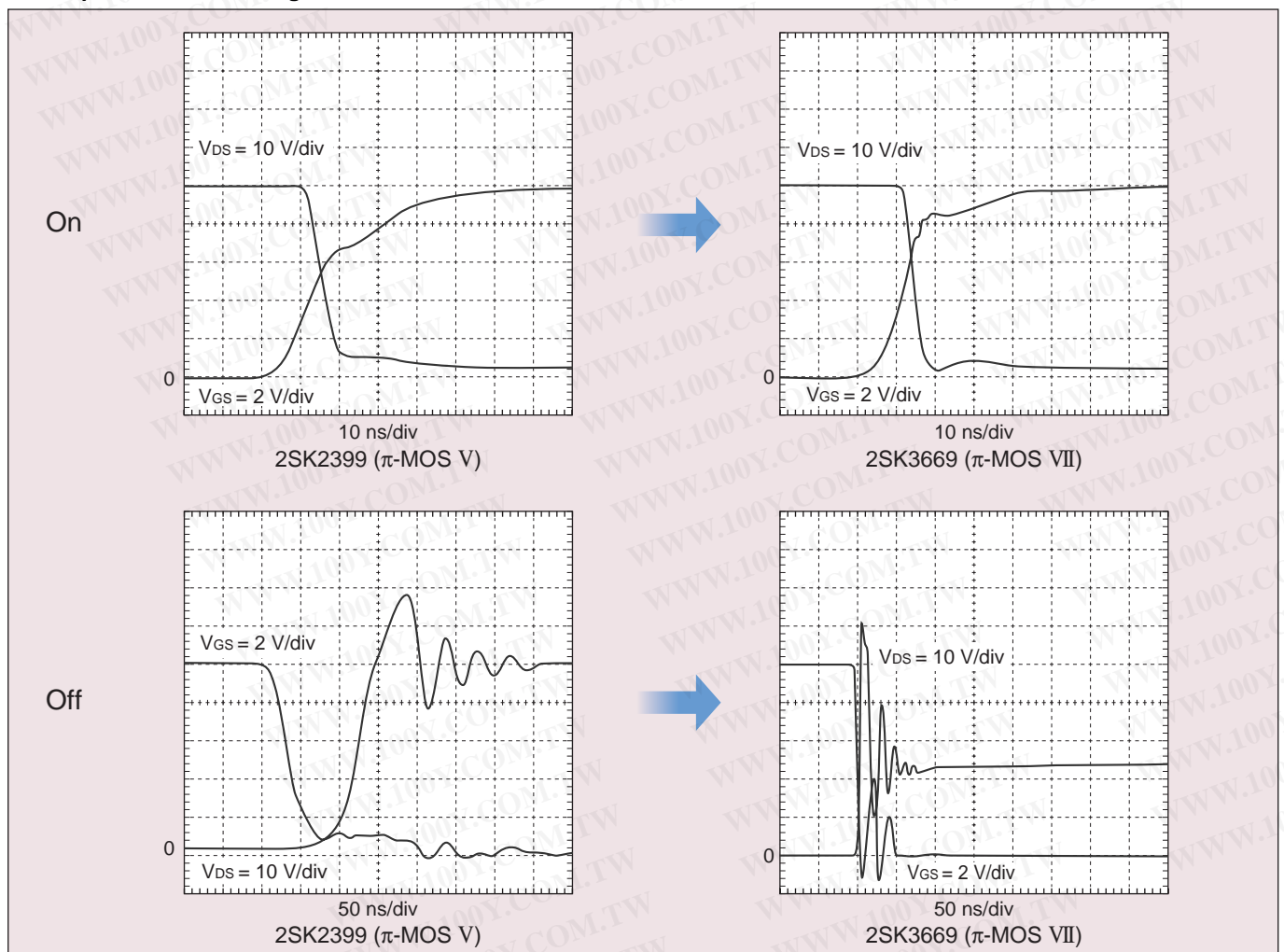
### ■ Product Lineup

Part Number	Maximum Ratings		$R_{DS(ON)}$ max (m $\Omega$ )	$C_{iss}$ typ. (pF)	$C_{rss}$ typ. (pF)	Qg typ. (nC)	Qsw typ. (nC)	Package
	$V_{DSS}$ (V)	$I_D$ (A)						
2SK3669	100	10	125	480	9	8.0	4.2	PW-Mold
TPCA8006-H	100	18	67	780	17	12	6.9	SOP Advance

### ■ Dynamic Input / Output Characteristics



### ■ Comparison of Switching Characteristics with $\pi$ -MOS V



## 6. High-speed $\pi$ -MOS V Series ( $V_{DSS} = 450$ to $600$ V)

To foster the development of high-efficiency portable equipment, Toshiba has developed two series of high-speed Power MOSFET devices: a High-Speed Switching Series for AC adapters and switching power supplies; and a High-Speed Diode Series for motor controllers and inverter circuits.

- The MACH Series: Achieves a higher switching speed than the existing  $\pi$ -MOS V Series, which is currently well-established in the marketplace (toff-switching is 38% faster).
- The High-Speed Diode Series: Achieves a higher parasitic diode speed by using lifetime control ( $t_{rr} \doteq 100$  ns)

### ■ Product Lineup

- MACH Series

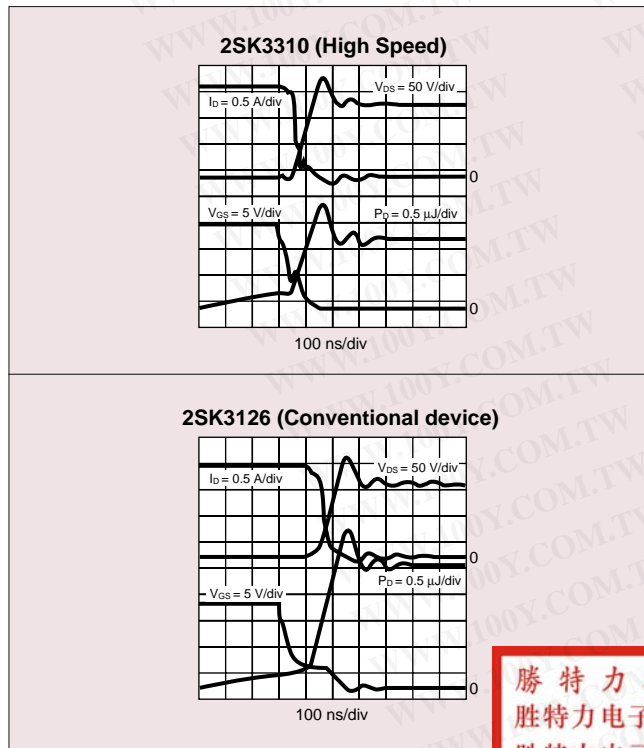
Applications	Part Numbers	Maximum Ratings			Package	$R_{DS(ON)}$ max ( $\Omega$ )	$V_{GS}$ (V)	$I_D$ (A)	$Q_g$ typ. (nC)	Equivalent Conventional Device
		$V_{DSS}$ (V)	$I_D$ (A)	$P_D$ (W)						
AC adapters Switching power supplies	2SK3310	450	10	40	TO-220NIS	0.65	10	5	23	2SK3126
	2SK3309	450	10	65	TO-220FL/SM	0.65	10	5	23	—
	2SK3403	450	13	100	TO-220FL/SM	0.4	10	6	34	—
	2SK3312	600	6	65	TO-220FL/SM	1.25	10	3	25	2SK2777
	2SK3437	600	10	80	TO-220FL/SM	1	10	5	28	2SK2996
	2SK3399	600	10	100	TO-220FL/SM	0.75	10	5	35	2SK2866

- High-Speed Diode Series (HSD Series)

Applications	Part Numbers	Maximum Ratings			Package	$R_{DS(ON)}$ max ( $\Omega$ )	$V_{GS}$ (V)	$I_D$ (A)	$t_{rr}$ typ. (ns)	Equivalent Conventional Device
		$V_{DSS}$ (V)	$I_D$ (A)	$P_D$ (W)						
Motor Control Inverter Switching power supplies	2SK3316	500	5	35	TO-220NIS	1.8	10	2.5	60	2SK2662
	2SK3868	500	5	35	TO-220(SIS)	1.7	10	2.5	150	2SK3563
	2SK3313	500	12	40	TO-220NIS	0.62	10	6	90	2SK2842
	2SK3314	500	15	150	TO-3P(N)	0.49	10	7	105	2SK2698
	2SK3131	500	50	250	TO-3P(L)	0.11	10	25	105	2SK3132
	2SK3130	600	6	40	TO-220NIS	1.55	10	3	85	2SK2545

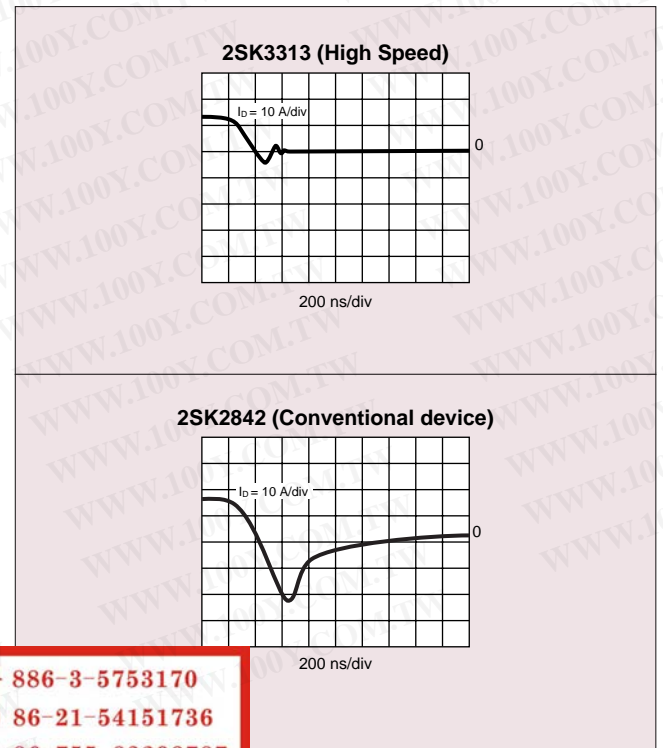
### ■ Characteristics of MACH Series

Switching loss reduced by 40%



### ■ Characteristics of High-speed diode Series

Faster parasitic diode



勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)

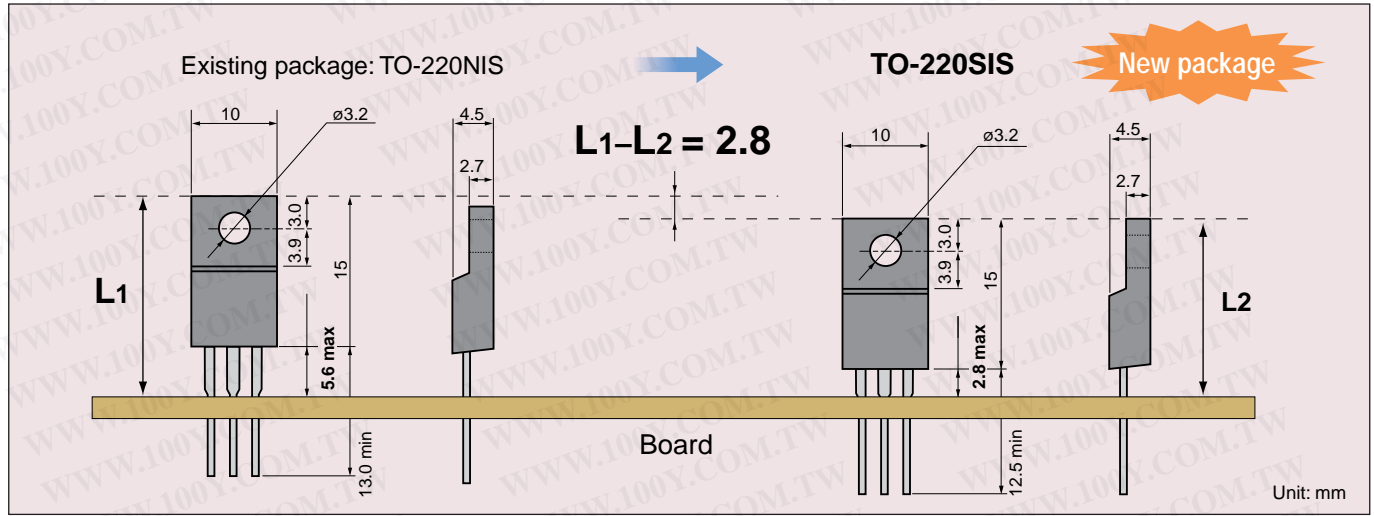


## 7. TO-220SIS / TO-3PN $\pi$ -MOS IV / VI Series

### ■ TO-220SIS: Features

- The shorter the standoff height achieved, the lower the height of the product on a PCB will be; in this case, the mounting height is reduced by approximately 2.8 mm compared with the existing package, the TO-220NIS. This helps make end-products even slimmer and more compact.
- $Q_g$  characteristics are reduced through optimization of chip design. Also, the switching characteristics are 10% faster than those of existing products.
- Improved heat dissipation through the use of a Cu connector

### ■ TO-220SIS: Package Dimensions

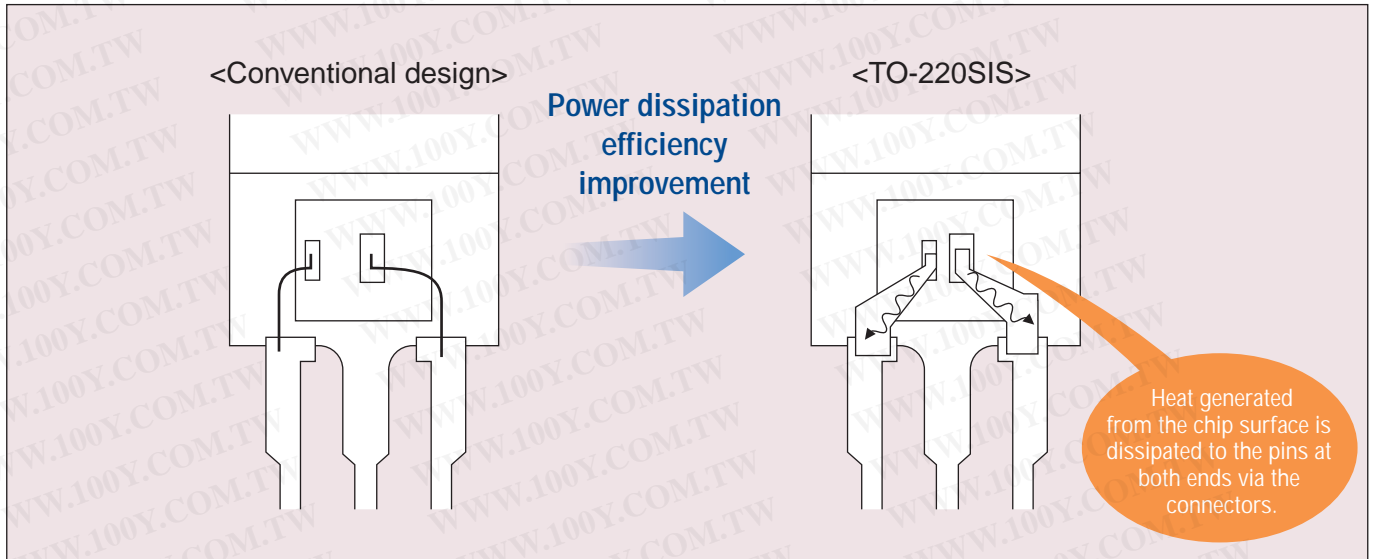


### ■ Product Lineup

Series	New Products	Maximum Ratings		$R_{DS(ON)}$ max ( $\Omega$ )	$Q_g$ typ. (nC)	$C_{iss}$ typ. (pF)	Previous Products	Package
		$V_{DSS}$ (V)	$I_D$ (A)	$V_{GS} = 10$ V				
$\pi$ -MOS VI	2SK3757	450	2	2.45	9	330	2SK3543	TO-220SIS
	2SK3766		2	2.45	8	270	2SK3543	TO-220SIS
	2SK3869		10	0.68	28	1050	2SK3407	TO-220SIS
	2SK3935		17	0.25	62	3100	—	TO-220SIS
	2SK3904	19	0.26	62	3100	—	TO-3PN	
	2SK3563	500	5	1.5	16	550	2SK2662	TO-220SIS
	2SK3868 †		5	1.7	16	550	2SK3316	TO-220SIS
	2SK3561		8	0.85	28	1050	2SK2543	TO-220SIS
	2SK3568		12	0.52	42	1500	2SK2842	TO-220SIS
	2SK3934		15	0.30	62	3100	—	TO-220SIS
	2SK3905		17	0.31	62	3100	—	TO-3PN
	2SK3907	23	0.23	60	4250	—	TO-3PN	
	2SK3767	600	2	4.5	9	320	2SK3067	TO-220SIS
	2SK3567		3.5	2.2	17	550	2SK2750	TO-220SIS
	2SK3562		6	1.25	28	1050	2SK2545	TO-220SIS
	2SK3667		7.5	1.0	33	1300	2SK2996	TO-220SIS
	2SK3569		10	0.75	42	1500	2SK2843	TO-220SIS
	2SK3797		13	0.43	62	3150	—	TO-220SIS
2SK3903	14		0.44	62	3100	—	TO-3PN	
2SK3911	20		0.32	60	4250	—	TO-3PN	
$\pi$ -MOS IV	2SK3663	800	7	1.7	35	1500	2SK2746	TO-3PN
	2SK3566		2.5	6.4	12	470	2SK2718	TO-220SIS
	2SK3564	900	3	4.3	17	700	2SK2700	TO-220SIS
	2SK3798		4	3.5	26	800	—	TO-220SIS
	2SK3565		5	2.5	28	1150	2SK2717	TO-220SIS
	2SK3742		5	2.5	25	1150	2SK2717	TO-220SIS
	2SK3799		8	1.3	60	2200	—	TO-220SIS
	2SK3770		9	2.5	28	1150	—	TO-3PN
	2SK3473		9	1.6	38	1450	—	TO-3PN
	2SK3878		9	1.3	60	2200	—	TO-3PN

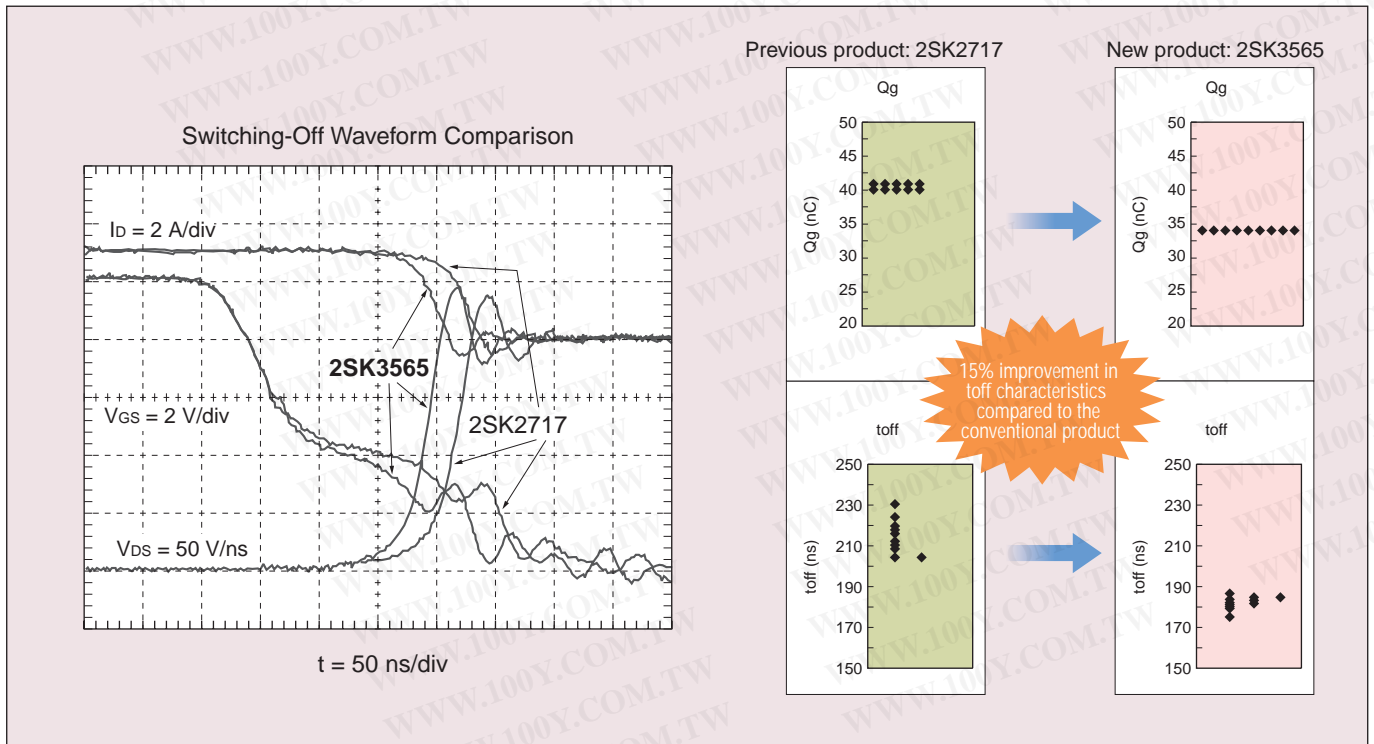
†: High-speed diode type

■ Improved Heat Dissipation



■ Comparison of Electrical Characteristics between Previous and New Products

	Previous Product 2SK2717	New Products 2SK3565
$V_{DSS}(V)$	900	<b>900</b>
$I_D(A)$	5	<b>5</b>
$R_{DS(ON)}(\Omega)$	2.5 (max)	<b>2.5 (max)</b>
$Q_g(nC)$	45 (typ.)	<b>28 (typ.)</b>
$t_{off}(ns)$	200 (typ.)	<b>170 (typ.)</b>





## 8. $\pi$ -MOS Series Lineup

### ■ 2.5-V Drive $\pi$ -MOS V Series ( $V_{DSS} = 16$ V)

Part Number	Maximum Ratings			Package	$R_{DS(ON)}$ max ( $\Omega$ )	$V_{GS}$ (V)	$I_D$ (A)	$R_{DS(ON)}$ max ( $\Omega$ )	$V_{GS}$ (V)	$I_D$ (A)	Qg typ. (nC)
	$V_{DSS}$ (V)	$I_D$ (A)	$P_D$ (W)								
2SJ465	-16	-2	0.5	PW-Mini	0.71	-4	-1.0	1.0	-2.5	-0.5	5
2SJ439	-16	-5	20	PW-Mold	0.20	-4	-2.5	0.28	-2.5	-2.5	24
2SK2549	16	2	0.5	PW-Mini	0.29	4	1.0	0.38	2.5	0.5	5
2SK2493	16	5	20	PW-Mold	0.10	4	2.5	0.12	2.5	2.5	23

### ■ L<sup>2</sup>- $\pi$ -MOS V Series ( $V_{DSS} = 30$ V to 100 V)

Part Number	$V_{DSS}$ (V)	$I_D$ (A)	$P_D$ (W)	Package	$R_{DS(ON)}$ ( $\Omega$ )				$R_{DS(ON)}$ ( $\Omega$ )				Qg typ. (nC)
					typ.	max	$V_{GS}$ (V)	$I_D$ (A)	typ.	max	$V_{GS}$ (V)	$I_D$ (A)	
2SK2964	30	2	1.5	PW-Mini	0.13	0.18	10	1	0.18	0.25	4	1	5.8
2SK2844	30	35	60	TO-220AB	0.016	0.02	10	18	0.026	0.035	4	18	40
2SK3089	30	40	50	TO-220FL/SM	0.025	0.03	10	20	—	—	—	—	23
2SK3090	30	45	60	TO-220FL/SM	0.016	0.02	10	25	—	—	—	—	39
2SK3127	30	45	65	TO-220FL/SM	0.0095	0.012	10	25	—	—	—	—	66
2SK3128	30	60	150	TO-3P(N)	0.0095	0.012	10	30	—	—	—	—	66
2SK3125	30	70	150	TO-3P(SM)	0.0053	0.007	10	30	—	—	—	—	130
2SK2989	50	5	0.9	LSTM	0.12	0.15	10	2.5	0.24	0.33	4	1.3	6.5
2SK2614	50	20	40	DP	0.032	0.046	10	10	0.055	0.08	4	5	25
2SK2507	50	25	30	TO-220NIS	0.034	0.046	10	12	0.058	0.08	4	6	25
2SK2886	50	45	40	TO-220NIS	0.014	0.02	10	25	0.027	0.036	4	25	66
2SK3051	50	45	40	TO-220FL/SM	0.024	0.03	10	25	—	—	—	—	36
2SK2744	50	45	125	TO-3P(N)	0.015	0.02	10	25	—	—	—	—	68
2SK2550	50	45	100	TO-3P(N)	0.024	0.030	10	25	—	—	—	—	36
2SK2551	50	50	150	TO-3P(N)	0.0072	0.011	10	25	—	—	—	—	130
2SK2745	50	50	150	TO-3P(N)	0.007	0.0095	10	25	0.011	0.016	4	25	130
2SK2615	60	2	0.5	PW-Mini	0.23	0.3	10	1	0.33	0.44	4	1	6
2SK2961	60	2	0.9	LSTM	0.2	0.27	10	1	0.26	0.38	4	1	5.8
2SK2229	60	5	1.2	TPS	0.12	0.16	10	2.5	0.2	0.3	4	1.3	12
2SK2231	60	5	20	PW-Mold	0.12	0.16	10	2.5	0.2	0.3	4	1.3	12
2SK2782	60	20	40	DP	0.039	0.055	10	10	0.06	0.090	4	5	25
2SK2232	60	25	35	TO-220NIS	0.036	0.046	10	12	0.057	0.08	4	12	38
2SK2311	60	25	40	TO-220FL/SM	0.036	0.046	10	12	0.057	0.08	4	12	38
2SK2385	60	36	40	TO-220NIS	0.022	0.03	10	18	0.04	0.055	4	15	60
2SK2233	60	45	100	TO-3P(N)	0.022	0.03	10	25	0.04	0.055	4	15	60
2SK2266	60	45	65	TO-220FL/SM	0.022	0.03	10	25	0.04	0.055	4	15	60
2SK2312	60	45	45	TO-220NIS	0.013	0.017	10	25	0.019	0.025	4	25	110
2SK2376	60	45	100	TO-220FL/SM	0.013	0.017	10	25	0.019	0.025	4	25	110
2SK2398	60	45	100	TO-3P(N)	0.022	0.03	10	25	—	—	—	—	60
2SK2173	60	50	125	TO-3P(N)	0.013	0.017	10	25	0.019	0.025	4	25	110
2SK2445	60	50	125	TO-3P(N)	0.014	0.018	10	25	—	—	—	—	110
2SK2267	60	60	150	TO-3P(L)	0.008	0.011	10	30	0.012	0.015	4	30	170
2SK2313	60	60	150	TO-3P(N)	0.008	0.011	10	30	0.012	0.015	4	30	170
2SK2962	100	1	0.9	LSTM	0.5	0.7	10	0.5	0.65	0.95	4	0.5	6.3
2SK2963	100	1	0.5	PW-Mini	0.5	0.7	10	0.5	0.65	0.95	4	0.5	6.3
2SK2200	100	3	1.3	TPS	0.28	0.35	10	2	0.36	0.45	4	2	13.5
2SK2201	100	3	20	PW-Mold	0.28	0.35	10	2	0.36	0.45	4	2	13.5
2SK2399	100	5	20	PW-Mold	0.17	0.23	10	2.5	0.22	0.3	4	2.5	22
2SK2400	100	5	1.2	TPS	0.17	0.23	10	2.5	0.22	0.3	4	2.5	22
2SK2391	100	20	35	TO-220NIS	0.068	0.085	10	10	0.09	0.13	4	10	50
2SK2314	100	27	75	TO-220AB	0.066	0.085	10	15	0.09	0.13	4	15	50
2SK2789	100	27	60	TO-220FL/SM	0.066	0.085	10	15	0.09	0.13	4	15	50

■ L<sup>2</sup>-π-MOS V Series (V<sub>DSS</sub> = 30 V to 100 V) (continued)

Part Number	V <sub>DSS</sub> (V)	I <sub>D</sub> (A)	P <sub>D</sub> (W)	Package	R <sub>DS(ON)</sub> (Ω)				R <sub>DS(ON)</sub> (Ω)				Q <sub>g</sub> typ. (nC)
					typ.	max	V <sub>GS</sub> (V)	I <sub>D</sub> (A)	typ.	max	V <sub>GS</sub> (V)	I <sub>D</sub> (A)	
2SJ511	-30	-2	1.5	PW-Mini	0.32	0.45	-10	-1	0.55	0.76	-4	-1	5.5
2SJ525	-30	-5	1.3	TPS	0.1	0.12	-10	-2.5	0.17	0.2	-4	-2.5	27
2SJ537	-50	-5	0.9	LSTM	0.16	0.19	-10	-2.5	0.27	0.34	-4	-1.3	18
2SJ360	-60	-1	0.5	PW-Mini	0.55	0.73	-10	-0.5	0.86	1.2	-4	-0.5	6.5
2SJ507	-60	-1	0.9	LSTM	0.5	0.7	-10	-0.5	0.72	1.0	-4	-0.5	5.6
2SJ377	-60	-5	20	PW-Mold	0.16	0.19	-10	-2.5	0.24	0.28	-4	-2.5	22
2SJ438	-60	-5	25	TO-220NIS	0.16	0.19	-10	-2.5	0.24	0.28	-4	-2.5	22
2SJ378	-60	-5	1.2	TPS	0.16	0.19	-10	-2.5	0.24	0.28	-4	-2.5	22
2SJ349	-60	-20	45	TO-220NIS	0.033	0.045	-10	-10	0.05	0.09	-4	-10	90
2SJ401	-60	-20	100	TO-220FL/SM	0.033	0.045	-10	-10	0.05	0.09	-4	-10	90
2SJ334	-60	-30	45	TO-220NIS	0.029	0.038	-10	-15	0.046	0.06	-4	-15	110
2SJ402	-60	-30	100	TO-220FL/SM	0.029	0.038	-10	-15	0.046	0.06	-4	-15	110
2SJ508	-100	-1	1.5	PW-Mini	1.34	1.9	-10	-0.5	1.68	2.5	-4	-0.5	6.3
2SJ509	-100	-1	0.9	LSTM	1.34	1.9	-10	-0.5	1.68	2.5	-4	-0.5	6.3
2SJ380	-100	-12	35	TO-220NIS	0.15	0.21	-10	-6	0.25	0.32	-4	-6	48
2SJ412	-100	-16	60	TO-220FL/SM	0.15	0.21	-10	-6	0.25	0.32	-4	-6	48
2SJ619	-100	-16	75	TFP	0.15	0.21	-10	-6	0.25	0.32	-4	-6	48
2SJ620	-100	-18	25	TFP	0.063	0.09	-10	-9	0.085	0.12	-4	-9	140
2SJ464	-100	-18	45	TO-220NIS	0.064	0.09	-10	-9	0.085	0.12	-4	-9	140

勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)



# 4 Power MOSFET Characteristics

## ■ $\pi$ -MOS V Series ( $V_{DSS} = 150\text{ V to }250\text{ V}$ )

Applications	Part Number	Maximum Ratings			Package	$R_{DS(ON)}$				Qg typ. (nC)
		$V_{DSS}$ (V)	$I_D$ (A)	$P_D$ (W)		$(\Omega)$		$V_{GS}$ (V)	$I_D$ (A)	
						typ.	max			
DC-DC converters Monitors Motor controllers	2SJ618	-180	-10	130	TO-3P(N)	-	0.37	-10	-5	18
	2SJ407	-200	-5	30	TO-220NIS	0.8	1.0	-10	-2.5	20
	2SJ567		-2.5	20	PW-Mold	1.6	2.0	-10	-1.5	10
	2SJ610	-250	-2	20	PW-Mold	1.85	2.55	-10	-1.0	24
	2SJ512		-5	30	TO-220NIS	1.0	1.25	-10	-2.5	22
	2SJ516		-6.5	35	TO-220NIS	0.6	0.8	-10	-3	29
	2SK3205	150	5	20	PW-Mold	0.36	0.5	10	2.5	12
	2SK2882		18	45	TO-220NIS	0.08	0.12	10	9	57
	2SK3497	180	10	130	TO-3P(N)	-	0.15	10	5	-
	2SK2992	200	1	1.5	PW-Mini	2.2	3.5	10	0.5	3
	2SK2835		5	1.3	TPS	0.56	0.8	10	2.5	10
	2SK2381		5	25	TO-220NIS	0.56	0.8	10	2.5	10
	2SK2920		5	20	PW-Mold	0.56	0.8	10	2.5	10
	2SK2350		8.5	30	TO-220NIS	0.26	0.4	10	5	17
	2SK2965		11	35	TO-220NIS	0.15	0.26	10	5.5	30
	2SK2382		15	45	TO-220NIS	0.13	0.18	10	10	40
	2SK2401		15	75	TO-220FL/SM	0.13	0.18	10	10	40
	2SK3176		30	150	TO-3P(N)	0.038	0.052	10	15	125
	2SK3462		3	20	PW-Mold	1.2	1.7	10	1.5	12
	2SK3342		4.5	20	PW-Mold	0.8	1.0	10	2.5	10
	2SK2417		7.5	30	TO-220NIS	0.42	0.5	10	3.5	20
	2SK2914	7.5	20	TO-220AB	0.42	0.5	10	3.5	20	
	2SK2508	13	45	TO-220NIS	0.18	0.25	10	6.5	40	
	2SK2598	13	60	TO-220FL/SM	0.18	0.25	10	6.5	40	
	2SK2993	20	100	TO-220FL/SM	0.082	0.105	10	10	100	
	2SK2967	30	150	TO-3P(N)	0.048	0.068	10	15	132	
	2SK2995	30	90	TO-3P(N)IS	0.048	0.068	10	15	132	

勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)

■  $\pi$ -MOS V Series ( $V_{DSS} = 400\text{ V to }700\text{ V}$ )

Applications	Part Number	Maximum Ratings			Package	$R_{DS(ON)}$				Qg typ. (nC)
		$V_{DSS}$ (V)	$I_D$ (A)	$P_D$ (W)		$(\Omega)$		$V_{GS}$ (V)	$I_D$ (A)	
						typ.	max			
AC 115 V switching power supplies Ballast inverters Motor controllers	2SK2838	400	5.5	40	TO-220FL/SM	0.84	1.2	10	3	17
	2SK2952	400	8.5	40	TO-220NIS	0.4	0.55	10	5	34
	2SK2841	400	10	80	TO-220AB	0.4	0.55	10	5	34
	2SK2949	400	10	80	TO-220FL/SM	0.4	0.55	10	5	34
	2SK3499	400	10	80	TFP	0.4	0.55	10	5	34
	2SK3472	450	1	20	PW-Mold	4.0	4.6	10	0.5	5
	2SK3126	450	10	40	TO-220NIS	0.48	0.65	10	5	35
	2SK2998	500	0.5	0.9	LSTM	10	18	10	0.25	3.8
	2SK3302	500	0.5	1.3	TPS	10	18	10	0.25	3.8
	2SK3471	500	0.5	0.5	PW-Mini	10	18	10	0.25	3.8
	2SK2599	500	2	1.3	TPS	2.9	3.2	10	1	9
	2SK2862	500	3	25	TO-220NIS	2.9	3.2	10	1	9
	2SK2661	500	5	75	TO-220AB	1.35	1.5	10	2.5	17
	2SK2662	500	5	35	TO-220NIS	1.35	1.5	10	2.5	17
	2SK2991	500	5	50	TO-220FL/SM	1.35	1.5	10	2.5	17
	2SK3466	500	5	50	TO-220FL/SM	1.35	1.5	10	2.5	17
	2SK2542	500	8	80	TO-220AB	0.75	0.85	10	4	30
	2SK2543	500	8	40	TO-220NIS	0.75	0.85	10	4	30
	2SK2776	500	8	65	TO-220FL/SM	0.75	0.85	10	4	30
	2SK2601	500	10	125	TO-3P(N)	0.56	1.0	10	5	30
	2SK2842	500	12	40	TO-220NIS	0.4	0.52	10	6	45
	2SK3068	500	12	100	TO-220FL/SM	0.4	0.52	10	6	45
	2SK3389	500	12	100	TFP	0.4	0.52	10	6	45
	2SK2916	500	14	80	TO-3P(N)IS	0.35	0.4	10	7	58
	2SK2698	500	15	150	TO-3P(N)	0.35	0.4	10	7	58
	2SK2917	500	18	90	TO-3P(N)IS	0.21	0.27	10	10	80
	2SK2837	500	20	150	TO-3P(N)	0.21	0.27	10	10	80
	2SK3117	500	20	150	TO-3P(SM)	0.21	0.27	10	10	80
	2SK3132	500	50	250	TO-3P(L)	0.07	0.095	10	25	280
	2SK3371	600	1	20	PW-Mold	6.4	9.0	10	0.5	9
	2SK2846	600	2	1.3	TPS	4.2	5.0	10	1	9
	2SK2865	600	2	20	PW-Mold	4.2	5.0	10	1	9
	2SK3067	600	2	25	TO-220NIS	4.2	5.0	10	1	9
	2SK2750	600	3.5	35	TO-220NIS	1.7	2.2	10	1.8	20
	2SK3085	600	3.5	75	TO-220AB	1.7	2.2	10	1.8	20
	2SK2544	600	6	80	TO-220AB	0.9	1.25	10	3	30
	2SK2545	600	6	40	TO-220NIS	0.9	1.25	10	3	30
	2SK2777	600	6	65	TO-220FL/SM	0.9	1.25	10	3	30
	2SK2602	600	6	125	TO-3P(N)	0.9	1.25	10	3	30
	2SK3312	600	6	65	TO-220FL/SM	0.95	1.25	10	3	22
	2SK2996	600	10	45	TO-220NIS	0.74	1.0	10	5	38
	2SK2843	600	10	45	TO-220NIS	0.54	0.75	10	5	45
2SK2866	600	10	125	TO-220AB	0.54	0.75	10	5	45	
2SK2889	600	10	100	TO-220FL/SM	0.54	0.75	10	5	45	
2SK2699	600	12	150	TO-3P(N)	0.5	0.65	10	6	58	
2SK2953	600	15	90	TO-3P(N)IS	0.31	0.4	10	8	80	
2SK2915	600	16	150	TO-3P(N)	0.31	0.4	10	8	80	
2SK3265	700	10	45	TO-220NIS	0.72	1.0	10	5	53	
2SK3453	700	10	80	TO-3P(N)IS	0.72	1.0	10	5	53	

勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)



# 4 Power MOSFET Characteristics

## ■ $\pi$ -MOS III Series ( $V_{DSS} = 800\text{ V to }1000\text{ V}$ )

Part Number	Maximum Ratings			Package	$R_{DS(ON)}$ ( $\Omega$ )				Qg typ. (nC)
	$V_{DSS}$ (V)	$I_D$ (A)	$P_D$ (W)		Typ.	Max	$V_{GS}$ (V)	$I_D$ (A)	
2SK2603	800	3	100	TO-220AB	3.0	3.6	10	1.5	25
2SK2883	800	3	75	TO-220FL/SM	3.0	3.6	10	15	25
2SK2605	800	5	45	TO-220NIS	1.9	2.2	10	3.0	34
2SK2884	800	5	100	TO-220FL/SM	1.9	2.2	10	3.0	34
2SK2604	800	5	125	TO-3P(N)	1.9	2.2	10	3.0	34
2SK2746	800	7	150	TO-3P(N)	1.3	1.7	10	3.5	55
2SK2606	800	8	85	TO-3P(N)IS	1.0	1.2	10	4.0	68
2SK2607	800	9	150	TO-3P(N)	1.0	1.2	10	4.0	68
2SK3301	900	1	20	PW-Mold	15	20	10	0.5	6
2SK2845	900	1	40	DP	8.0	9.0	10	0.5	15
2SK2733	900	1	60	TO-220AB	8.0	9.0	10	0.5	15
2SK2718	900	2.5	40	TO-220NIS	5.6	6.4	10	1.5	21
2SK2608	900	3	100	TO-220AB	3.73	4.3	10	1.5	25
2SK2700	900	3	40	TO-220NIS	3.7	4.3	10	1.5	25
2SK2719	900	3	125	TO-3P(N)	3.7	4.3	10	1.5	25
2SK2610	900	5	150	TO-3P(N)	2.3	2.5	10	3.0	45
2SK2717	900	5	45	TO-220NIS	2.3	2.5	10	3.0	45
2SK3700	900	5	45	TO-220NIS	2.0	2.5	10	2.5	28
2SK2749	900	7	150	TO-3P(N)	1.1	1.4	10	3.5	55
2SK2847	900	8	85	TO-3P(N)IS	1.05	1.25	10	4.0	58
2SK3017	900	8.5	90	TO-3P(N)IS	1.2	1.4	10	4.0	70
2SK2611	900	9	150	TO-3P(N)	1.1	1.4	10	4.0	58
2SK2613	1000	8	150	TO-3P(N)	1.4	1.7	10	8.0	65

勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)

# 5 Power Modules

Power modules enable high-density mounting and are the simplest of all multi-chip devices in structural terms. Use of these modules enables the construction of compact power supplies for electronic equipment.

## ■ Product Lineup

### • S-10M Series (4-in-1)

Polarity and Circuit Configuration	Part Number	Maximum Ratings			Electrical Characteristics (Ta = 25°C)				4-V Drive
		VDSS (V)	ID (A)	PT (Ta = 25°C) (W)	RDS(ON) (Ω)		VGS (V)	ID (A)	
					typ.	max			
N-ch x 4	<b>MP4210</b>	60	5	4	0.12	0.16	10	2.5	○
	<b>MP4209</b>	100	3	4	0.28	0.35	10	2.0	○
P-ch x 4	<b>MP4211</b>	-60	-5	4	0.16	0.19	-10	-2.5	○
	<b>MP4208</b>	-60	-5	4	0.20	0.30	-10	-2.5	○
N-ch x 2 + P-ch x 2	<b>MP4212</b>	60	5	4	0.12	0.16	10	2.5	○
		-60	-5		0.16	0.19	-10	-2.5	

### • S-12M Series (4-in-1, 6-in-1)

Polarity and Circuit Configuration	Part Number	Maximum Ratings			Electrical Characteristics (Ta = 25°C)				4-V Drive
		VDSS (V)	ID (A)	PT (Ta = 25°C) (W)	RDS(ON) (Ω)		VGS (V)	ID (A)	
					typ.	max			
N-ch x 2 + P-ch x 2 with FB-Di	<b>MP4411</b>	100	3	4.4	0.28	0.35	10	2.0	○
	<b>MP4412</b>	100	5	4.4	0.17	0.23	10	2.5	○
N-ch x 4	<b>MP4410</b>	60	5	4.4	0.12	0.16	10	2.5	○
N-ch x 3 + P-ch x 3	<b>MP6404</b>	60	5	4.4	0.12	0.16	10	2.5	○
		-60	-5		0.16	0.19	-10	-2.5	

### • F-12M Series (4-in-1, 6-in-1)

Polarity and Circuit Configuration	Part Number	Maximum Ratings			Electrical Characteristics (Ta = 25°C)				4-V Drive
		VDSS (V)	ID (A)	PT (Ta = 25°C) (W)	RDS(ON) (Ω)		VGS (V)	ID (A)	
					typ.	max			
N-ch x 2 + P-ch x 2 with FB-Di	<b>MP4711</b>	100	5	36	0.17	0.23	10	2.5	○

勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)



# 6 Product List

勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)

Part Number	Series	Package	Main Characteristics			Page
			V <sub>DSS</sub> (V)	I <sub>D</sub> (A)	R <sub>DS(ON)</sub> max (Ω)	
2SJ200	π-MOS II	TO-3P(N)	-180	-10	0.83	—
2SJ201	π-MOS II	TO-3P(N)	-200	-12	0.63	—
2SJ304	L <sup>2</sup> -π-MOS IV	TO-220NIS	-60	-14	0.12	—
2SJ312	L <sup>2</sup> -π-MOS IV	TO-220FL/SM	-60	-14	0.12	—
2SJ313	π-MOS II	TO-220NIS	-180	-1	5.0	—
2SJ315	L <sup>2</sup> -π-MOS IV	PW-Mold	-60	-5	0.25	—
2SJ334	L <sup>2</sup> -π-MOS V	TO-220NIS	-60	-30	0.038	P 25
2SJ338	π-MOS II	PW-Mold	-180	-1	5.0	—
2SJ349	L <sup>2</sup> -π-MOS V	TO-220NIS	-60	-20	0.045	P 25
2SJ360	L <sup>2</sup> -π-MOS V	PW-Mold	-60	-1	0.73	P 25
2SJ377	L <sup>2</sup> -π-MOS V	PW-Mold	-60	-5	0.19	P 25
2SJ378	L <sup>2</sup> -π-MOS V	TPS	-60	-5	0.19	P 25
2SJ380	L <sup>2</sup> -π-MOS V	TO-220NIS	-100	-12	0.21	P 25
2SJ401	L <sup>2</sup> -π-MOS V	TO-220FL/SM	-60	-20	0.045	P 25
2SJ402	L <sup>2</sup> -π-MOS V	TO-220FL/SM	-60	-30	0.038	P 25
2SJ407	π-MOS V	TO-220NIS	-200	-5	1.0	P 26
2SJ412	L <sup>2</sup> -π-MOS V	TO-220FL/SM	-100	-16	0.21	P 25
2SJ438	L <sup>2</sup> -π-MOS V	TO-220NIS	-60	-5	0.19	P 25
2SJ439	π-MOS V	PW-Mold	-16	-5	0.2	P 24
2SJ440	π-MOS II	TO-3P(N)IS	-180	-9	0.8	—
2SJ464	L <sup>2</sup> -π-MOS V	TO-220NIS	-100	-18	0.09	P 25
2SJ465	π-MOS V	PW-Mini	-16	-2	0.71	P 24
2SJ507	L <sup>2</sup> -π-MOS V	LSTM	-60	-1	0.7	P 25
2SJ508	L <sup>2</sup> -π-MOS V	PW-Mini	-100	-1	1.9	P 25
2SJ509	L <sup>2</sup> -π-MOS V	LSTM	-100	-1	1.9	P 25
2SJ511	L <sup>2</sup> -π-MOS V	PW-Mini	-30	-2	0.45	P 25
2SJ512	π-MOS V	TO-220NIS	-250	-5	1.25	P 26
2SJ516	π-MOS V	TO-220NIS	-250	-6.5	0.8	P 26
2SJ525	L <sup>2</sup> -π-MOS V	TPS	-30	-5	0.12	P 25
2SJ537	L <sup>2</sup> -π-MOS V	LSTM	-50	-5	0.19	P 25
2SJ610	π-MOS V	PW-Mold	-250	-2	2.55	P 26
2SJ618	π-MOS V	TO-3P(N)	-180	-10	0.37	P 26
2SJ619	L <sup>2</sup> -π-MOS V	TFP	-100	-16	0.21	—
2SJ620	L <sup>2</sup> -π-MOS V	TFP	-100	-18	0.09	—
2SJ668	U-MOS III	PW-Mold	-60	-5	0.17	P 19
2SJ669	U-MOS III	TPS	-60	-5	0.17	P 19
2SK1119	π-MOS II.5	TO-220AB	1000	4	3.8	—
2SK1120	π-MOS II.5	TO-3P(N)	1000	8	1.8	—
2SK1359	π-MOS II.5	TO-3P(N)	100	5	3.8	—
2SK1365	π-MOS II.5	TO-3P(N)IS	1000	7	1.8	—
2SK1381	L <sup>2</sup> -π-MOS III	TO-3P(N)	100	50	0.032	—
2SK1382	L <sup>2</sup> -π-MOS III	TO-3P(L)	100	60	0.02	—
2SK1486	π-MOS III.5	TO-3P(L)	300	32	0.095	—
2SK1489	π-MOS III.5	TO-3P(L)	1000	12	1.0	—
2SK1529	π-MOS II	TO-3P(N)	180	10	0.83	—
2SK1530	π-MOS II	TO-3P(N)	200	12	0.63	—

Part Number	Series	Package	Main Characteristics			Page
			V <sub>DSS</sub> (V)	I <sub>D</sub> (A)	R <sub>DS(ON)</sub> max (Ω)	
2SK1544	π-MOS III.5	TO-3P(L)	500	25	0.2	—
2SK1930	π-MOS II.5	TO-220FL/SM	1000	4	3.8	—
2SK2013	π-MOS II	TO-220NIS	180	1	5.0	—
2SK2162	π-MOS II	PW-Mold	180	1	5.0	—
2SK2173	L <sup>2</sup> -π-MOS V	TO-3P(N)	60	50	0.017	P 24
2SK2200	L <sup>2</sup> -π-MOS V	TPS	100	3	0.35	P 24
2SK2201	L <sup>2</sup> -π-MOS V	PW-Mold	100	3	0.35	P 24
2SK2229	L <sup>2</sup> -π-MOS V	TPS	60	5	0.16	P 24
2SK2231	L <sup>2</sup> -π-MOS V	PW-Mold	60	5	0.16	P 24
2SK2232	L <sup>2</sup> -π-MOS V	TO-220NIS	60	25	0.046	P 24
2SK2233	L <sup>2</sup> -π-MOS V	TO-3P(N)	60	45	0.03	P 24
2SK2266	L <sup>2</sup> -π-MOS V	TO-220FL/SM	60	45	0.03	P 24
2SK2267	L <sup>2</sup> -π-MOS V	TO-3P(L)	60	60	0.011	P 24
2SK2274	π-MOS II.5	TO-220NIS	700	5	1.7	—
2SK2311	L <sup>2</sup> -π-MOS V	TO-220FL/SM	60	25	0.046	P 24
2SK2312	L <sup>2</sup> -π-MOS V	TO-220NIS	60	45	0.017	P 24
2SK2313	L <sup>2</sup> -π-MOS V	TO-3P(N)	60	60	0.011	P 24
2SK2314	L <sup>2</sup> -π-MOS V	TO-220AB	100	27	0.085	P 24
2SK2350	π-MOS V	TO-220NIS	200	8.5	0.4	P 26
2SK2376	L <sup>2</sup> -π-MOS V	TO-220FL/SM	60	45	0.017	P 24
2SK2381	π-MOS V	TO-220NIS	200	5	0.8	P 26
2SK2382	π-MOS V	TO-220NIS	200	15	0.18	P 26
2SK2385	L <sup>2</sup> -π-MOS V	TO-220NIS	60	36	0.03	P 24
2SK2391	L <sup>2</sup> -π-MOS V	TO-220NIS	100	20	0.085	P 24
2SK2398	L <sup>2</sup> -π-MOS V	TO-3P(N)	60	45	0.03	P 24
2SK2399	L <sup>2</sup> -π-MOS V	PW-Mold	100	5	0.23	P 24
2SK2400	L <sup>2</sup> -π-MOS V	TPS	100	5	0.23	P 24
2SK2401	π-MOS V	TO-220FL/SM	200	15	0.18	P 26
2SK2417	π-MOS V	TO-220NIS	250	7.5	0.5	P 26
2SK2445	L <sup>2</sup> -π-MOS V	TO-3P(N)	60	50	0.018	P 24
2SK2467	π-MOS II	TO-3P(N)IS	180	9	0.8	—
2SK2493	π-MOS V	PW-Mold	16	5	0.1	P 24
2SK2507	L <sup>2</sup> -π-MOS V	TO-220NIS	50	25	0.046	P 24
2SK2508	π-MOS V	TO-220NIS	250	13	0.25	P 26
2SK2542	π-MOS V	TO-220AB	500	8	0.85	P 27
2SK2543	π-MOS V	TO-220NIS	500	8	0.85	P 27
2SK2544	π-MOS V	TO-220AB	600	6	1.25	P 27
2SK2545	π-MOS V	TO-220NIS	600	6	1.25	P 27
2SK2549	π-MOS V	PW-Mini	16	2	0.29	P 24
2SK2550	L <sup>2</sup> -π-MOS V	TO-3P(N)	50	45	0.03	P 24
2SK2551	L <sup>2</sup> -π-MOS V	TO-3P(N)	50	50	0.011	P 24
2SK2598	π-MOS V	TO-220FL/SM	250	13	0.25	P 26
2SK2599	π-MOS V	TPS	500	2	3.2	P 27
2SK2601	π-MOS V	TO-3P(N)	500	10	1.0	P 27
2SK2602	π-MOS V	TO-3P(N)	600	6	1.25	P 27
2SK2603	π-MOS III	TO-220AB	800	3	3.6	P 28

Part Number	Series	Package	Main Characteristics			Page
			V <sub>DSS</sub> (V)	I <sub>D</sub> (A)	R <sub>DS(ON)</sub> max (Ω)	
2SK2604	π-MOS III	TO-3P(N)	800	5	2.2	P 28
2SK2605	π-MOS III	TO-220NIS	800	5	2.2	P 28
2SK2606	π-MOS III	TO-3P(N)IS	800	8.5	1.2	P 28
2SK2607	π-MOS III	TO-3P(N)	800	9	1.2	P 28
2SK2608	π-MOS III	TO-220AB	900	3	4.3	P 28
2SK2610	π-MOS III	TO-3P(N)	900	5	2.5	P 28
2SK2611	π-MOS III	TO-3P(N)	900	9	1.4	P 28
2SK2613	π-MOS III	TO-3P(N)	1000	8	1.7	P 29
2SK2614	L <sup>2</sup> -π-MOS V	DP	50	20	0.046	P 24
2SK2615	L <sup>2</sup> -π-MOS V	PW-Mini	60	2	0.3	P 24
2SK2661	π-MOS V	TO-220AB	500	5	1.5	P 27
2SK2662	π-MOS V	TO-220NIS	500	5	1.5	P 27
2SK2698	π-MOS V	TO-3P(N)	500	15	0.4	P 27
2SK2699	π-MOS V	TO-3P(N)	600	12	0.65	P 27
2SK2700	π-MOS III	TO-220NIS	900	3	4.3	P 36
2SK2717	π-MOS III	TO-220NIS	900	5	2.5	P 36
2SK2718	π-MOS III	TO-220NIS	900	2.5	6.4	P 36
2SK2719	π-MOS III	TO-3P(N)	900	3	4.3	P 36
2SK2733	U-MOS III	TO-220AB	900	1	9.0	P 36
2SK2744	L <sup>2</sup> -π-MOS V	TO-3P(N)	50	45	0.02	P 24
2SK2745	L <sup>2</sup> -π-MOS V	TO-3P(N)	50	50	0.0095	P 24
2SK2746	π-MOS III	TO-3P(N)	800	7	1.7	P 28
2SK2749	π-MOS III	TO-3P(N)	900	7	2.0	P 28
2SK2750	π-MOS V	TO-220NIS	600	3.5	2.2	P 27
2SK2776	π-MOS V	TO-220FL/SM	500	8	0.85	P 27
2SK2777	π-MOS V	TO-220FL/SM	600	6	1.25	P 27
2SK2782	L <sup>2</sup> -π-MOS V	DP	60	20	0.055	P 24
2SK2789	L <sup>2</sup> -π-MOS V	TO-220FL/SM	100	27	0.085	P 24
2SK2835	π-MOS V	TPS	200	5	0.8	P 26
2SK2837	π-MOS V	TO-3P(N)	500	20	0.27	P 27
2SK2838	π-MOS V	TO-220FL/SM	400	5.5	1.2	P 27
2SK2841	π-MOS V	TO-220AB	400	10	0.55	P 27
2SK2842	π-MOS V	TO-220NIS	500	12	0.52	P 27
2SK2843	π-MOS V	TO-220NIS	600	10	0.75	P 27
2SK2844	L <sup>2</sup> -π-MOS V	TO-220AB	30	35	0.02	P 24
2SK2845	π-MOS III	DP	900	1	9.0	P 28
2SK2846	π-MOS V	TPS	600	2	5.0	P 27
2SK2847	π-MOS III	TO-3P(N)IS	900	8	1.4	P 28
2SK2862	π-MOS V	TO-220NIS	500	3	3.2	P 27
2SK2865	π-MOS V	PW-Mold	600	2	5.0	P 27
2SK2866	π-MOS V	TO-220AB	600	10	0.75	P 27
2SK2882	π-MOS V	TO-220NIS	150	18	0.12	P 26
2SK2883	π-MOS III	TO-220FL/SM	800	3	3.6	P 28
2SK2884	π-MOS III	TO-220FL/SM	800	5	2.2	P 28
2SK2886	L <sup>2</sup> -π-MOS V	TO-220NIS	50	45	0.02	P 24
2SK2889	π-MOS V	TO-220FL/SM	600	10	0.75	P 27

Part Number	Series	Package	Main Characteristics			Page
			V <sub>DSS</sub> (V)	I <sub>D</sub> (A)	R <sub>DS(ON)</sub> max (Ω)	
2SK2914	π-MOS V	TO-220AB	250	7.5	0.5	P 26
2SK2915	π-MOS V	TO-3P(N)	600	16	0.4	P 27
2SK2916	π-MOS V	TO-3P(N)IS	500	14	0.4	P 27
2SK2917	π-MOS V	TO-3P(N)IS	500	18	0.27	P 27
2SK2920	π-MOS V	PW-Mold	200	5	0.8	P 26
2SK2949	π-MOS V	TO-220FL/SM	400	10	0.55	P 27
2SK2952	π-MOS V	TO-220NIS	400	8.5	0.55	P 27
2SK2953	π-MOS V	TO-3P(N)IS	600	15	0.4	P 27
2SK2961	L <sup>2</sup> -π-MOS V	LSTM	60	2	0.27	P 24
2SK2962	L <sup>2</sup> -π-MOS V	LSTM	100	1	0.7	P 24
2SK2963	L <sup>2</sup> -π-MOS V	PW-Mini	100	1	0.7	P 24
2SK2964	L <sup>2</sup> -π-MOS V	PW-Mini	30	2	0.18	P 24
2SK2965	π-MOS V	TO-220NIS	200	11	0.26	P 26
2SK2967	π-MOS V	TO-3P(N)	250	30	0.068	P 26
2SK2989	L-π-MOS V	LSTM	50	5	0.15	P 24
2SK2991	π-MOS V	TO-220FL/SM	500	5	1.5	P 27
2SK2992	π-MOS V	PW-Mini	200	1	3.5	P 26
2SK2993	π-MOS V	TO-220FL/SM	250	20	0.105	P 26
2SK2995	π-MOS V	TO-3P(N)IS	250	30	0.068	P 26
2SK2996	π-MOS V	TO-220NIS	600	10	1.0	P 27
2SK2998	π-MOS V	LSTM	500	0.5	18	P 27
2SK3017	π-MOS III	TO-3P(N)IS	900	8.5	1.25	P 28
2SK3051	L <sup>2</sup> -π-MOS V	TO-220FL/SM	50	45	0.03	P 24
2SK3067	π-MOS V	TO-220NIS	600	2	5.0	P 27
2SK3068	π-MOS V	TO-220FL/SM	500	12	0.52	P 27
2SK3085	π-MOS V	TO-220AB	600	3.5	2.2	P 27
2SK3089	L <sup>2</sup> -π-MOS V	TO-220FL/SM	30	40	0.03	P 24
2SK3090	L <sup>2</sup> -π-MOS V	TO-220FL/SM	30	45	0.02	P 24
2SK3117	π-MOS V	TO-3P(SM)	500	20	0.27	P 27
2SK3125	L <sup>2</sup> -π-MOS V	TO-3P(SM)	30	70	0.007	P 24
2SK3126	π-MOS V	TO-220NIS	450	10	0.65	P 27
2SK3127	L <sup>2</sup> -π-MOS V	TO-220FL/SM	30	45	0.012	P 24
2SK3128	L <sup>2</sup> -π-MOS V	TO-3P(N)	30	60	0.012	P 24
2SK3129	π-MOS V	TO-3P(N)	50	60	0.007	—
2SK3130	π-MOS V	TO-220NIS	600	6	1.55	P 21
2SK3131	π-MOS V	TO-3P(L)	500	50	0.11	P 21
2SK3132	π-MOS V	TO-3P(L)	500	50	0.095	P 27
2SK3205	π-MOS V	PW-Mold	150	5	0.5	P 26
2SK3265	π-MOS V	TO-220NIS	700	10	1.0	P 27
2SK3301	π-MOS III	PW-Mold	900	1	20	P 28
2SK3302	π-MOS V	TPS	500	0.5	18	P 27
2SK3309	MACH	TO-220FL/SM	450	10	0.65	P 21
2SK3310	MACH	TO-220NIS	450	10	0.65	P 21
2SK3312	π-MOS V	TO-220FL/SM	600	6	1.25	P 21
2SK3313	π-MOS V	TO-220NIS	500	12	0.62	P 21
2SK3314	π-MOS V	TO-3P(N)	500	15	0.49	P 21



# 6 Product List

勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)

Part Number	Series	Package	Main Characteristics			Page
			V <sub>DSS</sub> (V)	I <sub>D</sub> (A)	R <sub>DS(ON)</sub> max (Ω)	
2SK3316	π-MOS V	TO-220NIS	500	5	1.8	P 35
2SK3342	π-MOS V	PW-Mold	250	4.5	1.0	P 26
2SK3371	π-MOS V	PW-Mold	600	1	9.0	P 27
2SK3373	π-MOS V	PW-Mold	500	2	3.2	—
2SK3374	π-MOS V	TPS	450	1	4.6	—
2SK3387	L <sup>2</sup> -π-MOS V	TFP	150	18	0.12	—
2SK3388	π-MOS V	TFP	250	20	0.105	—
2SK3389	U-MOS II	TFP	30	75	0.005	—
2SK3397	U-MOS II	TFP	30	70	0.006	—
2SK3398	π-MOS V	TFP	500	12	0.52	—
2SK3399	MACH	TO-220FL/SM	600	10	0.75	P 21
2SK3403	MACH	TO-220FL/SM	450	13	0.4	P 21
2SK3407	π-MOS V	TO-220NIS	450	10	0.65	—
2SK3437	MACH	TO-220FL/SM	600	10	1.0	P 21
2SK3438	π-MOS V	TFP	600	10	1.0	—
2SK3439	U-MOS II	TFP	30	75	0.005	—
2SK3440	U-MOS II	TFP	60	50	0.008	—
2SK3441	U-MOS II	TFP	60	75	0.0058	—
2SK3442	U-MOS II	TFP	100	45	0.02	—
2SK3443	π-MOS V	TFP	150	30	0.055	—
2SK3444	π-MOS V	TFP	200	25	0.082	—
2SK3445	π-MOS V	TFP	250	20	0.105	—
2SK3453	π-MOS V	TO-3P(N)IS	700	10	1.0	P 27
2SK3462	π-MOS V	PW-Mold	250	3	1.7	P 26
2SK3466	π-MOS V	TFP	500	5	1.5	—
2SK3471	π-MOS V	PW-Mini	500	0.5	18	P 27
2SK3473	π-MOS IV	TO-3P(N)	900	9	1.6	P 28
2SK3497	π-MOS V	TO-3P(N)	180	10	0.15	P 26
2SK3499	π-MOS V	TFP	400	10	0.55	—
2SK3506	π-MOS V	TO-3P(N)	30	45	0.02	—
2SK3538	π-MOS V	TFP	500	8	0.85	—
2SK3543	π-MOS V	TO-220NIS	450	2	2.45	—
2SK3544	π-MOS V	TFP	450	13	0.4	—
2SK3561	π-MOS VI	TO-220SIS	500	8	0.85	P 22
2SK3562	π-MOS VI	TO-220SIS	600	6	1.25	P 22
2SK3563	π-MOS VI	TO-220SIS	500	5	1.5	P 22
2SK3564	π-MOS IV	TO-220SIS	900	3	4.3	P 22
2SK3565	π-MOS IV	TO-220SIS	900	5	2.5	P 22
2SK3566	π-MOS IV	TO-220SIS	900	2.5	6.4	P 22
2SK3567	π-MOS VI	TO-220SIS	600	3.5	2.2	P 22
2SK3568	π-MOS VI	TO-220SIS	500	12	0.52	P 22
2SK3569	π-MOS VI	TO-220SIS	600	10	0.75	P 22
2SK3633	π-MOS IV	TO-3P(N)	800	7	1.7	P 28
2SK3662	U-MOS III	TO-220NIS	60	35	0.0125	P 19
2SK3667	π-MOS VI	TO-220SIS	600	7.5	1.0	P 22
2SK3669	π-MOS VII	PW-Mold	100	10	0.125	P 20

Part Number	Series	Package	Main Characteristics			Page
			V <sub>DSS</sub> (V)	I <sub>D</sub> (A)	R <sub>DS(ON)</sub> max (Ω)	
2SK3670	π-MOS V	LSTM	150	0.67	1.7	—
2SK3700	π-MOS IV	TO-3P(N)	900	5	2.5	P 28
2SK3742	π-MOS IV	TO-220SIS	900	5	2.5	P 22
2SK3757	π-MOS VI	TO-220SIS	450	2	2.45	P 22
2SK3766	π-MOS VI	TO-220SIS	450	2	2.45	P 22
2SK3767	π-MOS VI	TO-220SIS	600	2	4.5	P 22
2SK3797	π-MOS VI	TO-220SIS	600	13	0.43	P 22
2SK3798	π-MOS IV	TO-220SIS	900	4	3.5	P 22
2SK3799	π-MOS IV	TO-220SIS	900	8	1.3	P 22
2SK3842	U-MOS III	TFP	60	75	0.0058	P 19
2SK3843	U-MOS III	TFP	40	75	0.0035	P 19
2SK3844	U-MOS III	TO-220NIS	60	45	0.0058	P 19
2SK3845	U-MOS III	TO-3P(N)	60	70	0.0058	P 19
2SK3846	U-MOS III	TO-220NIS	40	26	0.018	P 19
2SK3847	U-MOS III	TO-220SM	40	26	0.018	P 19
2SK3864	U-MOS III	TO-220SM	120	45	0.025	P 19
2SK3868	π-MOS VI	TO-220SIS	500	5	1.7	P 22
2SK3869	π-MOS VI	TO-220SIS	450	10	0.68	P 22
2SK3878	π-MOS IV	TO-220 3P(N)	900	9	1.3	P 22
2SK3903	π-MOS VI	TO-3P(N)	600	14	0.44	P 22
2SK3904	π-MOS VI	TO-3P(N)	450	19	0.26	P 22
2SK3905	π-MOS VI	TO-3P(N)	500	17	0.31	P 22
2SK3907	π-MOS VI	TO-3P(N)	500	23	0.23	P 22
2SK3911	π-MOS VI	TO-3P(N)	600	20	0.32	P 22
2SK3934	π-MOS VI	TO-220SIS	500	15	0.3	P 22
2SK3935	π-MOS VI	TO-220SIS	450	17	0.25	P 22
TPC6001	U-MOS II	VS-6	20	6	0.03	P 18
TPC6002	U-MOS II	VS-6	30	6	0.03	P 18
TPC6003	U-MOS III	VS-6	30	6	0.024	P 18
TPC6004	U-MOS III	VS-6	20	6	0.024	P 18
TPC6005	U-MOS III	VS-6	30	6	0.028	P 18
TPC6103	U-MOS III	VS-6	-12	-4.5	0.035	P 18
TPC6104	U-MOS III	VS-6	-20	-4.5	0.04	P 18
TPC6105	U-MOS III	VS-6	-20	-2.7	0.11	P 18
TPC6107	U-MOS IV	VS-6	-20	-4.5	0.055	P 18
TPC6108	U-MOS IV	VS-6	-30	-4.5	0.06	P 18
TPC6201	U-MOS II	VS-6	30	2.5	0.095	P 18
TPC8003	U-MOS II	SOP-8	30	13	0.007	P 14
TPC8009-H	High-speed U-MOS III	SOP-8	30	13	0.01	P 14
TPC8010-H	High-speed U-MOS III	SOP-8	30	11	0.016	P 14
TPC8012-H	π-MOS V	SOP-8	200	1.8	0.4	P 14
TPC8013-H	High-speed U-MOS III	SOP-8	30	15	0.0065	P 14
TPC8014	U-MOS III	SOP-8	30	11	0.014	P 14
TPC8015-H	High-speed U-MOS III	SOP-8	30	13	0.008	P 14
TPC8016-H	High-speed U-MOS III	SOP-8	30	15	0.0057	P 14
TPC8017-H	Ultra-high-speed U-MOS III	SOP-8	30	15	0.0066	P 14

Part Number	Series	Package	Main Characteristics			Page
			V <sub>DSS</sub> (V)	I <sub>D</sub> (A)	R <sub>DS(ON)</sub> max (Ω)	
TPC8018-H	Ultra-high-speed U-MOS III	SOP-8	30	18	0.0046	P 14
TPC8020-H	Ultra-high-speed U-MOS III	SOP-8	30	13	0.009	P 14
TPC8021-H	Ultra-high-speed U-MOS III	SOP-8	30	13	0.015	P 14
TPC8022-H	Ultra-high-speed U-MOS III	SOP-8	40	7.5	0.027	P 14
TPC8107	U-MOS III	SOP-8	-30	-13	0.0007	P 14
TPC8108	U-MOS III	SOP-8	-30	-11	0.0013	P 14
TPC8109	U-MOS III	SOP-8	-30	-10	0.02	P 14
TPC8110	U-MOS III	SOP-8	-40	-8	0.025	P 14
TPC8111	U-MOS IV	SOP-8	-30	-11	0.012	P 14
TPC8112	U-MOS III	SOP-8	-30	-13	0.006	P 14
TPC8114	U-MOS IV	SOP-8	-30	-18	0.0045	P 14
TPC8115	U-MOS IV	SOP-8	-20	-10	0.01	P 14
TPC8203	U-MOS II	SOP-8	30	6	0.021	P 14
TPC8206	U-MOS II	SOP-8	60	7	0.05	P 14
TPC8207	U-MOS III	SOP-8	20	6	0.02	P 14
TPC8208	U-MOS III	SOP-8	20	5	0.05	P 14
TPC8209	U-MOS II	SOP-8	30	5	0.04	P 14
TPC8210	U-MOS III	SOP-8	30	8	0.015	P 14
TPC8211	U-MOS III	SOP-8	30	5.5	0.036	P 14
TPC8303	U-MOS II	SOP-8	-30	-4.5	0.035	P 14
TPC8305	U-MOS II	SOP-8	-20	-5	0.03	P 14
TPC8405	U-MOS IV/U-MOS III	SOP-8	-30/30	-4.5/6	0.033/0.026	P 14
TPC8A02-H	Ultra-high-speed U-MOS III	SOP-8	30	11/1	0.008	P 14
TPCA8003-H	Ultra-high-speed U-MOS III	SOP Advance	30	35	0.0066	P 13
TPCA8004-H	Ultra-high-speed U-MOS III	SOP Advance	30	40	0.0046	P 13
TPCA8005-H	Ultra-high-speed U-MOS III	SOP Advance	30	27	0.009	P 13
TPCA8006-H	π-MOS VII	SOP Advance	100	18	0.067	P 13
TPCA8007-H	π-MOS VII	SOP Advance	100	20	0.047	P 13
TPCA8008-H	π-MOS V	SOP Advance	250	4	0.58	P 13
TPCA8009-H	π-MOS V	SOP Advance	150	7	0.35	P 13
TPCA8010-H	π-MOS V	SOP Advance	200	5.5	0.45	P 13
TPCA8011-H	Ultra-high-speed U-MOS III	SOP Advance	20	40	0.004	P 13
TPCA8101	U-MOS III	SOP Advance	-30	-40	0.007	P 13
TPCA8102	U-MOS III	SOP Advance	-30	-40	0.006	P 13
TPCA8103	U-MOS IV	SOP Advance	-30	-40	0.0042	P 13
TPCA8104	U-MOS III	SOP Advance	-60	-40	0.016	P 13
TPCA8105	U-MOS III	SOP Advance	-12	-6	0.0033	P 13
TPCM8001-H	Ultra-high-speed U-MOS III	TSSOP Advance	30	20	0.0095	P 12
TPCS8004	π-MOS V	TSSOP-8	200	1.3	0.8	P 15
TPCS8007-H	π-MOS V	TSSOP-8	200	1.9	0.45	P 15
TPCS8008-H	π-MOS V	TSSOP-8	250	1.6	0.58	P 15
TPCS8009-H	π-MOS V	TSSOP-8	150	2.1	0.35	P 15
TPCS8010-H	Ultra-high-speed U-MOS III	TSSOP-8	30	8	0.011	P 15
TPCS8101	U-MOS II	TSSOP-8	-30	-6	0.025	P 15
TPCS8102	U-MOS II	TSSOP-8	-20	-6	0.02	P 15
TPCS8104	U-MOS IV	TSSOP-8	-30	-11	0.012	P 15

Part Number	Series	Package	Main Characteristics			Page
			V <sub>DSS</sub> (V)	I <sub>D</sub> (A)	R <sub>DS(ON)</sub> max (Ω)	
TPCS8105	U-MOS IV	TSSOP-8	-30	-11	0.0135	P 15
TPCS8204	U-MOS III	TSSOP-8	20	6	0.017	P 15
TPCS8205	U-MOS II	TSSOP-8	20	5	0.045	P 15
TPCS8208	U-MOS III	TSSOP-8	20	6	0.017	P 15
TPCS8209	U-MOS III	TSSOP-8	20	5	0.03	P 15
TPCS8210	U-MOS III	TSSOP-8	20	5	0.03	P 15
TPCS8211	U-MOS III	TSSOP-8	20	6	0.024	P 15
TPCS8212	U-MOS III	TSSOP-8	20	6	0.024	P 15
TPCS8213	U-MOS IV	TSSOP-8	20	6	0.013	P 15
TPCS8214	U-MOS IV	TSSOP-8	30	6	0.0135	P 15
TPCS8302	U-MOS III	TSSOP-8	-20	-5	0.0035	P 15
TPCS8303	U-MOS IV	TSSOP-8	-20	-5	0.021	P 15
TPCF8001	U-MOS III	VS-8	30	7	0.0025	P 18
TPCF8101	U-MOS III	VS-8	-12	-6	0.028	P 18
TPCF8102	U-MOS III	VS-8	-20	-6	0.03	P 18
TPCF8103	U-MOS III	VS-8	-20	-2.7	0.11	P 18
TPCF8104	U-MOS III	VS-8	-30	-6	0.0028	P 18
TPCF8201	U-MOS III	VS-8	20	3	0.049	P 18
TPCF8301	U-MOS III	VS-8	-20	-2.7	0.11	P 18
TPCF8302	U-MOS III	VS-8	-20	-3	0.0059	P 18
TPCF8303	U-MOS III	VS-8	-20	-3	0.0059	P 18
TPCF8304	U-MOS IV	VS-8	-30	-3.2	0.072	P 18
TPCF8402	U-MOS III	VS-8	-30/30	-3.2/4	0.11/0.049	P 18
TPCF8A01	U-MOS III	VS-8	20	3	0.049	P 18
TPCF8B01	U-MOS III	VS-8	-20	-2.7	0.11	P 18
TPCP8001-H	Ultra-high-speed U-MOS III	PS-8	30	7.2	0.016	P 18
TPCP8002	U-MOS IV	PS-8	20	9.1	0.01	P 18
TPCP8201	U-MOS III	PS-8	30	4.2	0.05	P 18
TPCP8401	U-MOS III	PS-8	-30/30	-3.4/4.2	0.048/0.072	P 18
TPCP8402	U-MOS III	PS-8	-12/20	-5.5/0.1	0.038/3	P 18
TPCP8J01	U-MOS IV	PS-8	-32/50	-6/0.1	0.035	P 18

勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)



# 7 Superseded, Final-Phase and Discontinued Product List

## 1. Superseded Products

The part numbers in the left-hand column below are soon to be superseded, final-phase or discontinued products. When ordering, please choose from among the recommended products in the right-hand column.

Superseded Products					Replacement Products				
Part Number	Electrical Characteristics			Package	Part Number	Electrical Characteristics			Package
	V <sub>DSS</sub> (V)	I <sub>D</sub> (A)	R <sub>DS(ON)</sub> max(Ω)			V <sub>DSS</sub> (V)	I <sub>D</sub> (A)	R <sub>DS(ON)</sub> max(Ω)	
2SK2057	500	20	0.34	TO-3P(N)	2SK2837	500	20	0.27	TO-3P(N)
2SK2235	250	2	2	PW-Mold	2SK3462	250	3	1.7	PW-Mold
2SK2741	60	5	0.16	SP	2SK2231	60	5	0.16	PW-Mold
2SK2742	100	3	0.35	SP	2SK2201	100	3	0.35	PW-Mold
2SK2836	600	1	9	SP	2SK3371	600	1	9	PW-Mold
2SK2839	30	10	0.04	SP	TPCF8001	30	7	0.023	VS-8
2SK2985	60	45	0.0058	TO-220NIS	2SK3844	60	45	0.0058	TO-220NIS
2SK2986	60	55	0.0058	TO-220FL/SM	2SK3844	60	45	0.0058	TO-220NIS
2SK2987	60	70	0.0058	TO-3P(N)	2SK3845	60	70	0.0058	TO-3P(N)
TPC6101	-20	-4.5	0.06	VS-6	TPC6107	-20	-4.5	0.055	VS-6
TPC6102	-30	-4.5	0.06	VS-6	TPC6108	-30	-4.5	0.06	VS-6
TPC8002	30	11	0.014	SOP-8	TPC8014	30	11	0.014	SOP-8
TPC8004	30	5	0.05	SOP-8	TPC8014	30	11	0.016	SOP-8
TPC8006-H	30	7	0.027	SOP-8	TPC8021-H	30	11	0.017	SOP-8
TPC8009-H	30	13	0.01	SOP-8	TPC8020-H	30	13	0.009	SOP-8
TPC8010-H	30	11	0.016	SOP-8	TPC8021-H	30	11	0.017	SOP-8
TPC8013-H	30	15	0.0065	SOP-8	TPC8017-H	30	15	0.0066	SOP-8
TPC8015-H	30	13	0.008	SOP-8	TPC8017-H	30	15	0.0066	SOP-8
TPC8016-H	30	15	0.0057	SOP-8	TPC8018-H	30	18	0.0046	SOP-8
TPC8201	30	5	0.05	SOP-8	TPC8209	30	5	0.05	SOP-8
TPC8202	20	5	0.05	SOP-8	TPC8208	20	5	0.05	SOP-8
TPC8204	20	6	0.02	SOP-8	TPC8207	20	6	0.02	SOP-8
TPC8401	-30/30	-4.5/6	0.035/0.021	SOP-8	TPCS8212	20	6	0.024	TSSOP-8
TPC8402	-30/30	-4.5/5	0.035/0.05	SOP-8	TPC8405	-30/30	-4.5/6	0.033/0.026	SOP-8
TPC8403	-30/30	-4.5/6	0.055/0.033	SOP-8	TPC8405	-30/30	-4.5/6	0.033/0.026	SOP-8
TPCS8201	20	5	0.03	TSSOP-8	TPC8405	-30/30	-4.5/6	0.033/0.026	SOP-8
TPCS8203	20	6	0.045	TSSOP-8	TPCS8209	20	5	0.03	TSSOP-8
TPCS8206	20	5	0.03	TSSOP-8	TPCS8211	20	6	0.024	TSSOP-8
TPCS8207	20	5	0.024	TSSOP-8	TPCS8210	20	5	0.03	TSSOP-8

## 2. Final-Phase Products

Part Number	Replacement Products
2SJ147	2SJ304
2SJ1347	2SK2314
2SK794	2SK2610
2SK1349	2SK2391
2SK1488	2SK2601
2SK1652	2SK2698
2SK1720	2SK2266
2SK1854	2SK2952
2SK1856	2SK2698
2SK1864	2SK2776

Part Number	Replacement Products
2SK1882	2SK2232
2SK1915	2SK2777
2SK1997	2SK2385
2SK1998	2SK2233
2SK2387	2SK2542
TPC8001	TPC8010-H
TPC8005-H	TPC8021-H
TPC8007-H	TPC8020-H
TPC8102	TPC8105-H
TPC8103	TPC8111/TPC8108

Part Number	Replacement Products
TPC8106-H	TPC8109
TPCA8101	TPCA8102
TPC8201	TPC8209
TPC8202	TPC8208
TPC8204	TPC8207
TPCS8201	TPCS8209
TPCS8203	TPCS8211
TPCS8206	TPCS8210
TPCS8207	TPCS8212

勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)

### 3. Discontinued Products

Part Number	Replacement Products
2SJ91	2SJ200
2SJ92	2SJ200
2SJ123	2SJ304
2SJ124	2SJ304
2SJ126	2SJ304
2SJ183	2SJ377
2SJ224	2SJ312
2SJ238	2SJ360
2SJ239	2SJ377
2SJ240	2SJ349
2SJ241	2SJ401
2SJ315	2SJ377
2SK271	2SK1529
2SK272	2SK1529
2SK324	2SK2698
2SK325	2SK2698
2SK355	2SK387
2SK356	2SK388
2SK357	2SK2381
2SK358	2SK2417
2SK385	2SK2698
2SK386	2SK2698
2SK387	2SK2882
2SK388	2SK2508
2SK405	2SK1529
2SK417	2SK2232
2SK418	2SK2662
2SK419	2SK2662
2SK420	2SK2662
2SK421	2SK2662
2SK422	2SK2961
2SK442	2SK2232
2SK447	2SK2508
2SK525	2SK2382
2SK526	2SK2417
2SK527	2SK2232
2SK528	2SK2662
2SK529	2SK2662
2SK530	2SK2662
2SK531	2SK2662
2SK532	2SK2232
2SK537	2SK2733
2SK538	2SK2719
2SK539	2SK2610
2SK568	-
2SK572	-
2SK573	2SK1641
2SK578	2SK2882
2SK643	2SK2601
2SK644	2SK2601
2SK672	2SK2232
2SK673	2SK2232
2SK674	2SK2232
2SK678	2SK2698
2SK693	2SK2698
2SK694	2SK2698
2SK708	2SK2698

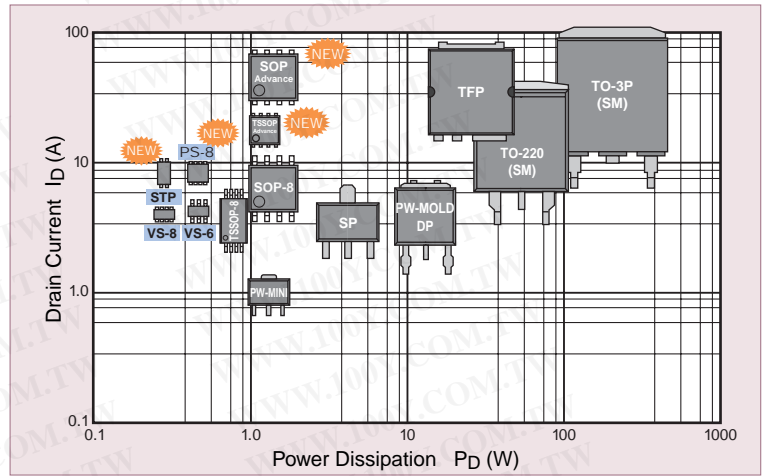
Part Number	Replacement Products
2SK788	2SK2698
2SK789	2SK2698
2SK790	2SK2698
2SK791	2SK2608
2SK792	2SK2608
2SK793	2SK2610
2SK849	2SK2233
2SK850	2SK2466
2SK851	2SK2967
2SK856	2SK2385
2SK857	2SK2233
2SK858	2SK2750
2SK888	2SK2350
2SK889	2SK2314
2SK890	2SK2350
2SK891	2SK2382
2SK892	2SK2662
2SK893	2SK2386
2SK894	2SK2542
2SK895	2SK2601
2SK896	2SK2695
2SK942	2SK2232
2SK943	2SK2232
2SK944	2SK2967
2SK945	2SK2599
2SK1029	2SK2698
2SK1078	2SK2615
2SK1112	2SK2231
2SK1113	2SK2201
2SK1114	2SK2232
2SK1115	2SK2232
2SK1116	2SK2232
2SK1117	2SK2544
2SK1118	2SK2545
2SK1124	2SK2233
2SK1213	2SK2602
2SK1251	2SK2231
2SK1252	2SK2201
2SK1333	2SK2698
2SK1344	2SK2232
2SK1346	2SK2232
2SK1348	2SK2391
2SK1350	2SK2382
2SK1351	2SK2662
2SK1352	2SK2543
2SK1356	2SK2700
2SK1357	2SK2610
2SK1358	2SK2611
2SK1362	2SK2610
2SK1363	2SK2847
2SK1377	2SK2679
2SK1378	2SK2841
2SK1379	2SK2173
2SK1380	2SK2267
2SK1487	2SK2601
2SK1513	2SK2601
2SK1531	2SK2698

Part Number	Replacement Products
2SK1542	2SK2376
2SK1574	2SK2542
2SK1600	2SK2603
2SK1601	2SK2608
2SK1602	2SK2603
2SK1603	2SK2718
2SK1641	2SK2993
2SK1642	2SK2952
2SK1643	2SK2717
2SK1649	2SK2610
2SK1650	2SK2719
2SK1651	2SK2601
2SK1653	2SK2312
2SK1692	2SK2749
2SK1717	2SK2615
2SK1719	2SK2231
2SK1721	2SK2991
2SK1722	2SK2991
2SK1723	2SK2699
2SK1745	2SK2837
2SK1746	2SK2865
2SK1766	2SK2417
2SK1767	2SK2750
2SK1768	2SK2614
2SK1769	2SK2599
2SK1792	2SK2376
2SK1805	2SK2543
2SK1855	2SK2698
2SK1858	2SK2883
2SK1865	2SK2776
2SK1879	2SK2398
2SK1913	2SK2750
2SK1927	2SK2789
2SK1928	2SK2789
2SK1929	2SK2884
2SK2030	2SK2231
2SK2038	2SK2604
2SK2039	2SK2610
2SK2056	2SK2605
2SK2077	2SK2746
2SK2078	2SK2607
2SK2088	2SK2401
2SK2089	2SK2884
2SK2107	2SK2401
2SK2149	2SK2601
2SK2150	2SK2698
2SK2222	2SK2604
2SK2236	2SK2662
2SK2237	2SK2543
2SK2319	2SK2746
2SK2320	2SK2607
2SK2351	2SK2544
2SK2352	2SK2545
2SK2386	2SK2661
2SK2388	2SK2750
2SK2402	2SK2750

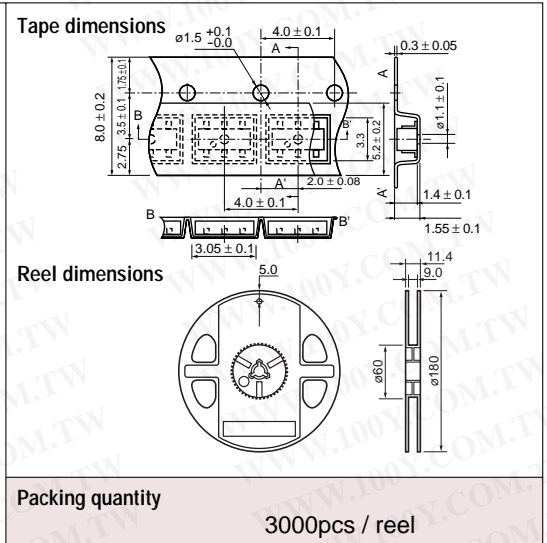
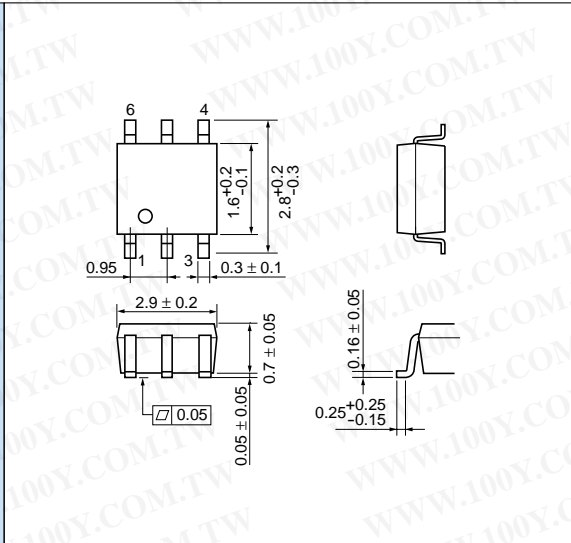
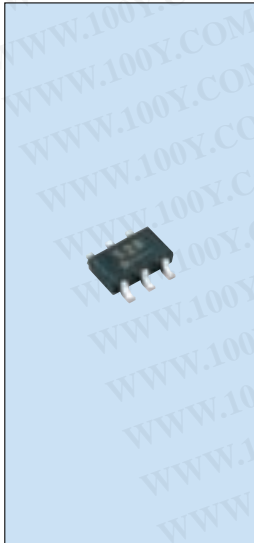


## 1. Compact Surface-Mount Packages

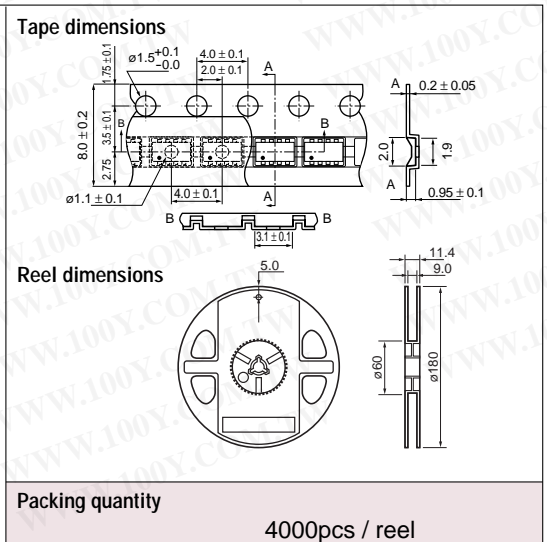
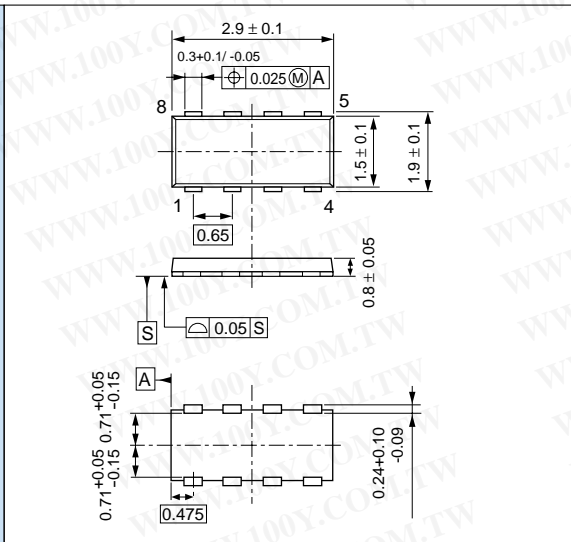
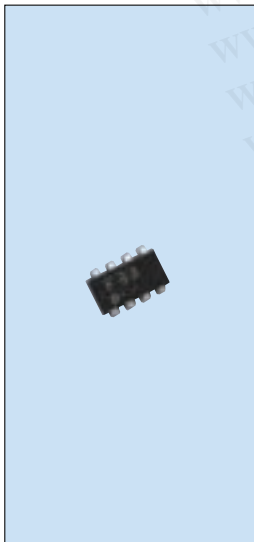
To meet requirements for compact and thin equipment, Toshiba offers various packages with power dissipation of 1.0 to 150 W and drain current of 1 to 50 A. In addition, we offer devices housed in the SOP-8 and TSSOP-8 packages. These devices consist of input/output isolated TFP Series MOSFETs and trench MOSFETs with ultra-low ON-resistance.



### ■ VS-6

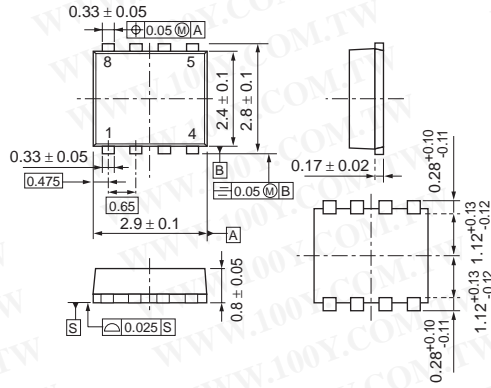


### ■ VS-8

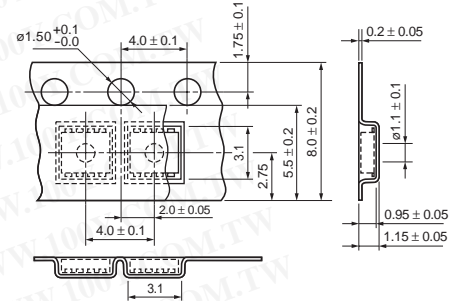


■ PS-8

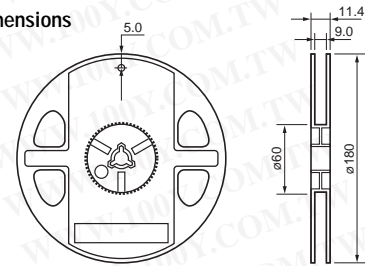
Unit: mm



Tape dimensions



Reel dimensions

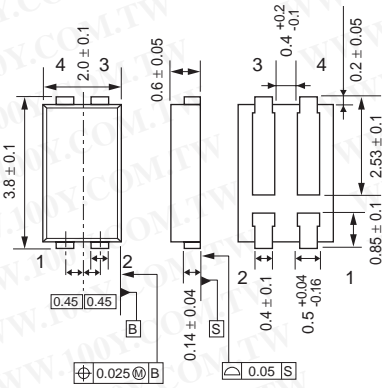


Packing quantity

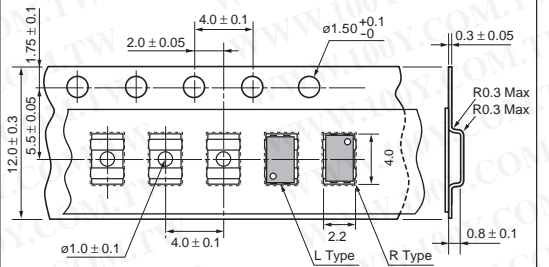
3000pcs / reel

■ STP

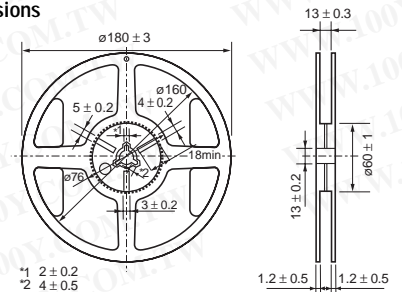
Unit: mm



Tape dimensions



Reel dimensions



Packing quantity

4000pcs / reel





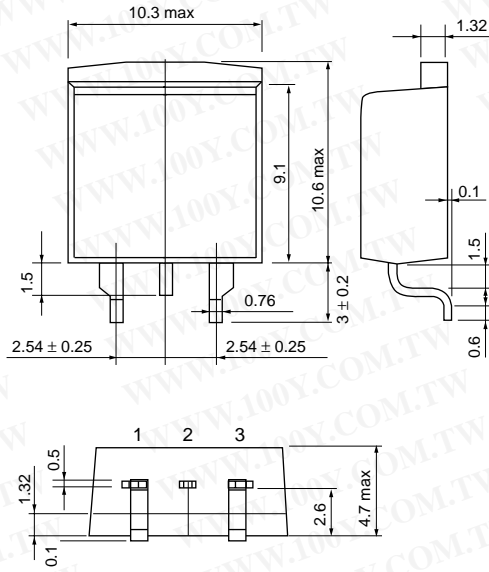






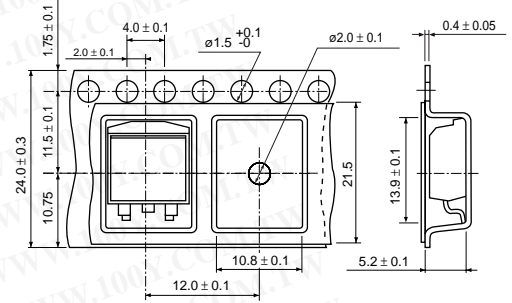
■ TO-220SM

Unit: mm

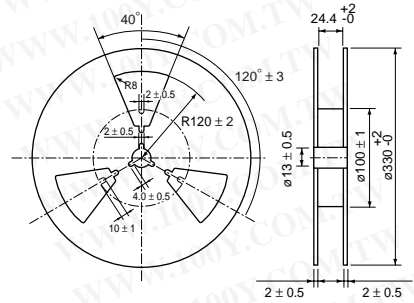


1. Gate
2. Drain (heat sink)
3. Source

Tape dimensions



Reel dimensions

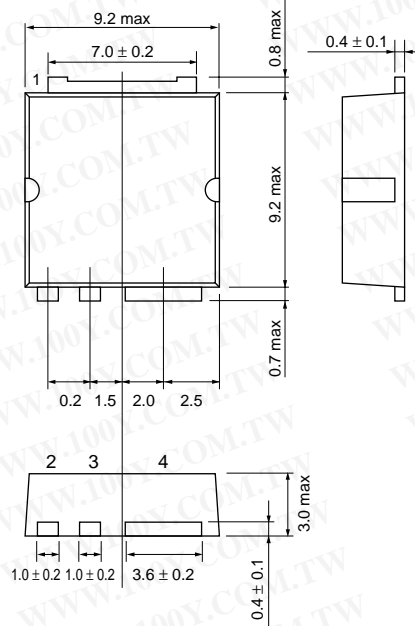


Packing quantity

1000pcs / reel

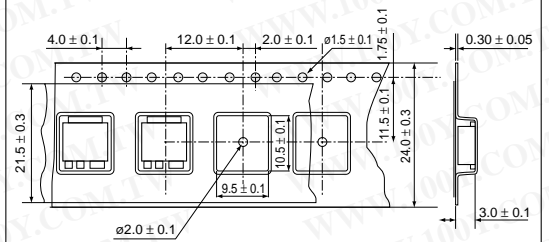
■ TFP

Unit: mm

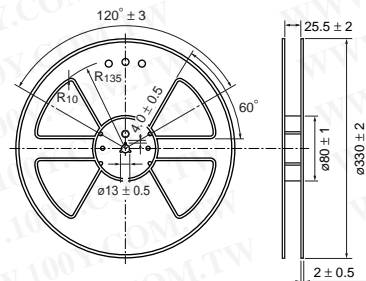


1. Drain (heat sink)
2. Gate
3. Source1
4. Source2

Tape dimensions



Reel dimensions



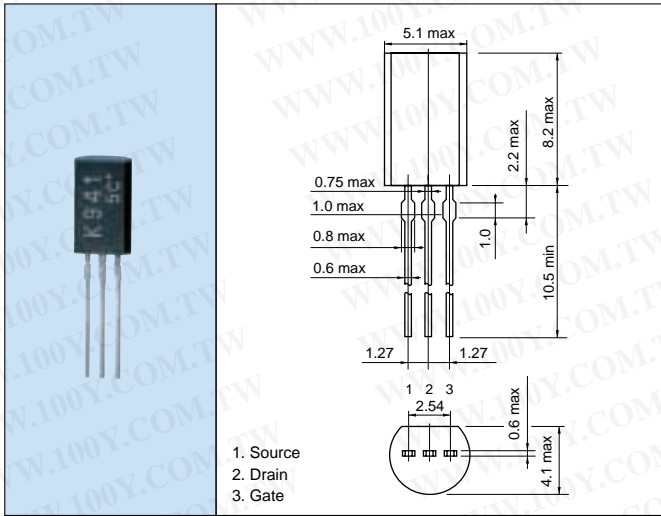
Packing quantity

1500pcs / reel

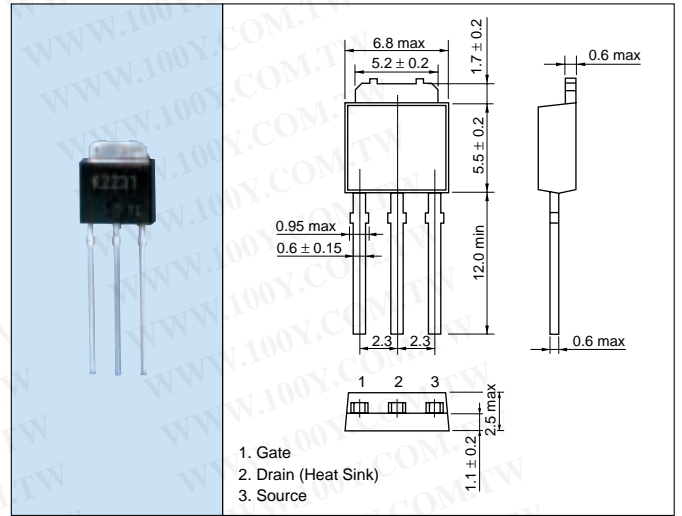
# 8 Package List

## 2. Through-Hole Package

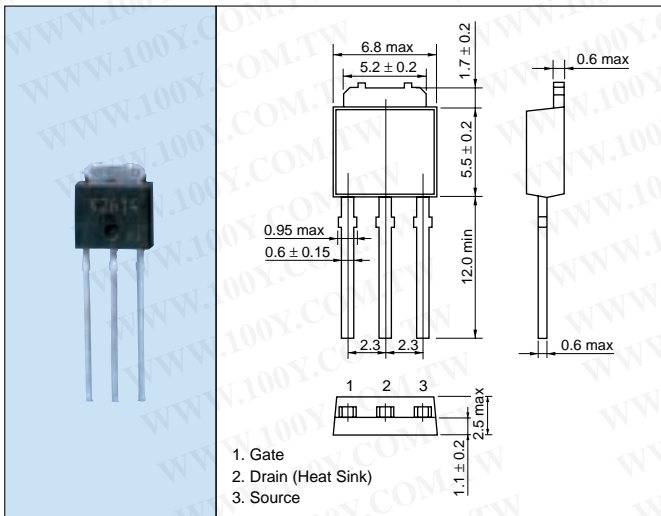
### ■ LSTM



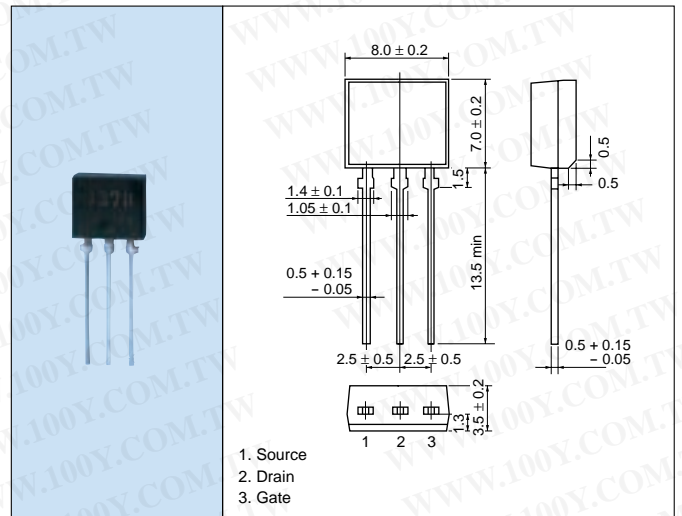
### ■ PW-Mold (Straight)



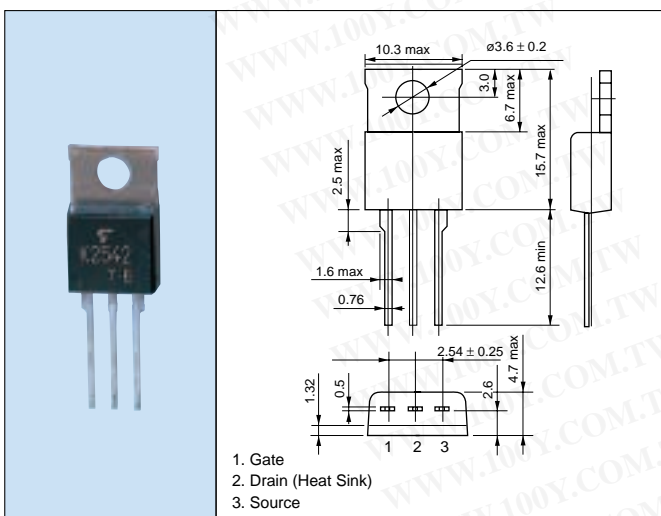
### ■ DP (Straight)



### ■ TPS



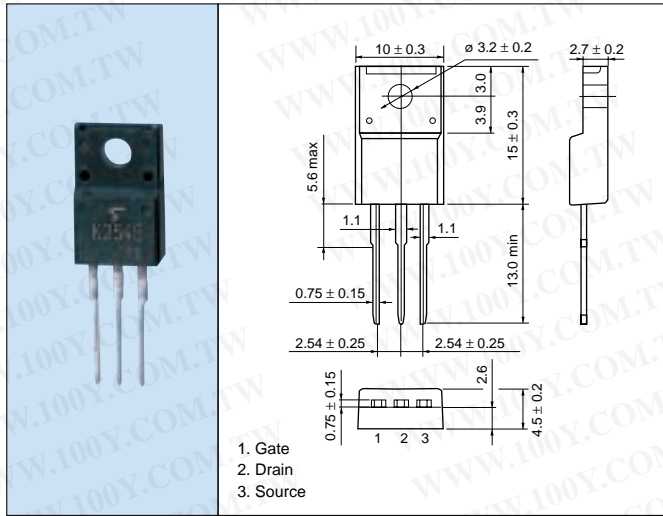
### ■ TO-220AB



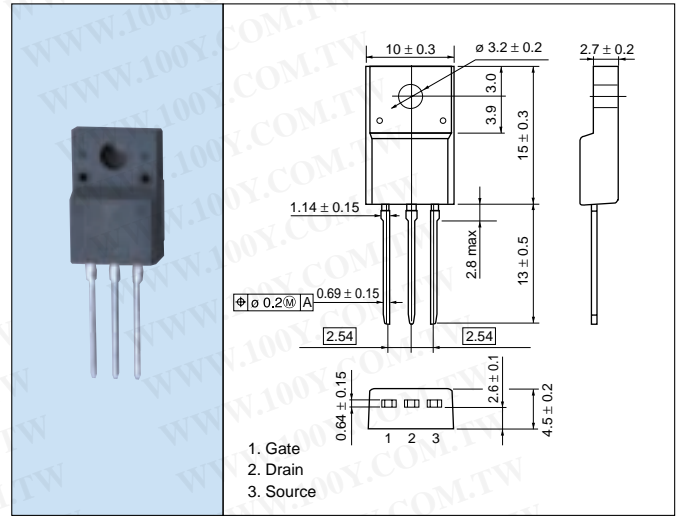
勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)



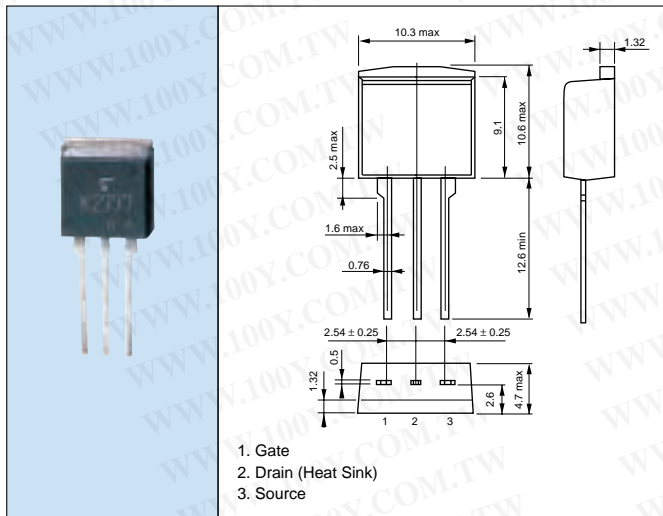
### TO-220NIS



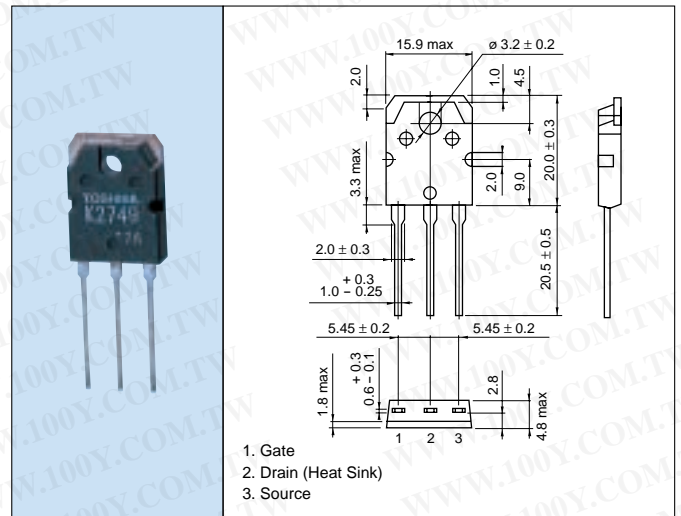
### TO-220SIS



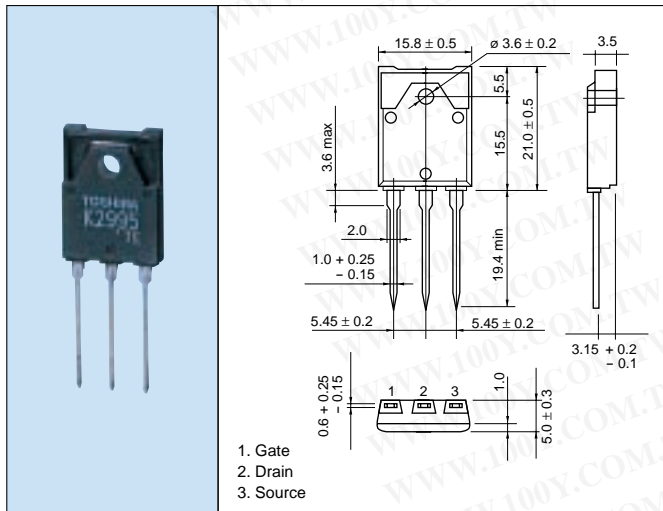
### TO-220FL



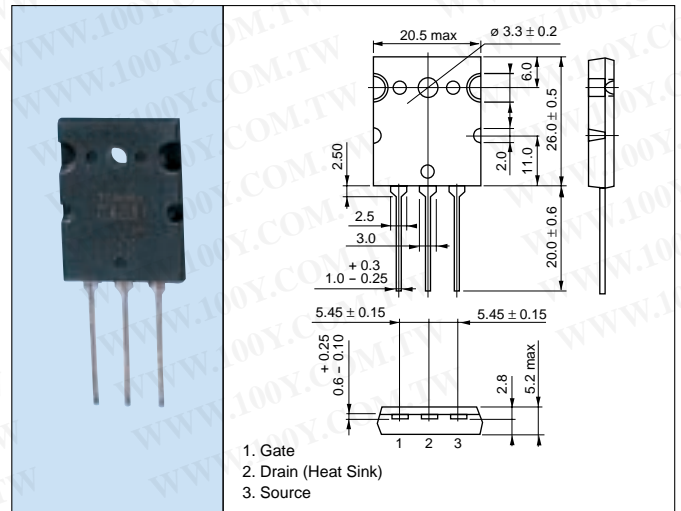
### TO-3P(N)



### TO-3P(N)IS



### TO-3P(L)



**Toshiba America  
Electronic Components, Inc.**

**Headquarters-Irvine, CA**  
1990 MacArthur Boulevard,  
Suite 400, Irvine, CA 92612, U.S.A.  
Tel: (949)623-2900 Fax: (949)474-1330

**Boulder, CO (Denver)**  
3100 Arapahoe #500,  
Boulder, CO 80303, U.S.A.  
Tel: (303)442-3801 Fax: (303)442-7216

**Buffalo Grove (Chicago)**  
2150 E. Lake Cook Road, Suite 310,  
Buffalo Grove, IL 60089, U.S.A.  
Tel: (847)484-2400 Fax: (847)541-7287

**Duluth, GA (Atlanta)**  
3700 Crestwood Pkwy, #160,  
Duluth, GA 30096, U.S.A.  
Tel: (770)931-3363 Fax: (770)931-7602

**Beaverton/Portland, OR**  
8323 SW Cirrus Drive, Beaverton,  
OR 97008, U.S.A.  
Tel: (503)466-3721 Fax: (503)629-0827

**Raleigh, NC**  
3120 Highwoods Blvd., #108, Raleigh,  
NC 27604, U.S.A.  
Tel: (919)859-2800 Fax: (919)859-2898

**Richardson, TX (Dallas)**  
777 East Campbell Rd., #650, Richardson,  
TX 75081, U.S.A.  
Tel: (972)480-0470 Fax: (972)235-4114

**San Jose Engineering Center, CA**  
1060 Rincon Circle, San Jose, CA 95131, U.S.A.  
Tel: (408)526-2400 Fax: (408)526-8910

**Wakefield, MA (Boston)**  
401 Edgewater Place, #360, Wakefield,  
MA 01880-6229, U.S.A.  
Tel: (781)224-0074 Fax: (781)224-1095

**Wixom (Detroit)**  
48679 Alpha Drive, Suite 100, Wixom,  
MI 48393 U.S.A.  
Tel: (248)449-6165 Fax: (248)449-8430

**Toshiba Electronics do Brasil Ltda.**  
Rua Afonso Celso, 552-8 andar, CJ. 81  
Vila Mariana Cep 04119-002 São Paulo SP, Brasil  
Tel: (011)5576-6619 Fax: (011)5576-6607

**Toshiba India Private Ltd.**  
6F DR, Gopal Das Bhawan 28,  
Barakhamba Road, New Delhi, 110001, India  
Tel: (011)2371-4601 Fax: (011)2371-4603

**Toshiba Electronics Europe GmbH**

**Düsseldorf Head Office**  
Hansaallee 181, D-40549 Düsseldorf,  
Germany  
Tel: (0211)5296-0 Fax: (0211)5296-400

**München Office**  
Büro München Hofmannstrasse 52,  
D-81379, München, Germany  
Tel: (089)748595-0 Fax: (089)748595-42

**France Branch**  
Les Jardins du Golf 6 rue de Rome 93561,  
Rosny-Sous-Bois, Cedex, France  
Tel: (1)48-12-48-12 Fax: (1)48-94-51-15

**Italy Branch**  
Centro Direzionale Colleoni,  
Palazzo Perseo 3,  
I-20041 Agrate Brianza, (Milan), Italy  
Tel: (039)68701 Fax: (039)6870205

**Spain Branch**  
Parque Empresarial, San Fernando, Edificio Europa,  
1ª Planta, E-28631 Madrid, Spain  
Tel: (91)660-6798 Fax: (91)660-6799

**U.K. Branch**  
Riverside Way, Camberley Surrey,  
GU15 3YA, U.K.  
Tel: (01276)69-4600 Fax: (01276)69-4800

**Sweden Branch**  
Gustavslundsvägen 18, 5th Floor,  
S-167 15 Bromma, Sweden  
Tel: (08)704-0900 Fax: (08)80-8459

**Toshiba Electronics Asia  
(Singapore) Pte. Ltd.**

**Singapore Head Office**  
438B Alexandra Road, #06-08/12 Alexandra  
Technopark, Singapore 119968  
Tel: (6278)5252 Fax: (6278)5155

**Toshiba Electronics Service  
(Thailand) Co., Ltd.**  
135 Moo 5, Bangkadi Industrial Park, Tivanon Road,  
Pathumthani, 12000, Thailand  
Tel: (02)501-1635 Fax: (02)501-1638

**Toshiba Electronics Trading  
(Malaysia) Sdn. Bhd.**

**Kuala Lumpur Head Office**  
Suite W1203, Wisma Consplant, No.2,  
Jalan SS 16/4, Subang Jaya, 47500 Petaling Jaya,  
Selangor Darul Ehsan, Malaysia  
Tel: (03)5631-6311 Fax: (03)5631-6307

**Penang Office**  
Suite 13-1, 13th Floor, Menara Penang Garden,  
42-A, Jalan Sultan Ahmad Shah,  
10050 Penang, Malaysia  
Tel: (04)226-8523 Fax: (04)226-8515

**Toshiba Electronics Philippines, Inc.**  
26th Floor, Citibank Tower, Valero Street, Makati,  
Manila, Philippines  
Tel: (02)750-5510 Fax: (02)750-5511

**Toshiba Electronics Asia, Ltd.**

**Hong Kong Head Office**  
Level 11, Tower 2, Grand Century  
Place, No.193, Prince Edward Road West,  
Mongkok, Kowloon, Hong Kong  
Tel: 2375-6111 Fax: 2375-0969

**Beijing Office**  
Room 714, Beijing Fortune Building,  
No.5 Dong San Huan Bei-Lu, Chao Yang District,  
Beijing, 100004, China  
Tel: (010)6590-8796 Fax: (010)6590-8791

**Chengdu Office**  
Suite 403A, Holiday Inn Crown Plaza 31, Zongfu Street,  
Chengdu, 610016, Sichuan, China  
Tel: (028)8675-1773 Fax: (028)8675-1065

**Qingdao Office**  
Room 4(D-E), 24F, International Financial Center,  
59 Xiang Gang Zhong Road, Qingdao,  
Shandong, China  
Tel: (0532)579-3328 Fax: (0532)579-3329

**Toshiba Electronics Shenzhen Co., Ltd.**  
Room 2601-2609, 2616, Office Tower Shun Hing Square,  
Di Wang Commercial Center, 5002 Shennan Road East,  
Shenzhen, 518008, China  
Tel: (0755)2583-0827 Fax: (0755)8246-1581

**Toshiba Electronics Korea Corporation**

**Seoul Head Office**  
891, Sejong Securities Bldg. 20F, Daechi-dong,  
Gangnam-gu, Seoul, 135-738, Korea  
Tel: (02)3484-4334 Fax: (02)3484-4302

**Gumi Office**  
6F, Goodmorning Securities Building,  
56 Songjung-dong, Gumi-shi,  
Kyeongbuk, 730-090, Korea  
Tel: (054)456-7613 Fax: (054)456-7617

**Toshiba Electronics (Shanghai) Co., Ltd.**  
11F, HSBC Tower, 101  
Yin Cheng East Road, Pudong New Area, Shanghai,  
200120, China  
Tel: (021)6841-0666 Fax: (021)6841-5002

**Hangzhou Office**  
502 JiaHua International Business Center,  
No.28 HangDa Road, Hangzhou, 310007, China  
Tel: (0571)8717-5004 Fax: (0571)8717-5013

**Tsurong Xiamen Xiangyu Trading Co., Ltd.**  
14G, International Bank BLDG., No.8 Lujiang Road,  
Xiamen, 361001, China  
Tel: (0592)226-1398 Fax: (0592)226-1399

**Toshiba Electronics Taiwan Corporation**

**Taipei Head Office**  
17F, Union Enterprise Plaza Building, 109  
Min Sheng East Road, Section 3, Taipei, 10544, Taiwan  
Tel: (02)2514-9988 Fax: (02)2514-7892

**Kaohsiung Office**  
16F-A, Chung-Cheng Building, 2, Chung-Cheng 3Road,  
Kaohsiung, 80027, Taiwan  
Tel: (07)237-0826 Fax: (07)236-0046

The information contained herein is subject to change without notice. 021023\_D

The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of TOSHIBA or others. 021023\_C

TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc. 021023\_A

The Toshiba products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These Toshiba products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc. Unintended Usage of Toshiba products listed in this document shall be made at the customer's own risk. 021023\_B

TOSHIBA products should not be embedded to the downstream products which are prohibited to be produced and sold, under any law and regulations. 030519\_Q

勝特力材料 886-3-5753170  
勝特力电子(上海) 86-21-54151736  
勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)

**TOSHIBA****TOSHIBA CORPORATION**  
Semiconductor CompanyWebsite: <http://www.semicon.toshiba.co.jp/eng>

© 2005 TOSHIBA CORPORATION

Previous edition: BCE0017B

2005-03(1.0k)PC-DQ

Printed in Japan