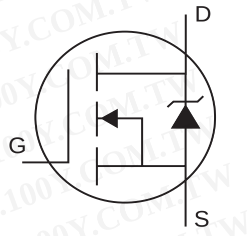
International
IOR Rectifier

PD-91651C

FB180SA10

HEXFET® Power MOSFET

- Fully Isolated Package
- Easy to Use and Parallel
- Very Low On-Resistance
- Dynamic dv/dt Rating
- Fully Avalanche Rated
- Simple Drive Requirements
- Low Drain to Case Capacitance
- Low Internal Inductance



V_{DSS} = 100V

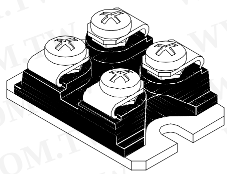
$R_{DS(on)}$ = 0.0065Ω

I_D = 180A

Description

Fifth Generation, high current density HEXFETS are paralled into a compact, high power module providing the best combination of switching, ruggedized design, very low ON resistance and cost effectiveness.

The isolated SOT-227 package is preferred for all commercial - industrial applications at power dissipation levels to approximately 500 watts. The low thermal resistance and easy connection to the SOT-227 package contribute to its universal acceptance throughout the industry.



SOT-227

Absolute Maximum Ratings

	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V	180	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V	120	
I_{DM}	Pulsed Drain Current ①	720	
P_D @T_C = 25°C	Power Dissipation	480	W
	Linear Derating Factor	2.7	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy②	700	mJ
I_{AR}	Avalanche Current①	180	A
E_{AR}	Repetitive Avalanche Energy①	48	mJ
dv/dt	Peak Diode Recovery dv/dt ③	5.7	V/ns
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	℃
V_{ISO}	Insulation Withstand Voltage (AC-RMS)	2.5	kV
	Mounting torque, M4 srew	1.3	N•m

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	——	0.26	°C/W
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	0.05	——	

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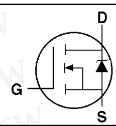
Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	100	——	——	V	V_{GS} = 0V, I_D = 250μA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	——	0.093	——	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	——	——	0.0065	W	V_{GS} = 10V, I_D = 108A ④
$V_{GS(th)}$	Gate Threshold Voltage	2.0	——	4.0	V	V_{DS} = V_{GS}, I_D = 250μA
g_{fs}	Forward Transconductance	93	——	——	S	V_{DS} = 25V, I_D = 108A
I_{DSS}	Drain-to-Source Leakage Current	——	——	50	μA	V_{DS} = 100V, V_{GS} = 0V
		——	——	500		V_{DS} = 80V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	——	——	200	nA	V_{GS} = 20V
	Gate-to-Source Reverse Leakage	——	——	-200		V_{GS} = -20V
Q_g	Total Gate Charge	——	250	380	nC	I_D = 180A
Q_{gs}	Gate-to-Source Charge	——	40	60		V_{DS} = 80V
Q_{gd}	Gate-to-Drain ("Miller") Charge	——	110	165		V_{GS} = 10.0V, See Fig. 6 and 13 ④
$t_{d(on)}$	Turn-On Delay Time	——	45	——	ns	V_{DD} = 50V
t_r	Rise Time	——	351	——		I_D = 180A
$t_{d(off)}$	Turn-Off Delay Time	——	181	——		R_G = 2.0W (Internal)
t_f	Fall Time	——	335	——		R_D = 0.27W, See Fig. 10 ④
L_S	Internal Source Inductance	——	5.0	——	nH	Between lead, and center of die contact
C_{iss}	Input Capacitance	——	10700	——	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	——	2800	——		V_{DS} = 25V
C_{rss}	Reverse Transfer Capacitance	——	1300	——		f = 1.0MHz, See Fig. 5

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	——	——	180	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	——	——	720		
V_{SD}	Diode Forward Voltage	——	——	1.3	V	T_J = 25°C, I_S = 180A, V_{GS} = 0V ④
t_{rr}	Reverse Recovery Time	——	300	450	ns	T_J = 25°C, I_F = 180A
Q_{rr}	Reverse Recovery Charge	——	2.6	3.9	μC	di/dt = 100A/μs ④
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

Notes:

① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)

② Starting T_J = 25°C, L =43μH
R_G = 25W, I_{AS} = 180A. (See Figure 12)

③ I_{SD} £ 180A, di/dt £83A/μs, V_{DD} £ $V_{(BR)DSS}$,
T_J £ 150°C

④ Pulse width £ 300μs; duty cycle £ 2%.

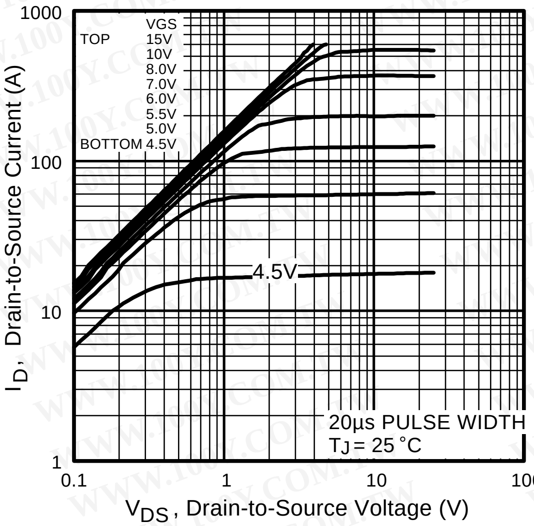


Fig 1. Typical Output Characteristics

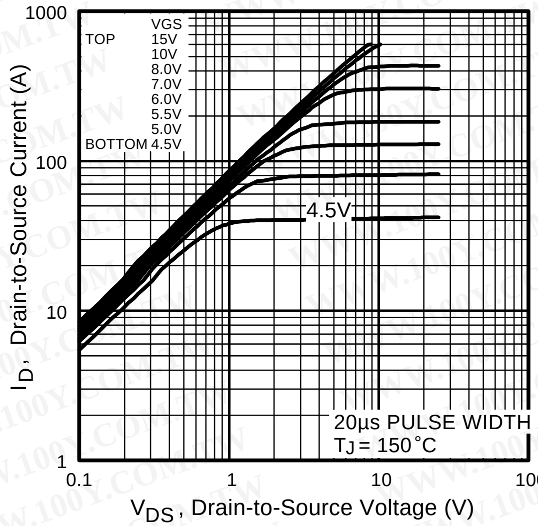


Fig 2. Typical Output Characteristics

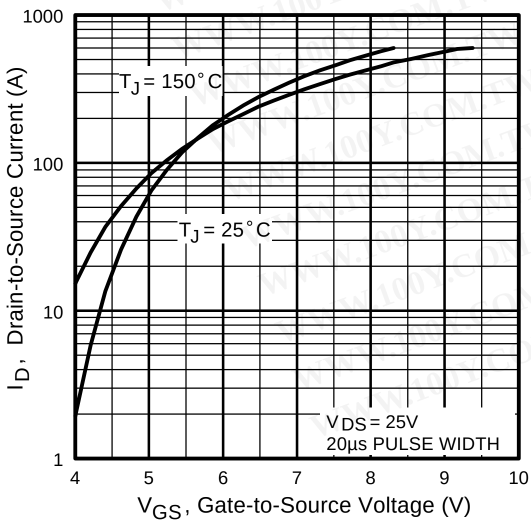


Fig 3. Typical Transfer Characteristics

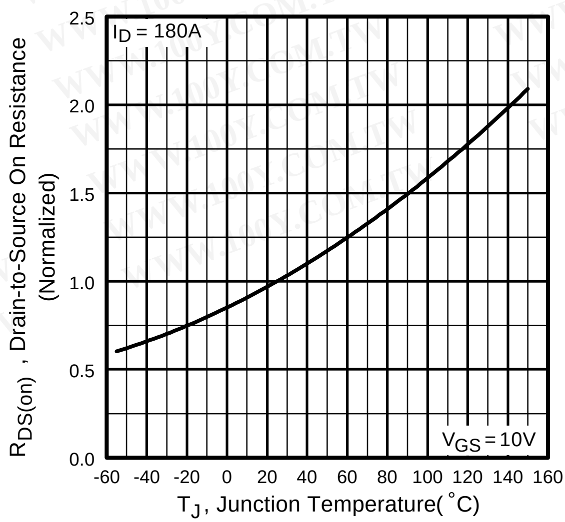


Fig 4. Normalized On-Resistance Vs. Temperature

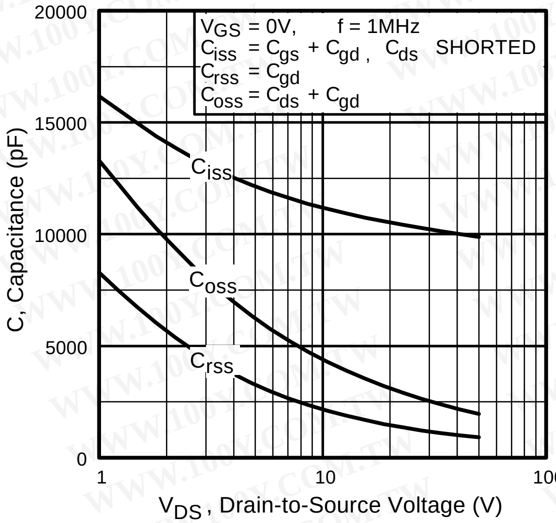


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

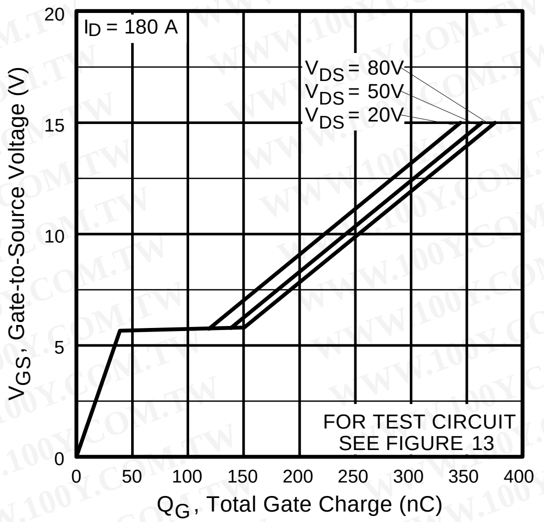


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

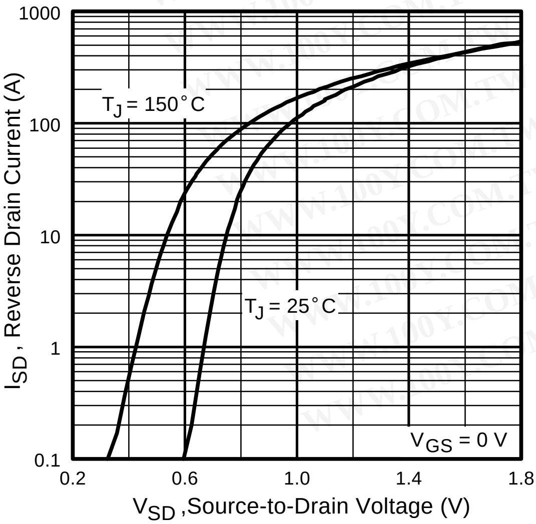


Fig 7. Typical Source-Drain Diode Forward Voltage

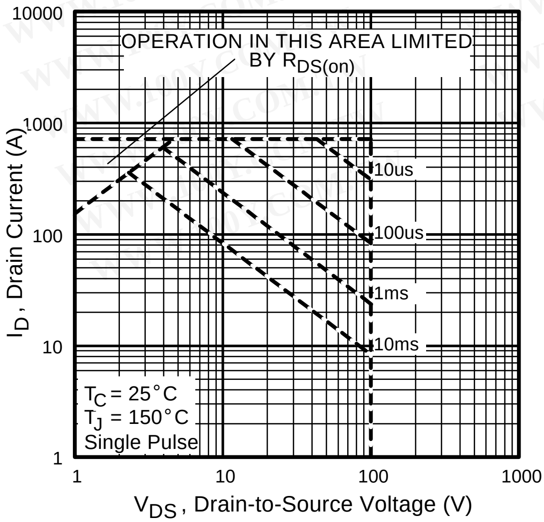


Fig 8. Maximum Safe Operating Area

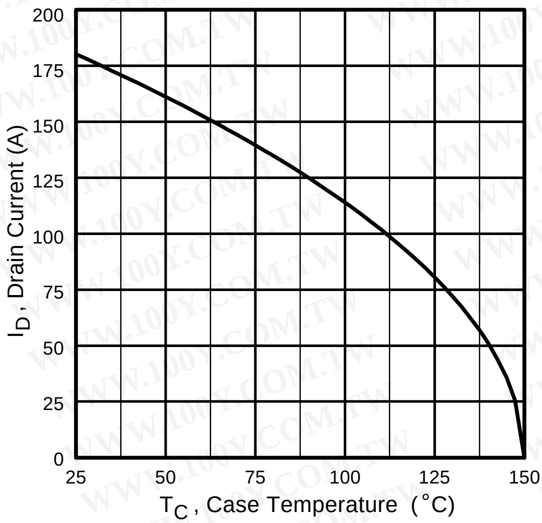


Fig 9. Maximum Drain Current Vs. Case Temperature

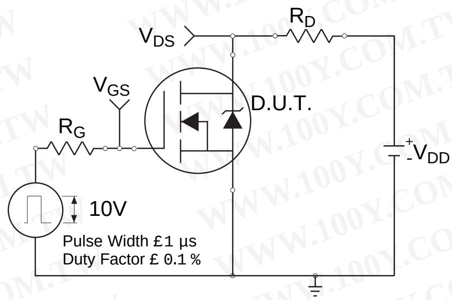


Fig 10a. Switching Time Test Circuit

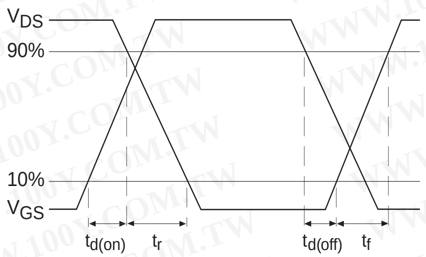


Fig 10b. Switching Time Waveforms

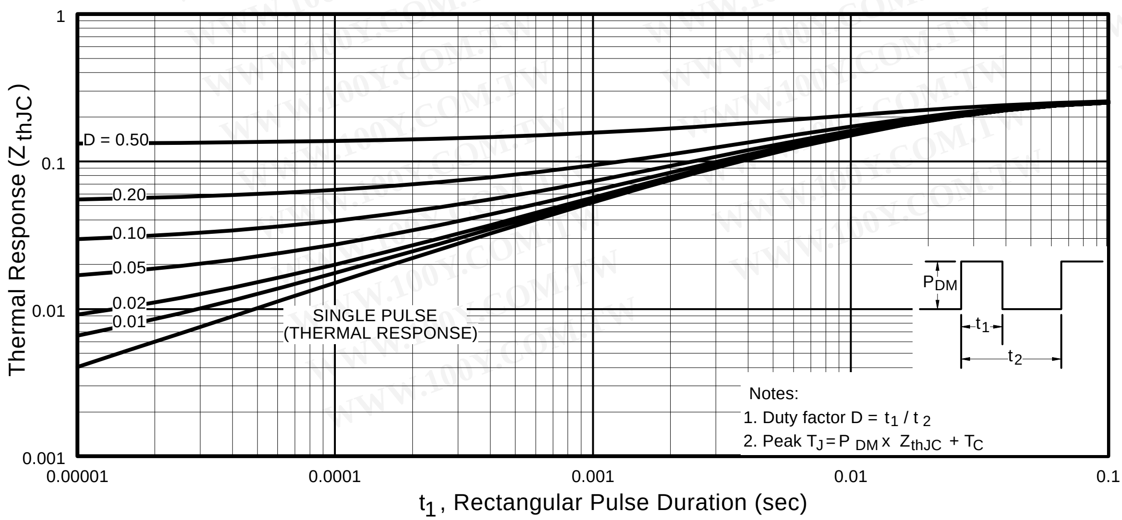


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

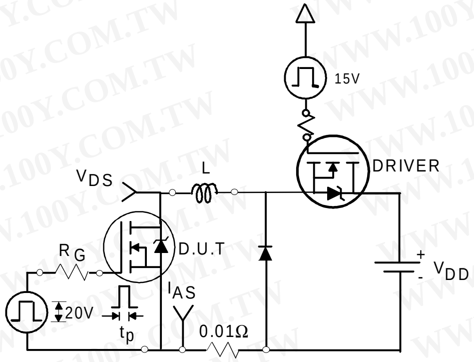


Fig 12a. Unclamped Inductive Test Circuit

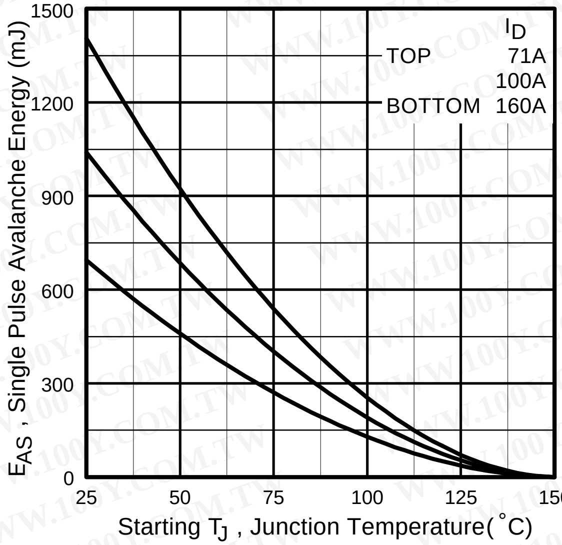


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

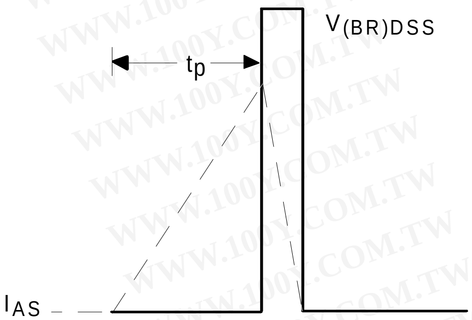


Fig 12b. Unclamped Inductive Waveforms

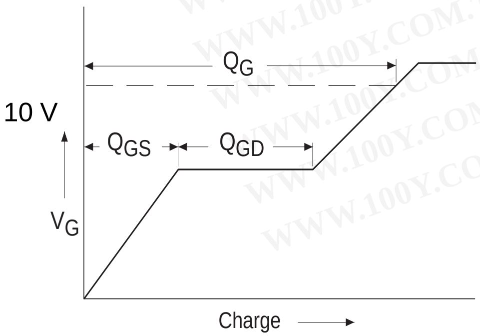


Fig 13a. Basic Gate Charge Waveform

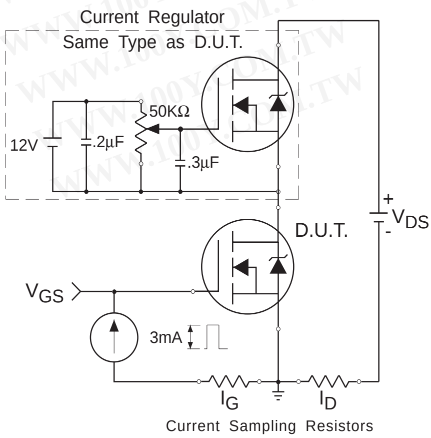
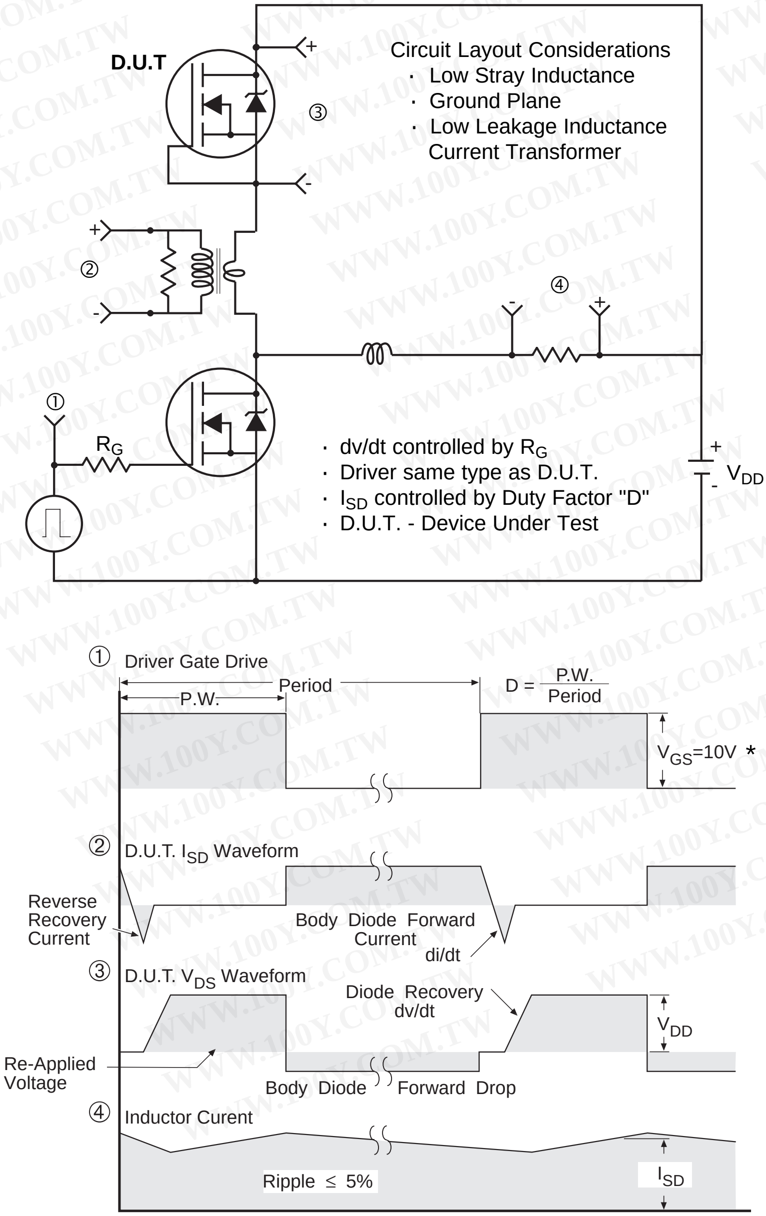


Fig 13b. Gate Charge Test Circuit

Peak Diode Recovery dv/dt Test Circuit



* V_{GS} = 5V for Logic Level Devices

Fig 14. For N-Channel HEXFETS

FB180SA10

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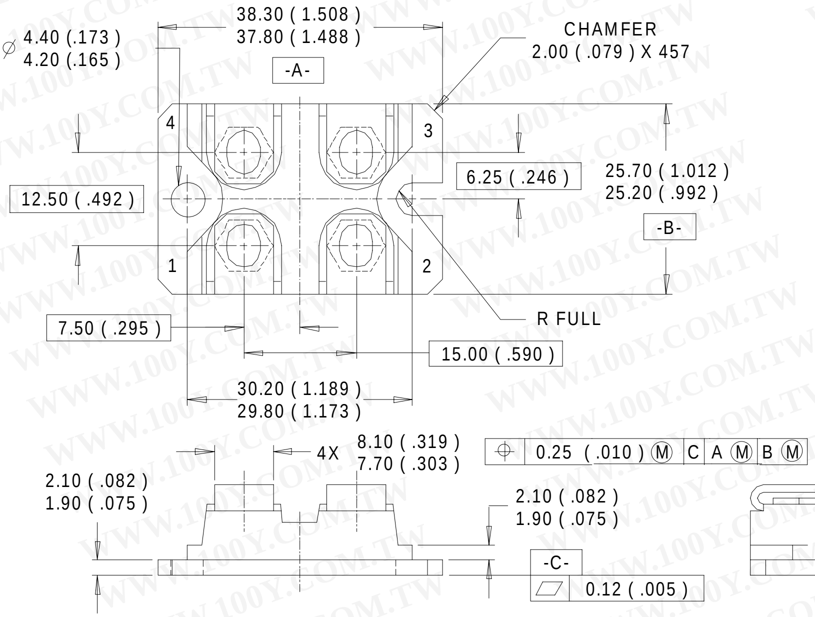
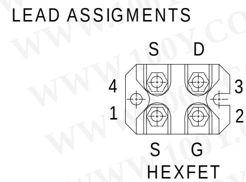
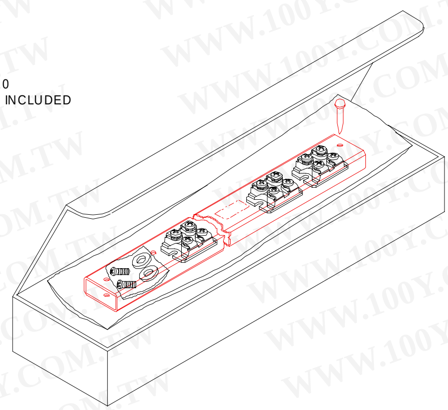
SOT-227 Package Details





Tube

QUANTITY PER TUBE IS 10
M4 SREW AND WASHER INCLUDED



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