CEP6060L/CEB6060L

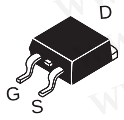
CET

March 1998

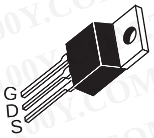
N-Channel Enhancement Mode Field Effect Transistor

FEATURES

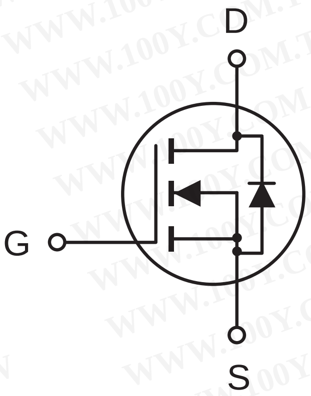
- 60V , 48A , $R_{DS(ON)}$=20mΩ @V_{GS}=10V.
  $R_{DS(ON)}$=25mΩ @V_{GS}= 5 V.
- Super high dense cell design for extremely low $R_{DS(ON)}$.
- High power and current handling capability.
- TO-220 & TO-263 package.



CEB SERIES
TO-263(DD-PAK)



CEP SERIES
TO-220



ABSOLUTE MAXIMUM RATINGS (T_C=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±16	V
Drain Current -Continuous	I_D	48	A
-Pulsed	I_{DM}	144	A
Drain-Source Diode Forward Current	I_S	48	A
Maximum Power Dissipation @T_C=25°C	P_D	100	W
Derate above 25°C		0.67	W/ °C
Operating and Storage Temperature Range	T_J, T_{STG}	-65 to 175	°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.5	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	°C/W

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ELECTRICAL CHARACTERISTICS (Tc=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250µA	60			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60V, V_{GS} = 0V			25	µA
Gate-Body Leakage	I_{GSS}	V_{GS} = ±16V, V_{DS} = 0V			±100	nA
ON CHARACTERISTICS[a]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} V_{GS}, I_D = 250µA	1	1.4	2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS} = 5V, I_D = 24A		19	25	mΩ
		V_{GS} = 10V, I_D = 24A		15	20	mΩ
On-State Drain Current	$I_{D(ON)}$	V_{GS} = 5V, V_{DS} = 10V	60			A
Forward Transconductance	g_{FS}	V_{DS} = 10V, I_D = 24A		39		S
DYNAMIC CHARACTERISTICS[b]						
Input Capacitance	C_{ISS}	V_{DS} =25V, V_{GS} = 0V f =1.0MHz		1565	2000	pF
Output Capacitance	C_{OSS}			441	600	pF
Reverse Transfer Capacitance	C_{RSS}			104	140	pF
SWITCHING CHARACTERISTICS[b]						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD} = 30V, I_D = 48A, V_{GS}= 5V R_{GEN} = 15Ω		20	30	ns
Rise Time	t_r			400	500	ns
Turn-Off Delay Time	$t_{D(OFF)}$			75	100	ns
Fall Time	t_f			260	300	ns
Total Gate Charge	Q_g	V_{DS} =48V, I_D = 48A, V_{GS} =10V		37	44	nC
Gate-Source Charge	Q_{gs}			7		nC
Gate-Drain Charge	Q_{gd}			12		nC

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ELECTRICAL CHARACTERISTICS (T_C=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS [a]						
Diode Forward Voltage	V_{SD}	V_{GS} = 0V, I_S =24A		0.8	1.3	V

Notes

a.Pulse Test:Pulse Width ≤300 μs, Duty Cycle ≤ 2%.

b.Guaranteed by design, not subject to production testing.

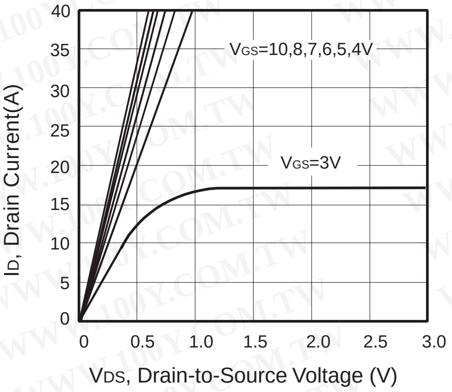

Figure 1. Output Characteristics

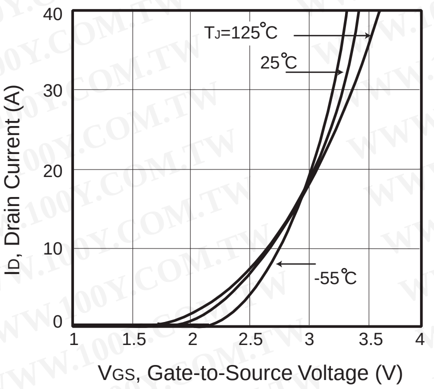

Figure 2. Transfer Characteristics

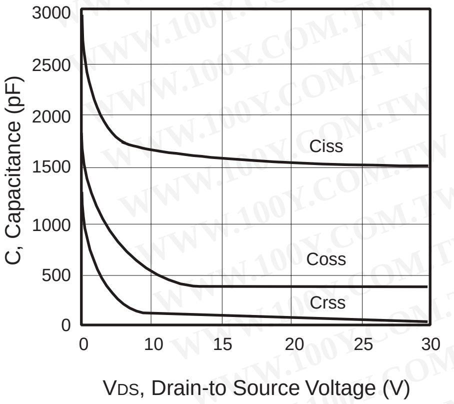

Figure 3. Capacitance

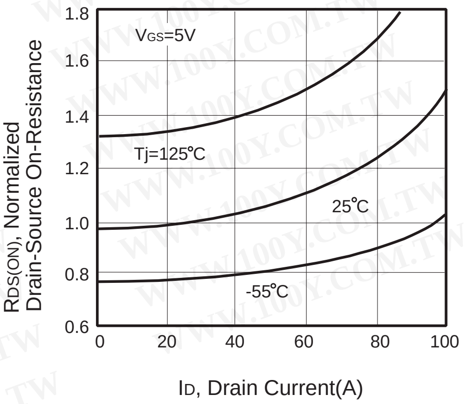

Figure 4. On-Resistance Variation with Drain Current and Temperature

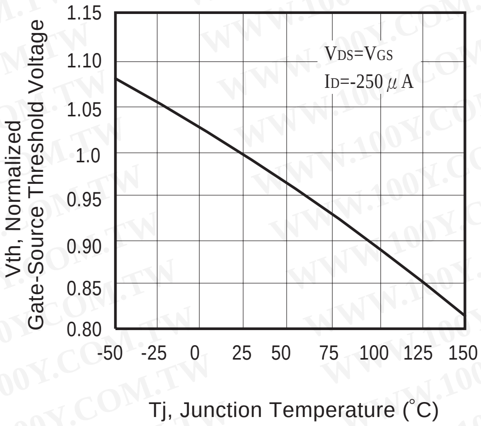

Figure 5. Gate Threshold Variation with Temperature

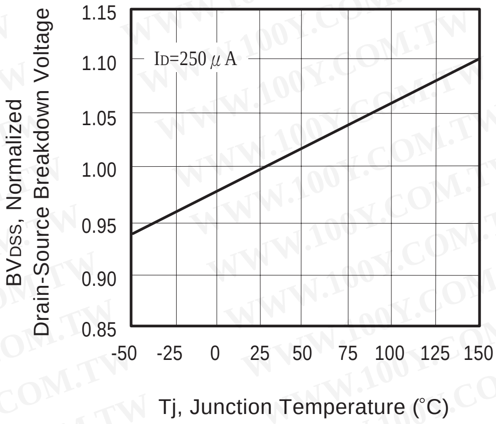

Figure 6. Breakdown Voltage Variation with Temperature

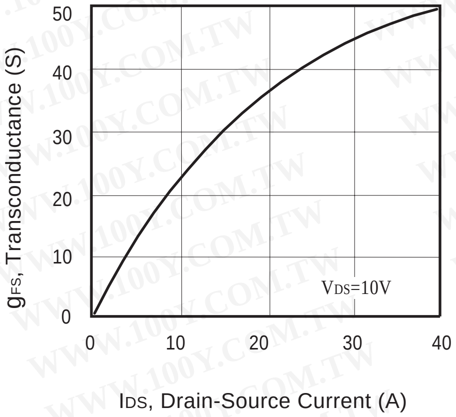

Figure 7. Transconductance Variation with Drain Current

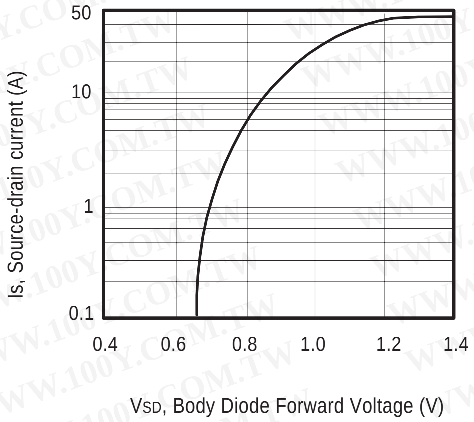

Figure 8. Body Diode Forward Voltage Variation with Source Current

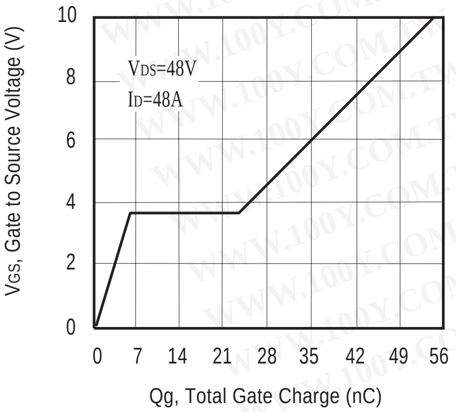

Figure 9. Gate Charge

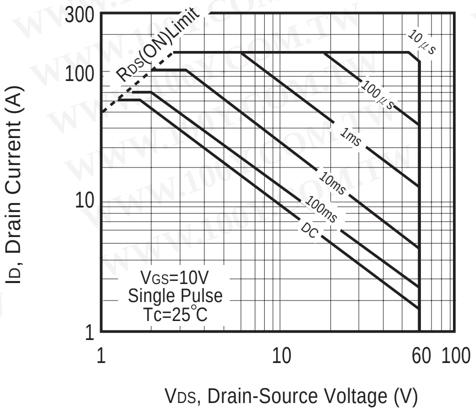

Figure 10. Maximum Safe Operating Area

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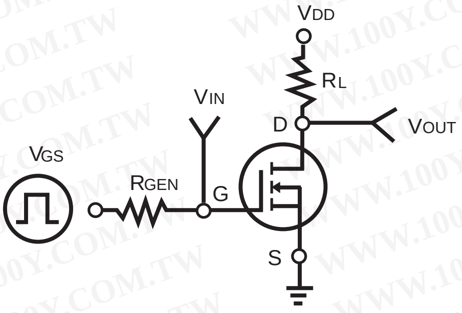


Figure 11. Switching Test Circuit

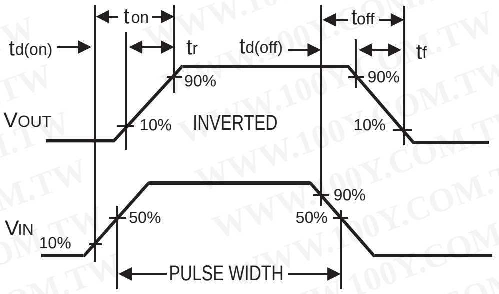
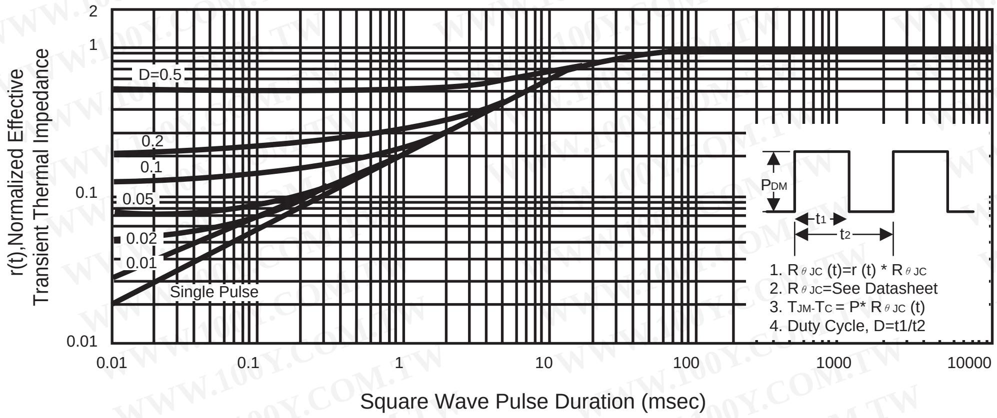


Figure 12. Switching Waveforms



1. $R_{\theta JC}$ (t)=r (t) * $R_{\theta JC}$
2. $R_{\theta JC}$=See Datasheet
3. T_{JM}-T_C = P* $R_{\theta JC}$ (t)
4. Duty Cycle, D=t1/t2

Figure 13. Normalized Thermal Transient Impedance Curve