



CEP4060ALR/CEB4060ALR

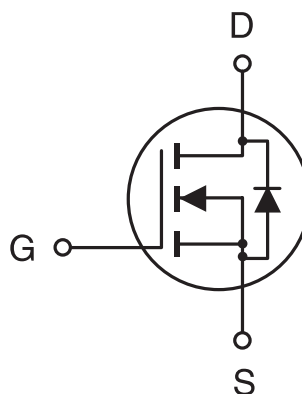
March 1998

N-Channel Enhancement Mode Field Effect Transistor

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FEATURES

- 60V , 15A , $R_{DS(ON)}=80m\Omega$ @ $V_{GS}=10V$.
 $R_{DS(ON)}=85m\Omega$ @ $V_{GS}=5.0V$.
- Super high dense cell design for extremely low $R_{DS(ON)}$.
- High power and current handling capability.
- TO-220 & TO-263 package.



ABSOLUTE MAXIMUM RATINGS ($T_c=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 16	V
Drain Current-Continuous -Pulsed	I_D	15	A
	I_{DM}	45	A
Drain-Source Diode Forward Current	I_S	15	A
Maximum Power Dissipation @ $T_c=25^{\circ}C$ Derate above $25^{\circ}C$	P_D	50	W
		0.3	W/ $^{\circ}C$
Operating and Storage Temperature Range	T_J, T_{STG}	-65 to 175	$^{\circ}C$

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3	$^{\circ}C/W$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	$^{\circ}C/W$

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
DRAIN-SOURCE AVALANCHE RATING^a						
Single Pulse Drain-Source Avalanche Energy	E _{AS}	V _{DD} =25V, I _D =150A		430		mJ
Maximum Drain-Source Avalanche Current	I _{AS}	L=25μH		150		A
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			250	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	1.5	2	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =5V, I _D =7.5A		72	85	mΩ
		V _{GS} =10V, I _D =15A		58	80	mΩ
On-State Drain Current	I _{D(ON)}	V _{GS} =5V, V _{DS} =10V	15			A
Forward Transconductance	g _{FS}	V _{DS} =10V, I _D =7.5A		11		S
SWITCHING CHARACTERISTICS^b						
Turn-On Delay Time	t _{D(ON)}	V _{DO} =30V, I _D =15A, V _{GS} =5V, R _{GEN} =51Ω		8	20	ns
Rise Time	t _r			140	250	ns
Turn-Off Delay Time	t _{D(OFF)}			30	100	ns
Fall Time	t _f			60	150	ns
Total Gate Charge	Q _g	V _{DS} =48V, I _D =15A, V _{GS} =5V		15	17	nC
Gate-Source Charge	Q _{gs}			3		nC
Gate-Drain Charge	Q _{gd}			2		nC

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ELECTRICAL CHARACTERISTICS ($T_c=25^{\circ}\text{C}$ unless otherwise noted)

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Parameter	Symbol	Condition	Min	Typ	Max	Unit
DYNAMIC CHARACTERISTICS ^b						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} = 0V f =1.0MHz		430	600	pF
Output Capacitance	C _{OSS}			126	200	pF
Reverse Transfer Capacitance	C _{RSS}			28	50	pF
DRAIN-SOURCE DIODE CHARACTERISTICS ^b						
Diode Forward Voltage	V _{SD}	V _{GS} = 0V, I _S =7.5A		0.9	1.3	V

Notes

a. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2\%$.

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

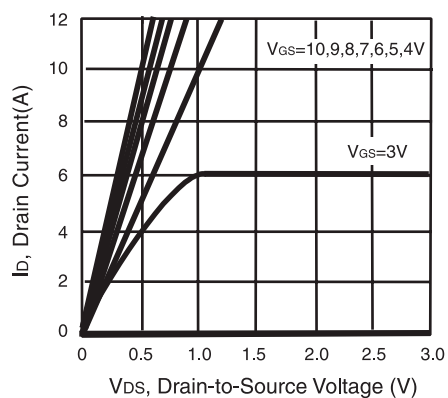


Figure 1. Output Characteristics

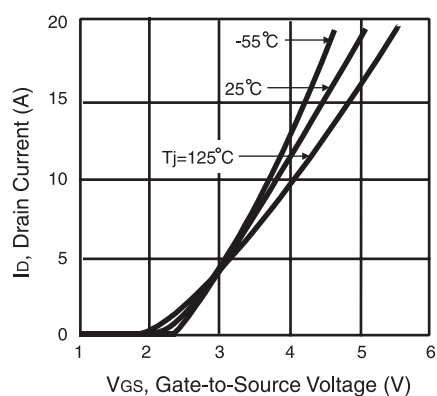


Figure 2. Transfer Characteristics

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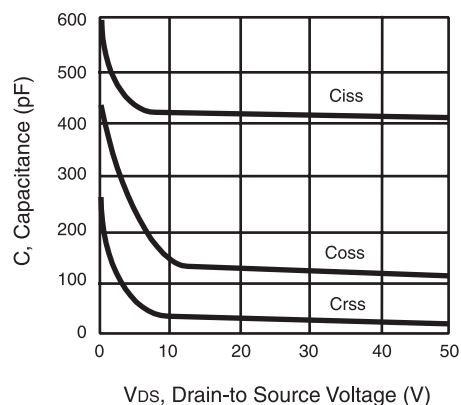


Figure 3. Capacitance

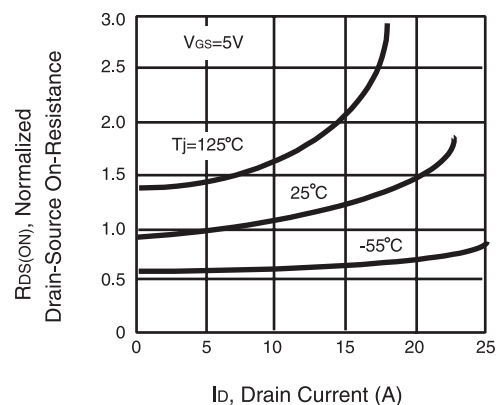


Figure 4. On-Resistance Variation with Drain Current and Temperature

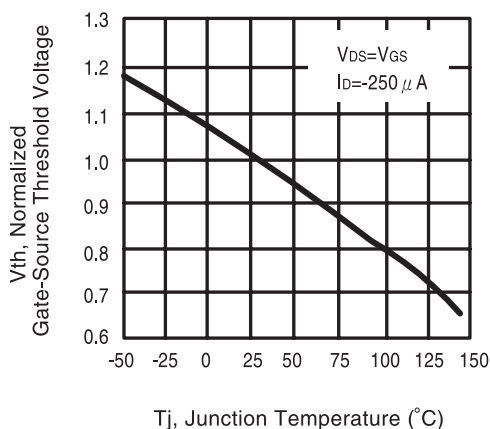


Figure 5. Gate Threshold Variation with Temperature

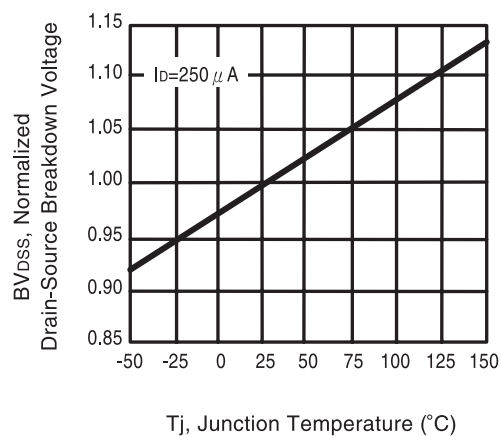


Figure 6. Breakdown Voltage Variation with Temperature

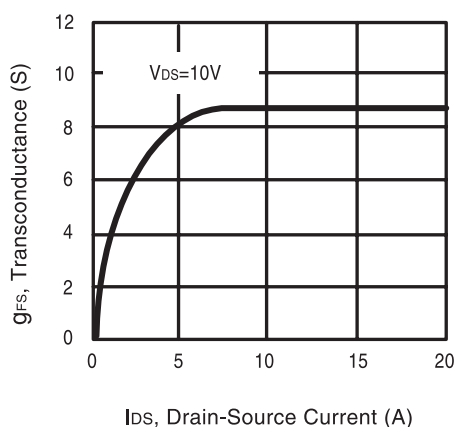


Figure 7. Transconductance Variation with Drain Current

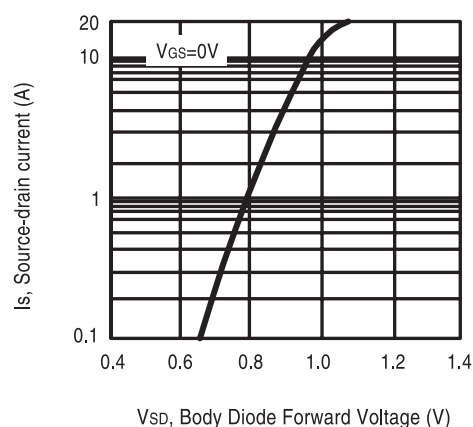


Figure 8. Body Diode Forward Voltage Variation with Source Current

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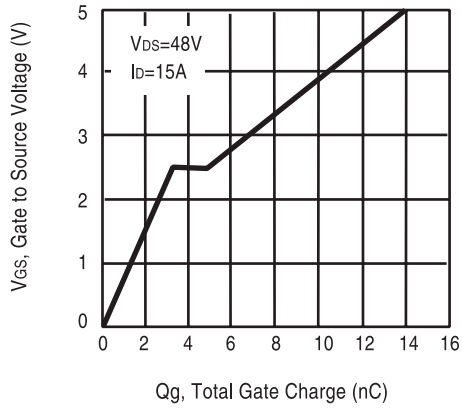


Figure 9. Gate Charge

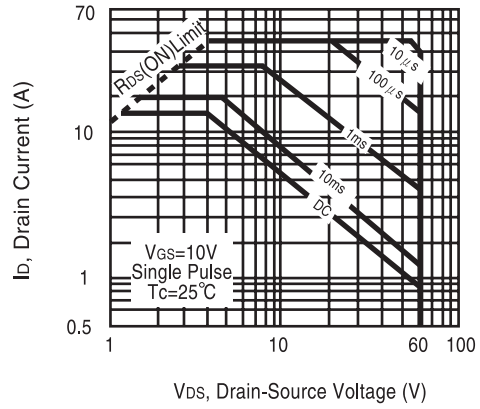


Figure 10. Maximum Safe Operating Area

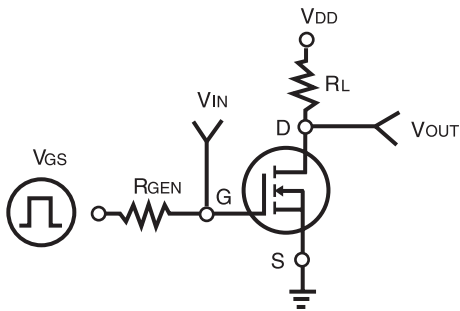


Figure 11. Switching Test Circuit

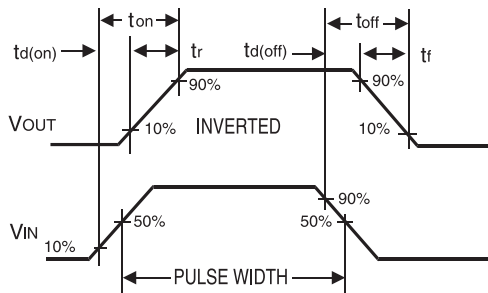


Figure 12. Switching Waveforms

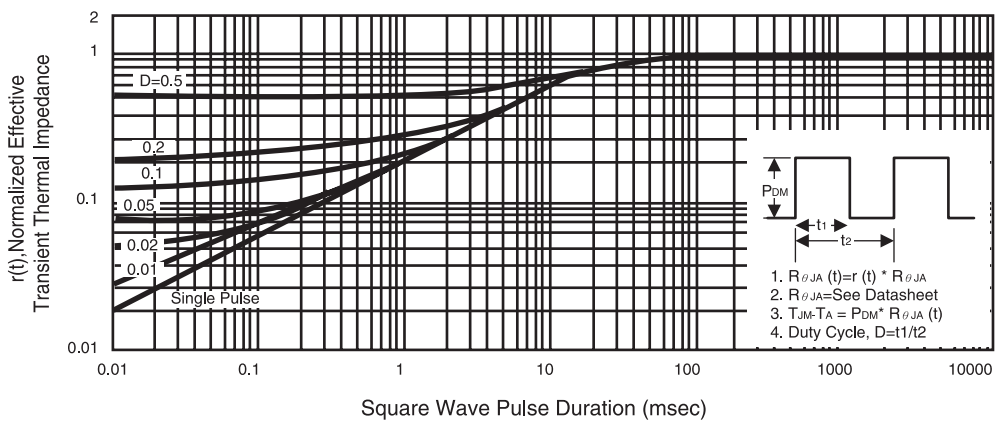


Figure 13. Normalized Thermal Transient Impedance Curve