

CEP4060AR/CEB4060AR



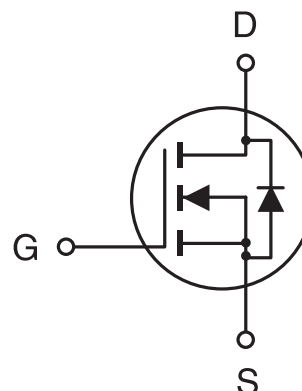
March 1998

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N-Channel Enhancement Mode Field Effect Transistor

FEATURES

- 60V , 15A , $R_{DS(ON)}=85m\Omega$ @ $V_{GS}=10V$.
- 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 ($T_c=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	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 @ $T_c=25^\circ\text{C}$ Derate above 25°C	P_D	50	W
		0.35	W/ $^\circ\text{C}$
Operating and Storage Temperature Range	T_J, T_{STG}	-65 to 175	$^\circ\text{C}$

THERMAL CHARACTERISTICS

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

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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} =±20V, V _{DS} =0V			±100	nA
ON CHARACTERISTICS^a						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2	2.8	4	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =7.5A		66	85	mΩ
On-State Drain Current	I _{D(ON)}	V _{GS} =10V, V _{DS} =10V	15			A
Forward Transconductance	g _{FS}	V _{DS} =10V, I _D =7.5A		6		S
SWITCHING CHARACTERISTICS^b						
Turn-On Delay Time	t _{D(ON)}	V _{DD} =30V, I _D =15A, V _{GS} =10V, V _{GEN} =25Ω		7	20	ns
Rise Time	t _r			65	100	ns
Turn-Off Delay Time	t _{D(OFF)}			15	30	ns
Fall Time	t _f			35	50	ns
Total Gate Charge	Q _g	V _{DS} =48V, I _D =15A, V _{GS} =10V		9	17	nC
Gate-Source Charge	Q _{gs}			2		nC
Gate-Drain Charge	Q _{gd}			4		nC

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
DYNAMIC CHARACTERISTICS^b						
Input Capacitance	C_{ISS}	$V_{DS}=25\text{V}, V_{GS}=0\text{V}$ $f=1.0\text{MHz}$		292	400	pF
Output Capacitance	C_{OSS}			130	200	pF
Reverse Transfer Capacitance	C_{RSS}			36	50	pF
DRAIN-SOURCE DIODE CHARACTERISTICS^b						
Diode Forward Voltage	V_{SD}	$V_{GS}=0\text{V}, I_S=7.5\text{A}$		0.8	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.

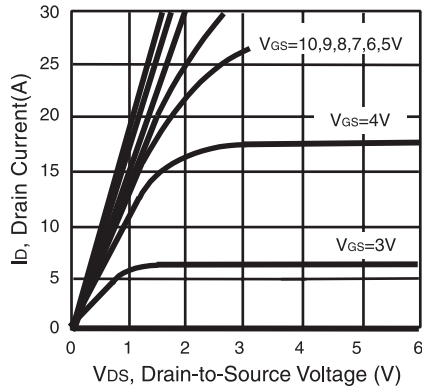


Figure 1. Output Characteristics

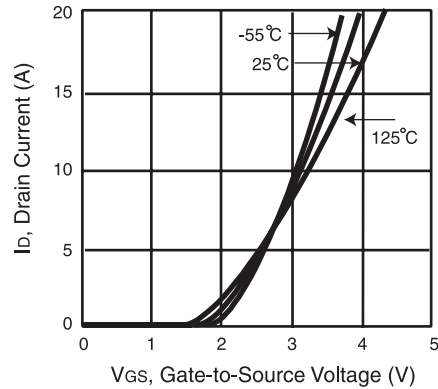


Figure 2. Transfer Characteristics

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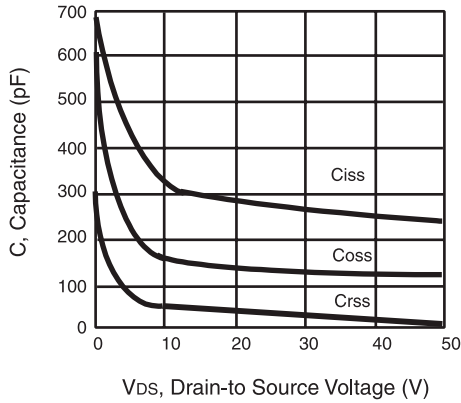


Figure 3. Capacitance

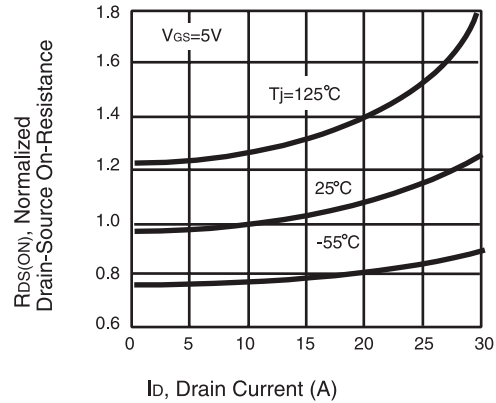


Figure 4. On-Resistance Variation with Drain Current and Temperature

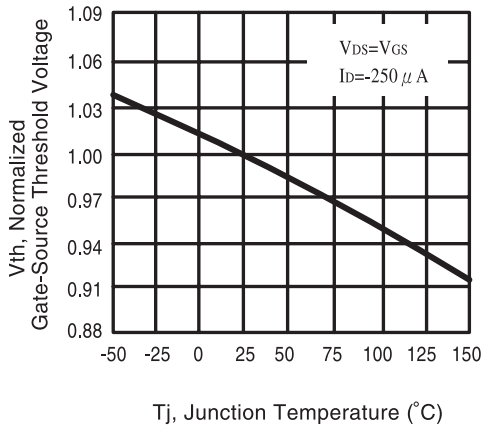


Figure 5. Gate Threshold Variation with Temperature

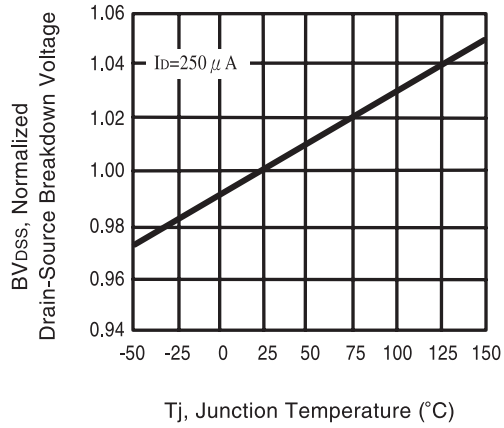


Figure 6. Breakdown Voltage Variation with Temperature

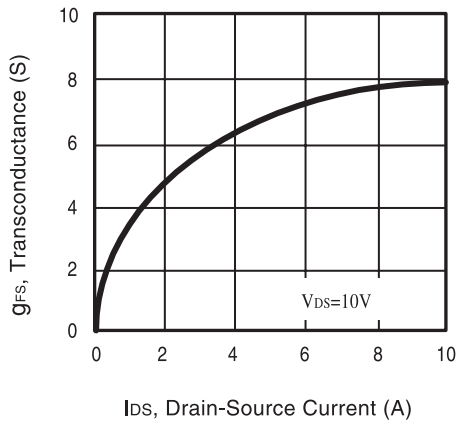


Figure 7. Transconductance Variation with Drain Current

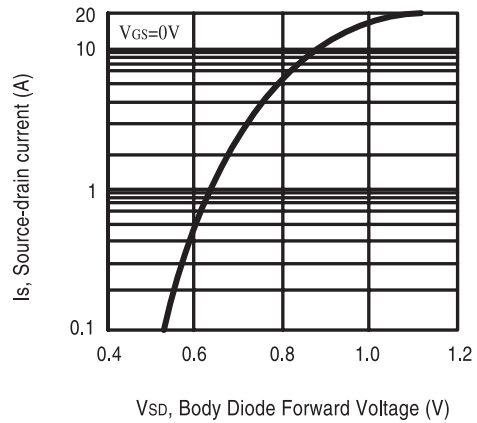


Figure 8. Body Diode Forward Voltage Variation with Source Current

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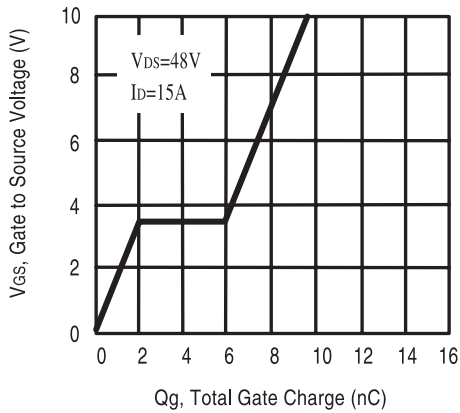


Figure 9. Gate Charge

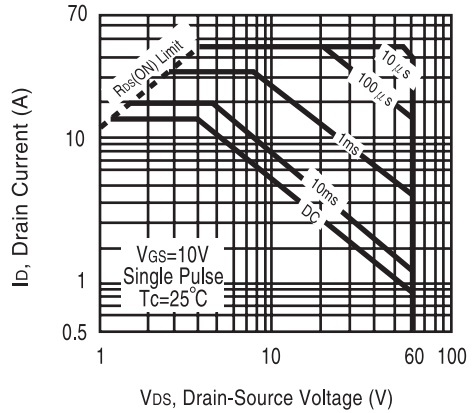


Figure 10. Maximum Safe Operating Area

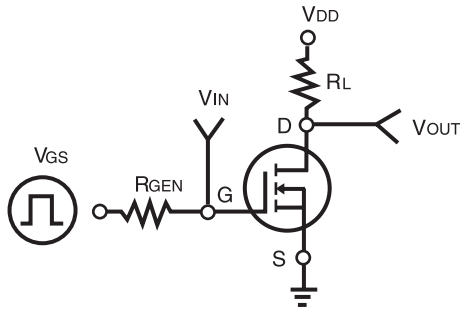


Figure 11. Switching Test Circuit

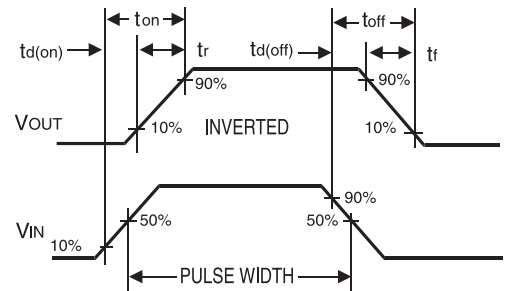


Figure 12. Switching Waveforms

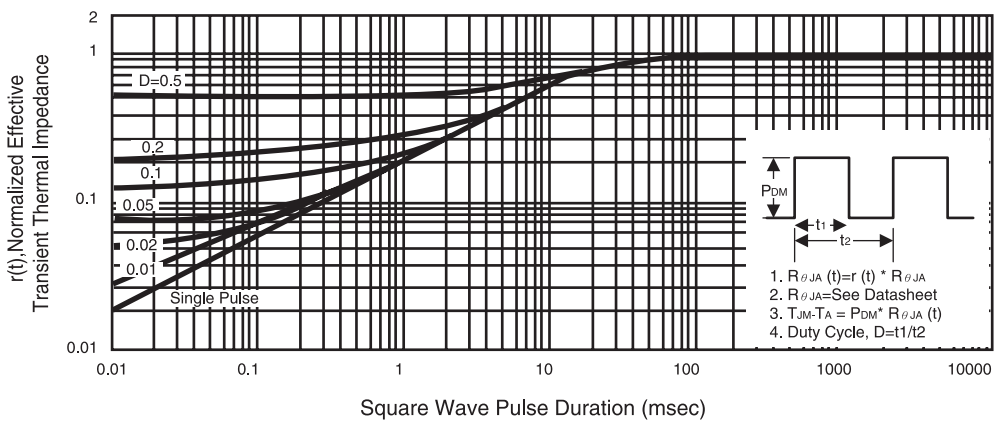


Figure 13. Normalized Thermal Transient Impedance Curve