



CEP50N06/CEB50N06

N-Channel Enhancement Mode Field Effect Transistor

FEATURES

- 60V, 50A, $R_{DS(ON)} = 22m\Omega @ V_{GS} = 10V$.
- Super high dense cell design for extremely low $R_{DS(ON)}$.
- High power and current handling capability.
- Lead free product is acquired.
- TO-220 & TO-263 package.



ABSOLUTE MAXIMUM RATINGS $T_C = 25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Limit	Units
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	50	A
Drain Current-Pulsed ^a	I_{DM}	150	A
Maximum Power Dissipation @ $T_C = 25^\circ\text{C}$ - Derate above 25°C	P_D	131	W
		0.88	W/ $^\circ\text{C}$
Single Pulsed Avalanche Energy ^d	E_{AS}	225	mJ
Single Pulsed Avalanche Current ^d	I_{AS}	50	A
Operating and Store Temperature Range	T_J, T_{stg}	-55 to 175	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Limit	Units
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.14	W/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	W/ $^\circ\text{C}$



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Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	60			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 54V, V_{GS} = 0V$			1	μA
Gate Body Leakage Current, Forward	I_{GSSF}	$V_{GS} = 20V, V_{DS} = 0V$			100	nA
Gate Body Leakage Current, Reverse	I_{GSSR}	$V_{GS} = -20V, V_{DS} = 0V$			-100	nA
On Characteristics^b						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}, I_D = 250\mu A$	2		4	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 30A$		19	22	m Ω
Forward Transconductance	g_{FS}	$V_{DS} = 10V, I_D = 25A$		19		S
Dynamic Characteristics^c						
Input Capacitance	C_{iss}	$V_{DS} = 25V, V_{GS} = 0V, f = 1.0\text{ MHz}$		1230		pF
Output Capacitance	C_{oss}			345		pF
Reverse Transfer Capacitance	C_{rss}			16		pF
Switching Characteristics^c						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 30V, I_D = 48A, V_{GS} = 10V, R_{GEN} = 7.5\Omega$		18	24	ns
Turn-On Rise Time	t_r			12.5	14	ns
Turn-Off Delay Time	$t_{d(off)}$			32.5	65	ns
Turn-Off Fall Time	t_f			3	6	ns
Total Gate Charge	Q_g	$V_{DS} = 48V, I_D = 48A, V_{GS} = 10V$		26	34	nC
Gate-Source Charge	Q_{gs}			6		nC
Gate-Drain Charge	Q_{gd}			9		nC
Drain-Source Diode Characteristics and Maximum Ratings						
Drain-Source Diode Forward Current	I_S				50	A
Drain-Source Diode Forward Voltage ^b	V_{SD}	$V_{GS} = 0V, I_S = 30A$			1.2	V
Notes : □ a.Repetitive Rating : Pulse width limited by maximum junction temperature. b.Pulse Test : Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$. □ c.Guaranteed by design, not subject to production testing. □ d.L = 90 μH , $I_{AS} = 50A$, $V_{DD} = 24V$, $R_G = 25\Omega$. Starting $T_J = 25^\circ\text{C}$						



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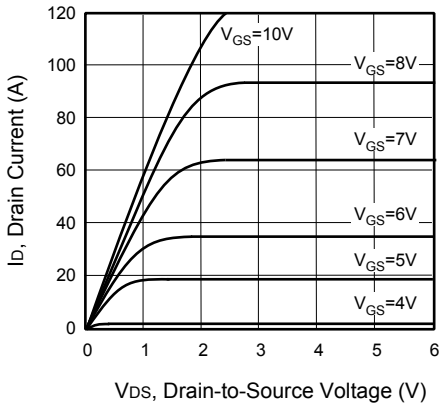


Figure 1. Output Characteristics

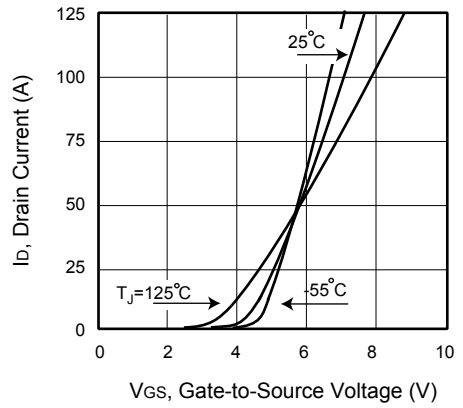


Figure 2. Transfer Characteristics

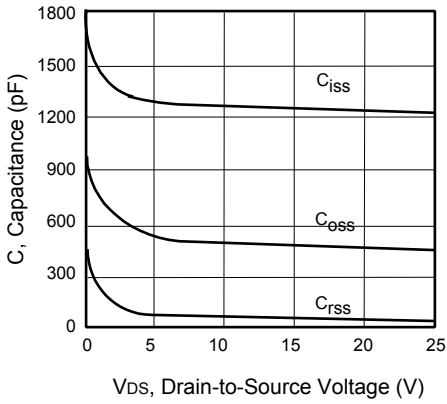


Figure 3. Capacitance

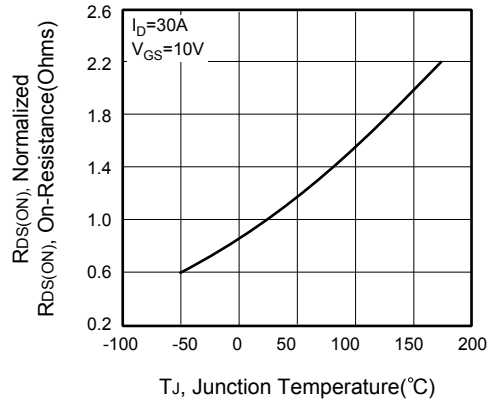


Figure 4. On-Resistance Variation with Temperature

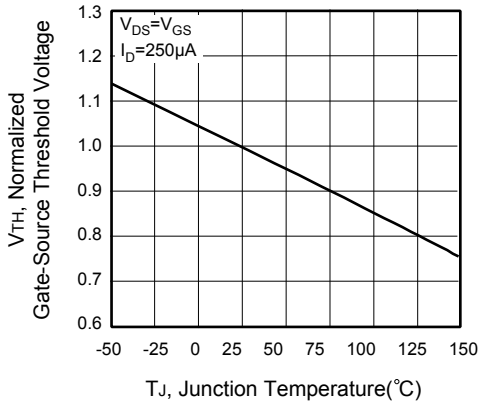


Figure 5. Gate Threshold Variation with Temperature

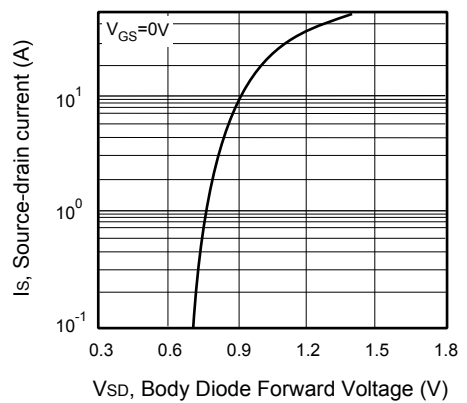


Figure 6. Body Diode Forward Voltage Variation with Source Current



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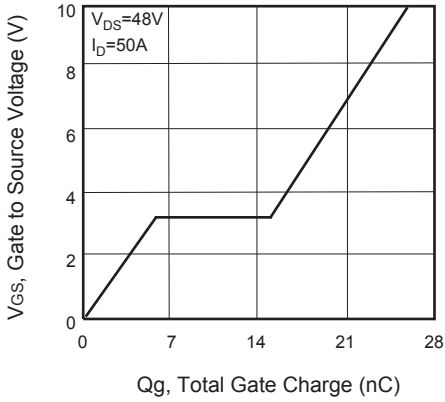


Figure 7. Gate Charge

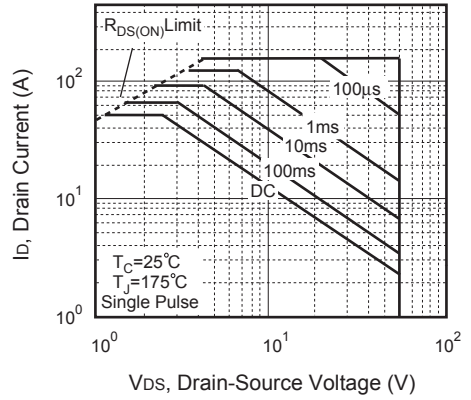


Figure 8. Maximum Safe Operating Area



Figure 9. Switching Test Circuit

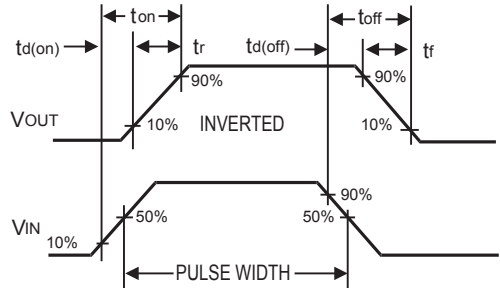


Figure 10. Switching Waveforms

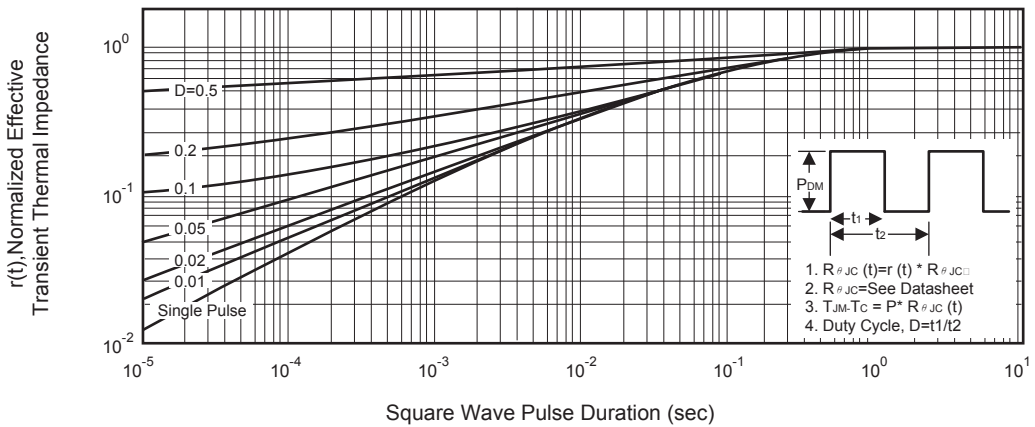


Figure 11. Normalized Thermal Transient Impedance Curve