



CEP15N60SA/CEB15N60SA CEF15N60SA

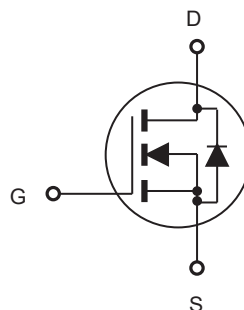
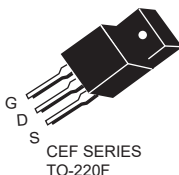
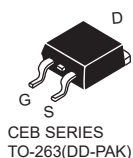
N-Channel Enhancement Mode Field Effect Transistor

PRELIMINARY

FEATURES

Type	$V_{DS}@T_{Jmax}$	$R_{DS(ON)}$	I_D	@ V_{GS}
CEP15N60SA	650V	0.28Ω	15A	10V
CEB15N60SA	650V	0.28Ω	15A	10V
CEF15N60SA	650V	0.28Ω	15A ^d	10V

- Super high dense cell design for extremely low $R_{DS(ON)}$.
- High power and current handling capability.
- RoHS compliant.



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

Parameter	Symbol	Limit		Units
		TO-220/263	TO-220F	
Drain-Source Voltage	V_{DS}	600		V
Gate-Source Voltage	V_{GS}	± 30		V
Drain Current-Continuous @ $T_C = 25^\circ\text{C}$ @ $T_C = 100^\circ\text{C}$	I_D	15	15 ^d	A
		9.6	9.6 ^d	A
Drain Current-Pulsed ^a	I_{DM}^e	60	60 ^d	A
Maximum Power Dissipation @ $T_C = 25^\circ\text{C}$ - Derate above 25°C	P_D	160	48	W
		1.28	0.38	W/ $^\circ\text{C}$
Single Pulsed Avalanche Energy ^h	E_{AS}	400		mJ
Single Pulsed Avalanche Current ^h	I_{AS}	4		A
Operating and Store Temperature Range	T_J, T_{stg}	-55 to 150		$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Limit		Units
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.78	2.6	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	65	$^\circ\text{C}/\text{W}$

This is preliminary information on a new product in development now .
Details are subject to change without notice .

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<http://www.cet-mos.com>



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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}	$V_{GS} = 0V, I_D = 250\mu A$	600			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 600V, V_{GS} = 0V$			1	μA
Gate Body Leakage Current, Forward	I_{GSSF}	$V_{GS} = 30V, V_{DS} = 0V$			100	nA
Gate Body Leakage Current, Reverse	I_{GSSR}	$V_{GS} = -30V, V_{DS} = 0V$			-100	nA
On Characteristics^b						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}, I_D = 250\mu A$	2.5		4.5	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 7.5A$		0.24	0.28	Ω
Dynamic Characteristics^c						
Input Capacitance	C_{iss}	$V_{DS} = 150V, V_{GS} = 0V,$ $f = 1.0\text{ MHz}$		870		pF
Output Capacitance	C_{oss}			65		pF
Reverse Transfer Capacitance	C_{rss}			10		pF
Switching Characteristics^c						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 400V, I_D = 7.5A,$ $V_{GS} = 15V, R_{GEN} = 10\Omega$		26		ns
Turn-On Rise Time	t_r			7		ns
Turn-Off Delay Time	$t_{d(off)}$			82		ns
Turn-Off Fall Time	t_f			10		ns
Total Gate Charge	Q_g	$V_{DS} = 400V, I_D = 1A,$ $V_{GS} = 10V$		25		nC
Gate-Source Charge	Q_{gs}			4		nC
Gate-Drain Charge	Q_{gd}			12		nC
Drain-Source Diode Characteristics and Maximum Ratings						
Drain-Source Diode Forward Current	I_S^f				15	A
Drain-Source Diode Forward Voltage ^b	V_{SD}	$V_{GS} = 0V, I_S = 7.5A^g$			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.Limited only by maximum temperature allowed . e.Pulse width limited by safe operating area . f.Full package $I_{S(max)} = 8.3A$. g.Full package V_{SD} test condition $I_S = 8.3A$. h.L = 50mH, $I_{AS} = 4A, V_{DD} = 50V, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$.						



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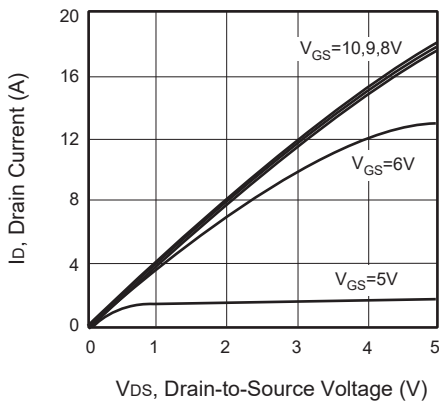


Figure 1. Output Characteristics

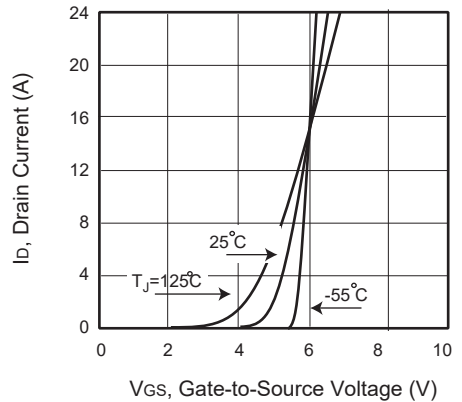


Figure 2. Transfer Characteristics

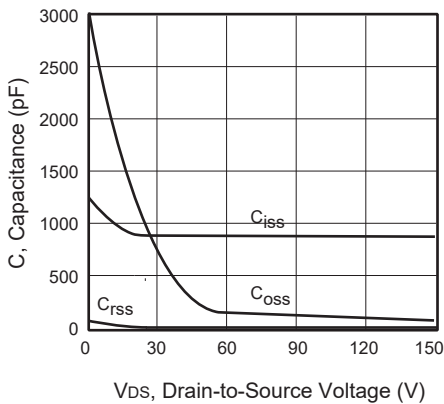


Figure 3. Capacitance

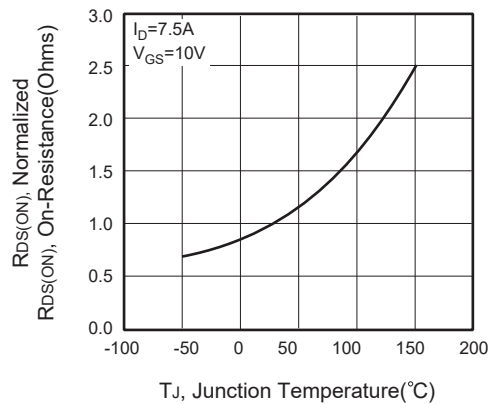


Figure 4. On-Resistance Variation with Temperature

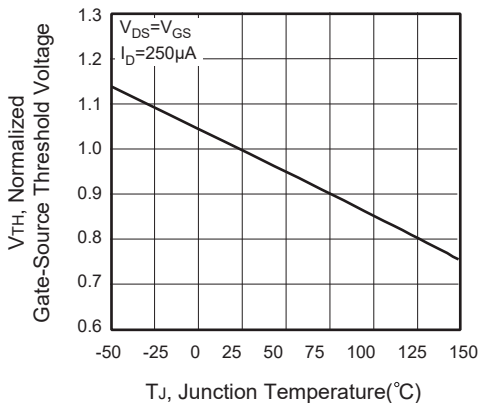


Figure 5. Gate Threshold Variation with Temperature

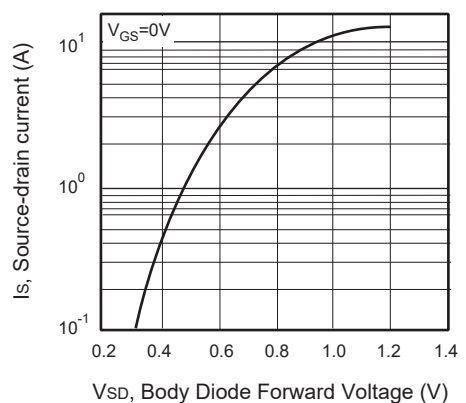


Figure 6. Body Diode Forward Voltage Variation with Source Current



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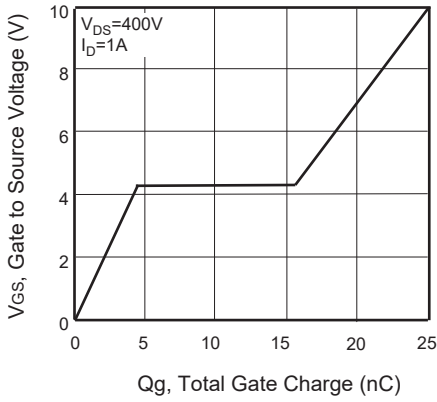


Figure 7. Gate Charge

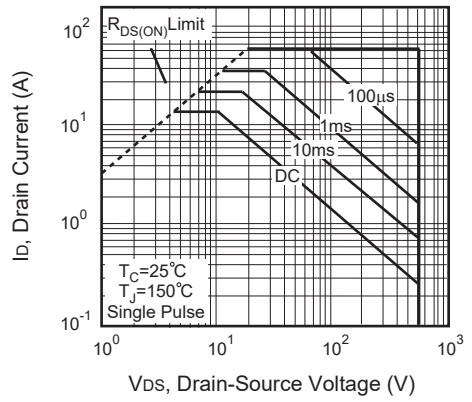


Figure 8. Maximum Safe Operating Area

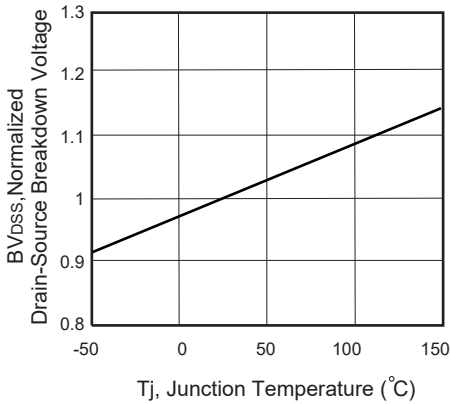


Figure 9. Breakdown Voltage Variation VS Temperature

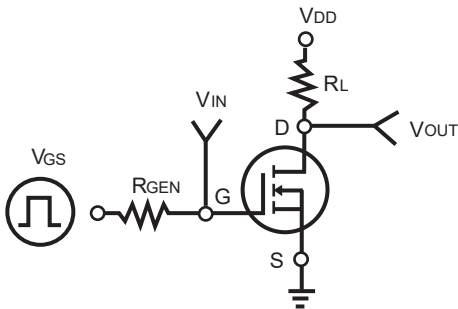


Figure 10. Switching Test Circuit

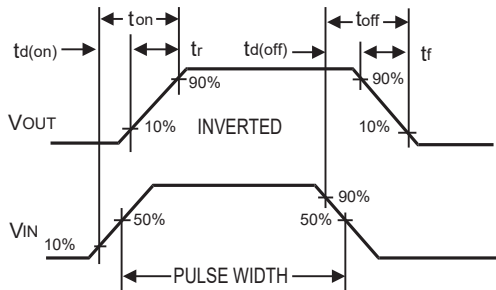


Figure 11. Switching Waveforms



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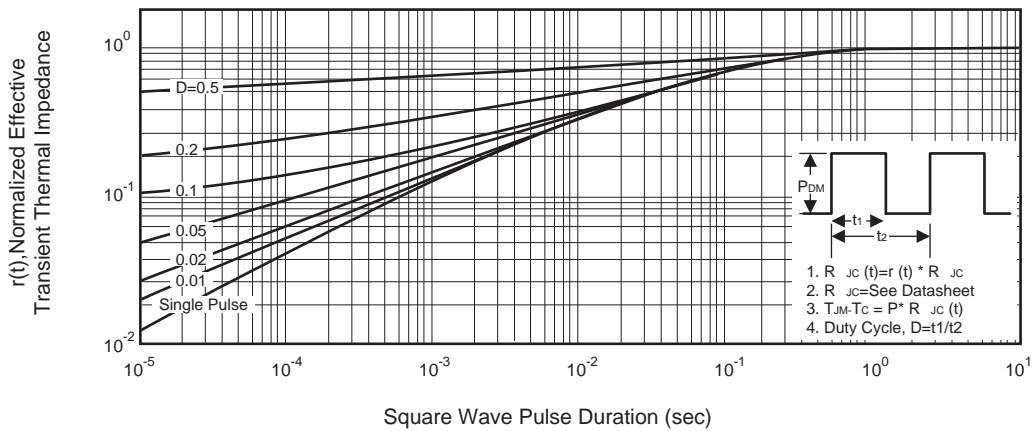


Figure 12. Normalized Thermal Transient Impedance Curve