



CEP9060N/CEB9060N

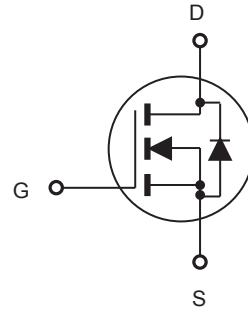
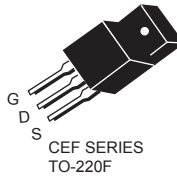
CEF9060N

N-Channel Enhancement Mode Field Effect Transistor

FEATURES

Type	V _{DSS}	R _{DS(ON)}	I _D	@V _{GS}
CEP9060N	55V	10.5mΩ	90A	10V
CEB9060N	55V	10.5mΩ	90A	10V
CEF9060N	55V	10.5mΩ	90A ^e	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 & TO-220F full-pak for through hole.



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}	55		V
Gate-Source Voltage	V _{GS}	±20		V
Drain Current-Continuous	I _D	90	90 ^e	A
Drain Current-Pulsed ^a	I _{DM} ^f	360	360 ^e	A
Maximum Power Dissipation @ T _C = 25°C - Derate above 25°C	P _D	166	49	W
		1.11	0.33	W/°C
Single Pulsed Avalanche Energy ^d	E _{AS}	325	325	mJ
Single Pulsed Avalanche Current ^d	I _{AS}	50	50	A
Operating and Store Temperature Range	T _J , T _{stg}	-55 to 175		°C

Thermal Characteristics

Parameter	Symbol	Limit		Units
Thermal Resistance, Junction-to-Case	R _{θJC}	0.9	3	°C/W
Thermal Resistance, Junction-to-Ambient	R _{θJA}	62.5	65	°C/W



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

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Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	55			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 55V, V_{GS} = 0V$			25	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	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 62A$		8.5	10.5	m Ω
Forward Transconductance	g_{FS}	$V_{DS} = 25V, I_D = 62A$		30		S
Dynamic Characteristics ^c						
Input Capacitance	C_{iss}	$V_{DS} = 25V, V_{GS} = 0V, f = 1.0\text{ MHz}$		3695		pF
Output Capacitance	C_{oss}			765		pF
Reverse Transfer Capacitance	C_{rss}			60		pF
Switching Characteristics ^c						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 28V, I_D = 62A, V_{GS} = 10V, R_{GEN} = 4.5\Omega$		24	48	ns
Turn-On Rise Time	t_r			11.9	23.8	ns
Turn-Off Delay Time	$t_{d(off)}$			60	120	ns
Turn-Off Fall Time	t_f			19	38 <input type="checkbox"/>	ns
Total Gate Charge	Q_g	$V_{DS} = 44V, I_D = 62A, V_{GS} = 10V$		68.1	90.5	nC
Gate-Source Charge	Q_{gs}			12.6		nC
Gate-Drain Charge	Q_{gd}			22.7		nC
Drain-Source Diode Characteristics and Maximum Ratings						
Drain-Source Diode Forward Current	I_S				62	A
Drain-Source Diode Forward Voltage ^b	V_{SD}	$V_{GS} = 0V, I_S = 62A$			1.3	V
Notes : <input type="checkbox"/> a.Repetitive Rating : Pulse width limited by maximum junction temperature b.Pulse Test : Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$. <input type="checkbox"/> c.Guaranteed by design, not subject to production testing. <input type="checkbox"/> d.L = 260 μH , $I_{AS} = 50A, V_{DD} = 24V, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$ e.Limited only by maximum temperature allowed . f.Pulse width limited by safe operating area .						



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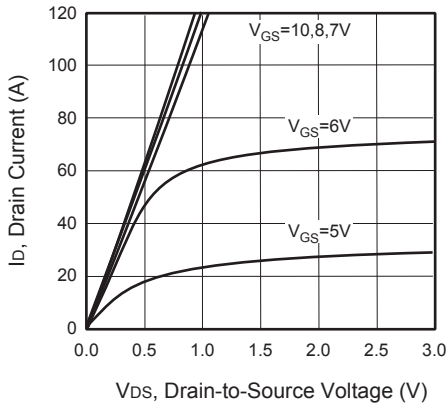


Figure 1. Output Characteristics

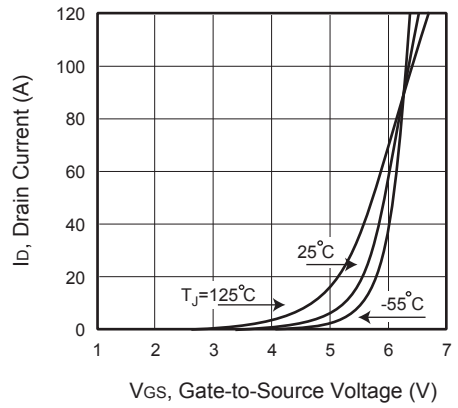


Figure 2. Transfer Characteristics

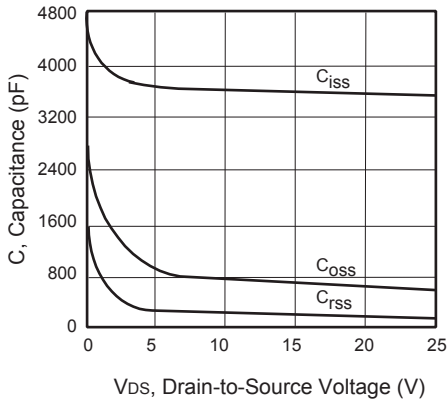


Figure 3. Capacitance

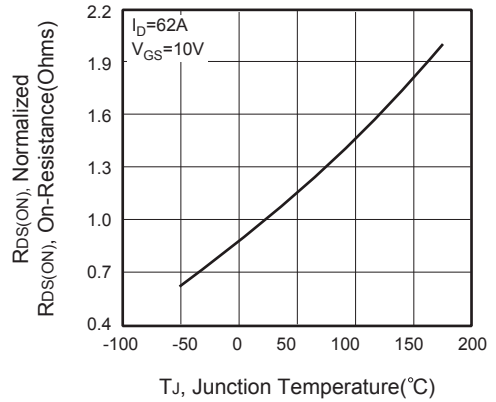


Figure 4. On-Resistance Variation with Temperature



Figure 5. Gate Threshold Variation with Temperature

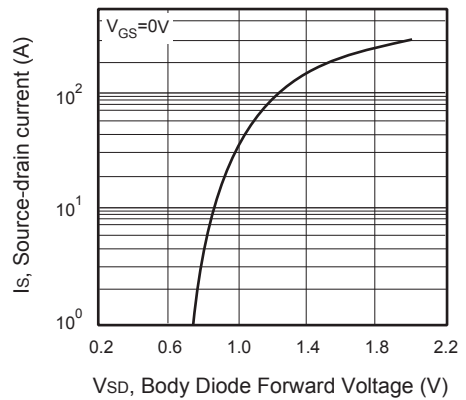


Figure 6. Body Diode Forward Voltage Variation with Source Current

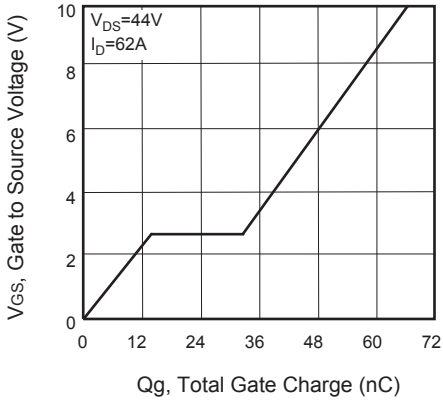


Figure 7. Gate Charge

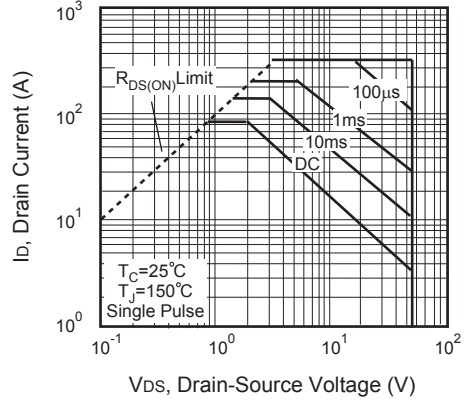


Figure 8. Maximum Safe Operating Area



Figure 9. Switching Test Circuit

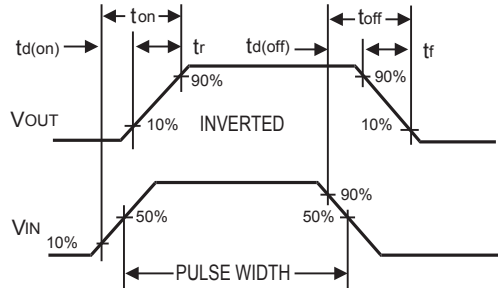


Figure 10. Switching Waveforms

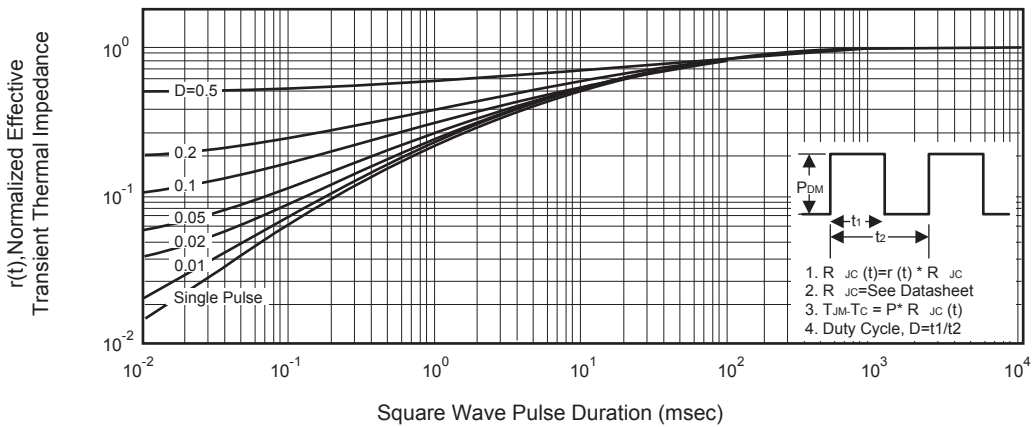


Figure 11. Normalized Thermal Transient Impedance Curve