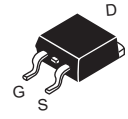
CEP70N20/CEB70N20
CEF70N20

N-Channel Enhancement Mode Field Effect Transistor

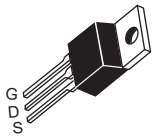
FEATURES

Type	V_{DSS}	$R_{DS(ON)}$	I_D	@V_{GS}
CEP70N20	200V	21mΩ	63A	10V
CEB70N20	200V	21mΩ	63A	10V
CEF70N20	200V	21mΩ	63A [d]	10V

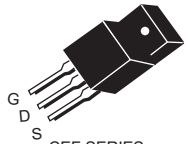
- Super high dense cell design for extremely low $R_{DS(ON)}$.
- High power and current handing capability.
- RoHS compliant.



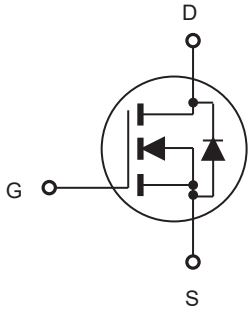
CEB SERIES
TO-263(DD-PAK)



CEP SERIES
TO-220



CEF SERIES
TO-220F



ABSOLUTE MAXIMUM RATINGS T_C = 25°C unless otherwise noted

Parameter	Symbol	Limit		Units
		TO-220/263	TO-220F	
Drain-Source Voltage	V_{DS}	200		V
Gate-Source Voltage	V_{GS}	±20		V
Drain Current-Continuous @ T_C = 25°C	I_D	63	63 [d]	A
@ T_C = 100°C		45	45 [d]	A
Drain Current-Pulsed [a]	I_{DM} [e]	252	252 [d]	A
Maximum Power Dissipation @ T_C = 25°C	P_D	200	60	W
- Derate above 25°C		1.33	0.4	W/°C
Single Pulsed Avalanche Energy [g]	E_{AS}	320		mJ
Single Pulsed Avalanche Current [g]	I_{AS}	40		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	$R_{\theta JC}$	0.75	2.5	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	65	°C/W

Electrical Characteristics T_C = 25°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 = 250μA	200			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 200V, 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 = 250μA	2		4	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A		16	21	mΩ
Dynamic Characteristics [c]						
Input Capacitance	C_{iss}	V_{DS} = 30V, V_{GS} = 0V, f = 1.0 MHz		2015		pF
Output Capacitance	C_{oss}			1250		pF
Reverse Transfer Capacitance	C_{rss}			20		pF
Switching Characteristics [c]						
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 160V, I_D = 20A, V_{GS} = 10V, R_{GEN} = 3Ω		22		ns
Turn-On Rise Time	t_r			9		ns
Turn-Off Delay Time	$t_{d(off)}$			50		ns
Turn-Off Fall Time	t_f			17		ns
Total Gate Charge	Q_g	V_{DS} = 160V, I_D = 20A, V_{GS} = 10V		39		nC
Gate-Source Charge	Q_{gs}			10		nC
Gate-Drain Charge	Q_{gd}			10		nC
Drain-Source Diode Characteristics and Maximun Ratings						
Drain-Source Diode Forward Current	I_S [f]				63	A
Drain-Source Diode Forward Voltage [b]	V_{SD}	V_{GS} = 0V, I_S = 20A			1.2	V
Reverse Recovery Time	T_{rr}	V_R = 100V, I_F = 20A, dI_F /dt = 100A/us		110		ns
Reverse Recovery Charge	Q_{rr}			425		nC

Notes :
a.Repetitive Rating : Pulse width limited by maximum junction temperature .
b.Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 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 $I_{S(max)}$ = 34.5A .
g.L = 0.4mH, I_{AS} = 40A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25 C

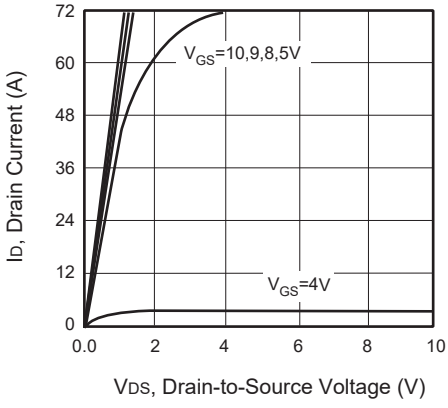


Figure 1. Output Characteristics

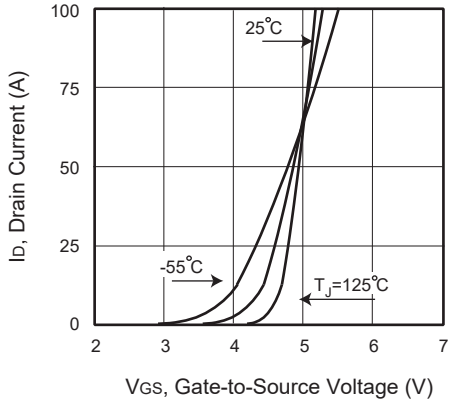


Figure 2. Transfer Characteristics

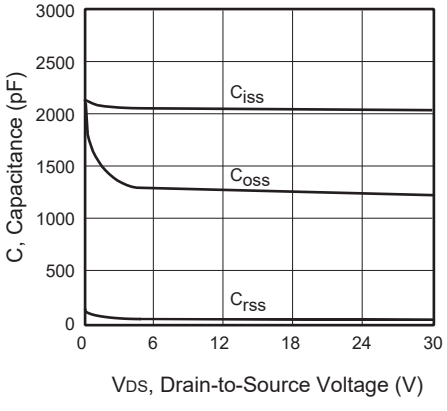


Figure 3. Capacitance

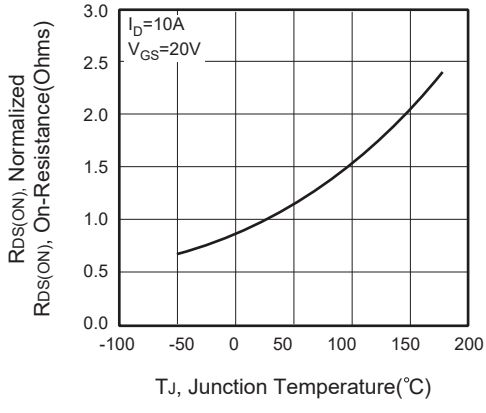


Figure 4. On-Resistance Variation with Temperature

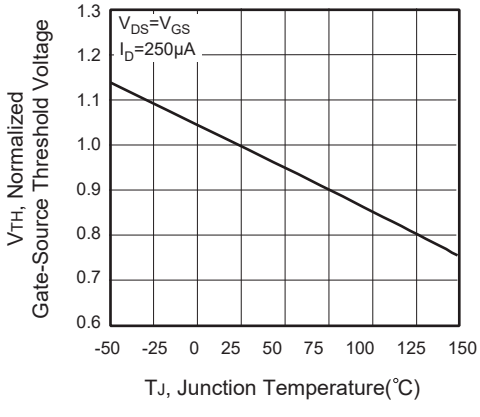


Figure 5. Gate Threshold Variation with Temperature

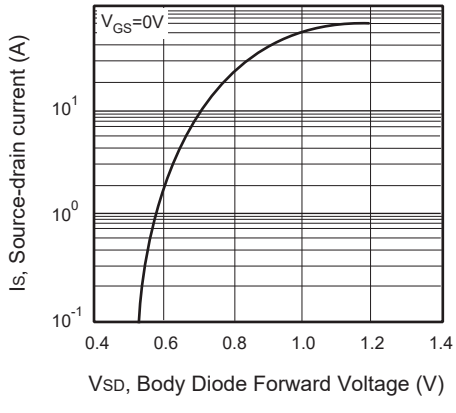


Figure 6. Body Diode Forward Voltage Variation with Source Current

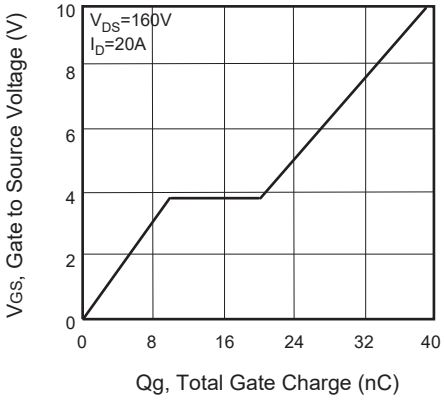


Figure 7. Gate Charge

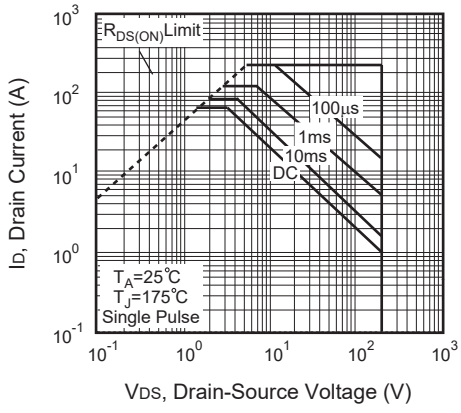


Figure 8. Maximum Safe Operating Area

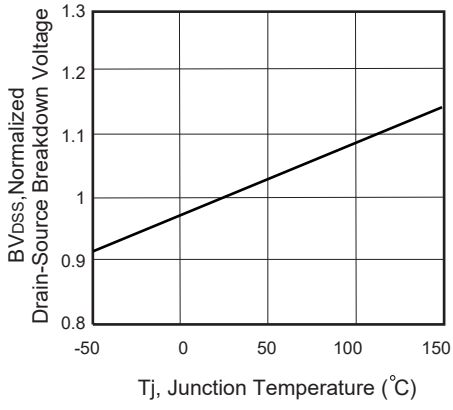


Figure 9. Breakdown Voltage Variation VS Temperature

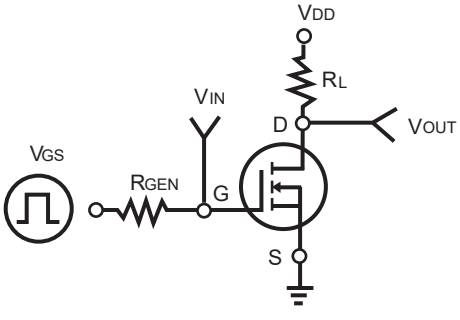


Figure 10. Switching Test Circuit

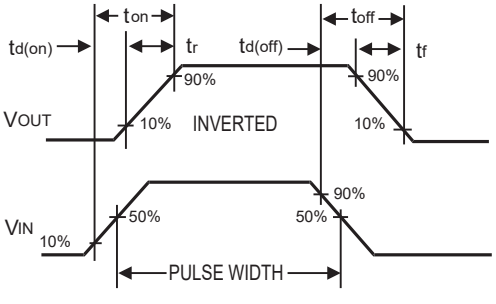


Figure 11. Switching Waveforms

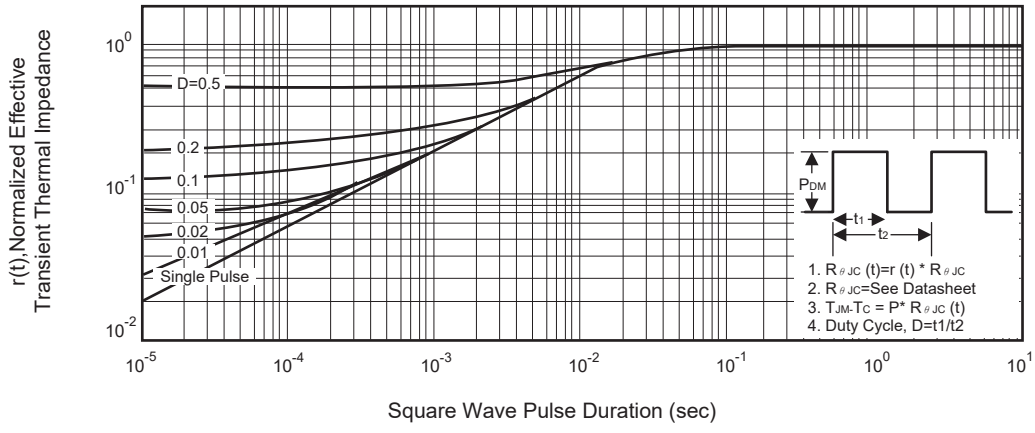


Figure 12. Normalized Thermal Transient Impedance Curve