

N-Channel Enhancement Mode Field Effect Transistor

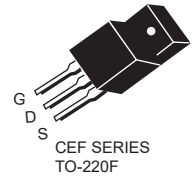
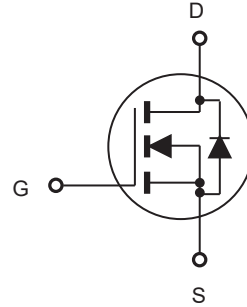
FEATURES

Type	V _{DSS}	R _{DS(ON)}	I _D	@V _{GS}
CEP45N20	200V	32mΩ	43A	10V
CEB45N20	200V	32mΩ	43A	10V
CEF45N20	200V	32mΩ	43A ^d	10V

- Super high dense cell design for extremely low R_{DS(ON)}.
- High power and current handling capability.
- Pb-free lead plating ; RoHS compliant.
- Halogen Free.

Applications

- Synchronous rectification .
- DC/DC converter.



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}	200		V
Gate-Source Voltage	V _{GS}	± 20		V
Drain Current-Continuous @ T _C = 25°C @ T _C = 100°C	I _D	43	43 ^d	A
		27	27 ^d	A
Drain Current-Pulsed ^a	I _{DM} ^e	172	172 ^d	A
Maximum Power Dissipation @ T _C = 25°C - Derate above 25°C	P _D	125	40	W
		1	0.32	W/°C
Single Pulsed Avalanche Energy ^g	E _{AS}	180		mJ
Single Pulsed Avalanche Current ^g	I _{AS}	30		A
Operating and Store Temperature Range	T _J , T _{stg}	-55 to 150		°C

Thermal Characteristics

Parameter	Symbol	Limit		Units
Thermal Resistance, Junction-to-Case	R _{θJC}	1	3.1	°C/W
Thermal Resistance, Junction-to-Ambient	R _{θJA}	62.5	65	°C/W



CEP45N20/CEB45N20 CEF45N20

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}	$V_{GS} = 0V, I_D = 250\mu A$	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	$V_{GS(th)}$	$V_{GS} = V_{DS}, I_D = 250\mu A$	2		4	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 10A$		27	32	$m\Omega$
Gate input resistance	R_g	f=1MHz, open Drain		4.5		Ω
Dynamic Characteristics^c						
Input Capacitance	C_{iss}	$V_{DS} = 100V, V_{GS}=0V,$ $f = 1.0 \text{ MHz}$		1470		pF
Output Capacitance	C_{oss}			170		pF
Reverse Transfer Capacitance	C_{rss}			10		pF
Switching Characteristics^c						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 100V, I_D = 10A,$ $V_{GS} = 10V, R_{GEN} = 10\Omega$		27		ns
Turn-On Rise Time	t_r			12		ns
Turn-Off Delay Time	$t_{d(off)}$			44		ns
Turn-Off Fall Time	t_f			16		ns
Total Gate Charge	Q_g	$V_{DS} = 100V, I_D = 10A,$ $V_{GS} = 10V$		22		nC
Gate-Source Charge	Q_{gs}			7		nC
Gate-Drain Charge	Q_{gd}			6		nC
Drain-Source Diode Characteristics and Maximum Ratings						
Drain-Source Diode Forward Current	I_S^f				43	A
Drain-Source Diode Forward Voltage ^b	V_{SD}	$V_{GS} = 0V, I_S = 10A$			1.2	V
Reverse Recovery Time	T_{rr}	$I_F = 10A,$ $dI_F/dt = 100A/us$		93		ns
Reverse Recovery Charge	Q_{rr}			305		nC
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 $I_{S(max)} = 33A$. g.L = 0.4mH, $I_{AS} = 30A, V_{DD} = 50V, R_G = 25\Omega$, Starting $T_J = 25^\circ C$.						

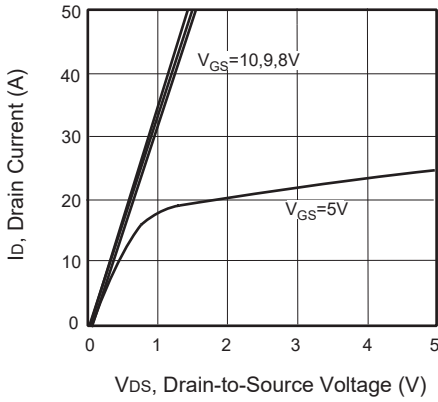


Figure 1. Output Characteristics

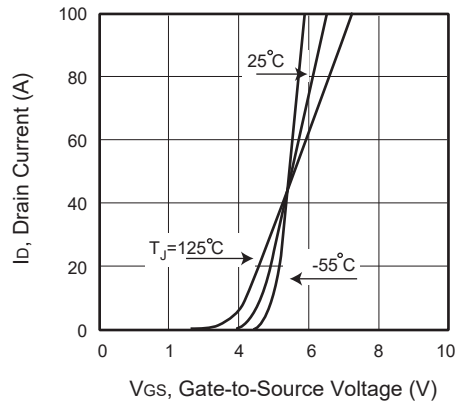


Figure 2. Transfer Characteristics

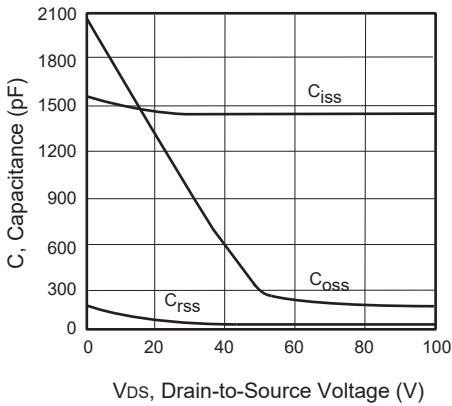


Figure 3. Capacitance

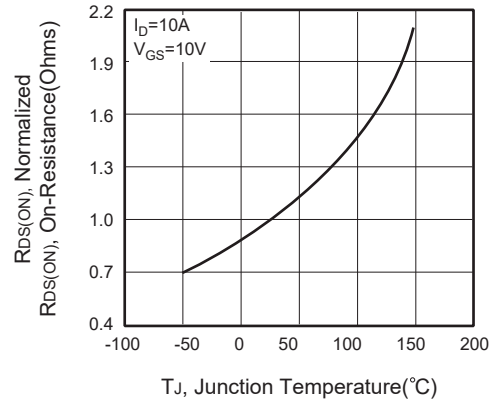


Figure 4. On-Resistance Variation with Temperature



Figure 5. Gate Threshold Variation with Temperature

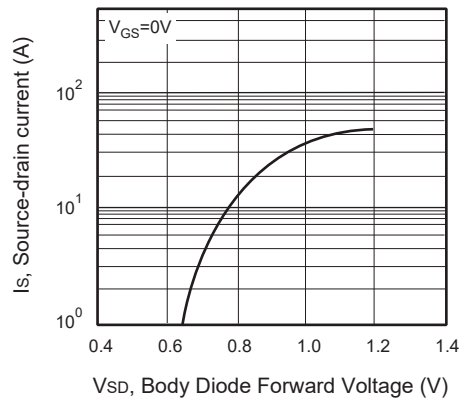


Figure 6. Body Diode Forward Voltage Variation with Source Current

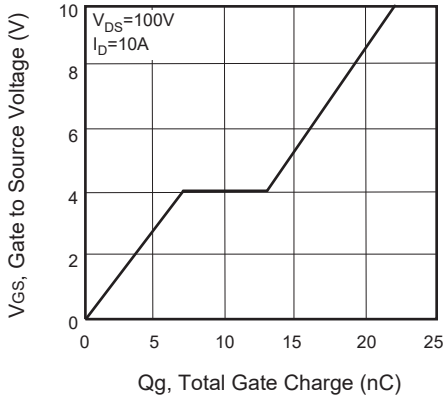


Figure 7. Gate Charge

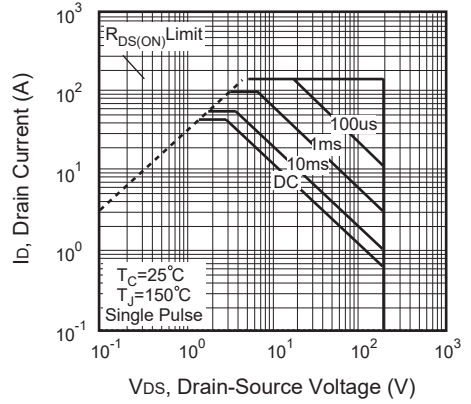


Figure 8. Maximum Safe Operating Area



Figure 9. Breakdown Voltage Variation VS Temperature

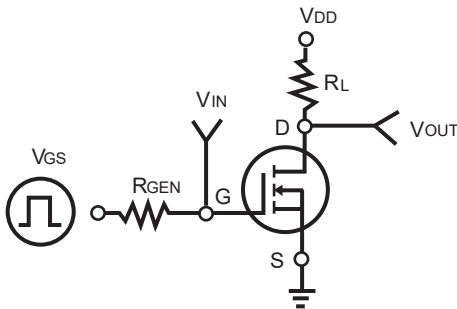


Figure 10. Switching Test Circuit

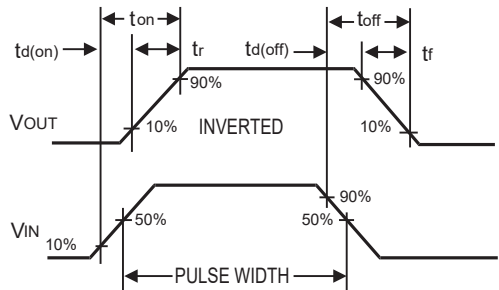


Figure 11. Switching Waveforms



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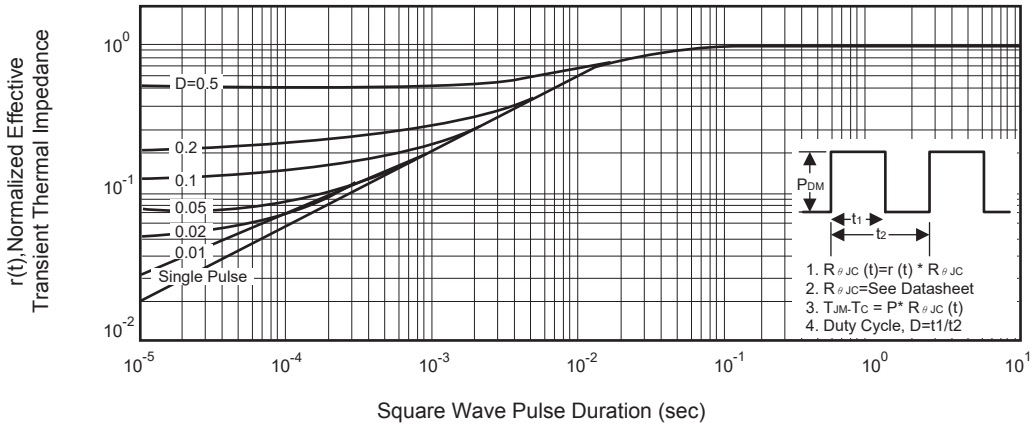


Figure 12. Normalized Thermal Transient Impedance Curve