

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV _{DSS}	Drain-Source Breakdown Voltage	I _D =250μA, V _{GS} =0V, T _J =25°C	600			V
		I _D =250μA, V _{GS} =0V, T _J =150°C		700		
BV _{DSS} /ΔT _J	Breakdown Voltage Temperature Coefficient	I _D =250μA, V _{GS} =0V		0.58		V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =600V, V _{GS} =0V			1	μA
		V _{DS} =480V, T _J =125°C			10	
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±30V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =5V, I _D =250μA	3	4.1	5	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =6A		0.44	0.52	Ω
g _{FS}	Forward Transconductance	V _{DS} =40V, I _D =6A		11		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.73	1	V
I _S	Maximum Body-Diode Continuous Current				12	A
I _{SM}	Maximum Body-Diode Pulsed Current ^C				48	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =100V, f=1MHz		2028		pF
C _{oss}	Output Capacitance			71		pF
C _{o(er)}	Effective output capacitance, energy related ^H	V _{GS} =0V, V _{DS} =0 to 480V, f=1MHz		52		pF
C _{o(tr)}	Effective output capacitance, time related ^I			94		pF
C _{rss}	Reverse Transfer Capacitance	V _{GS} =0V, V _{DS} =100V, f=1MHz		13		pF
R _g	Gate resistance	f=1MHz		2.2		Ω
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =480V, I _D =12A		33	50	nC
Q _{gs}	Gate Source Charge			13		nC
Q _{gd}	Gate Drain Charge			10		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =300V, I _D =12A, R _G =25Ω		52		ns
t _r	Turn-On Rise Time			72		ns
t _{D(off)}	Turn-Off DelayTime			66		ns
t _f	Turn-Off Fall Time			42		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =12A, dI/dt=100A/μs, V _{DS} =100V		483		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =12A, dI/dt=100A/μs, V _{DS} =100V		7		μC

A. The value of R_{θJA} is measured with the device in a still air environment with T_A=25°C.

B. The power dissipation P_D is based on T_{J(MAX)}=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150°C. Ratings are based on low frequency and duty cycles to keep initial T_J=25°C.

D. The R_{θJA} is the sum of the thermal impedance from junction to case R_{θJC} and case to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using <300 ms pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T_{J(MAX)}=150°C. The SOA curve provides a single pulse rating.

G. L=60mH, I_{AS}=5A, V_{DD}=150V, R_G=25Ω, Starting T_J=25°C.

H. C_{o(er)} is a fixed capacitance that gives the same stored energy as C_{oss} while V_{DS} is rising from 0 to 80% V_{(BR)DSS}.

I. C_{o(tr)} is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 to 80% V_{(BR)DSS}.

J. I_{SD}≤I_D, dI/dt≤200A/μs, V_{DD}=400V, T_J≤T_{J(MAX)}.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

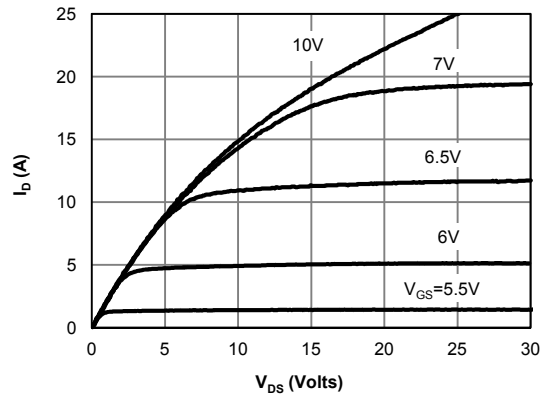


Figure 1: On-Region Characteristics

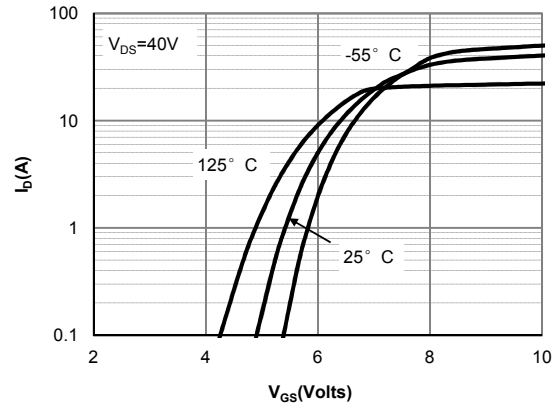


Figure 2: Transfer Characteristics

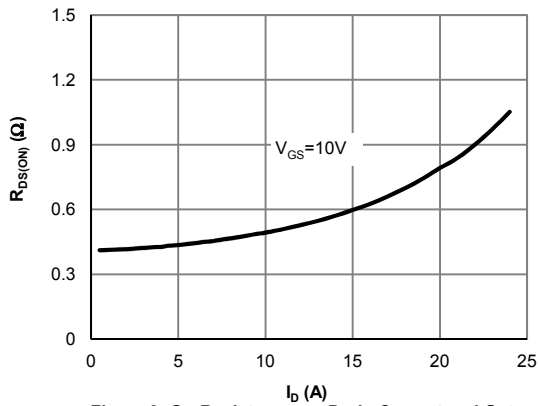


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

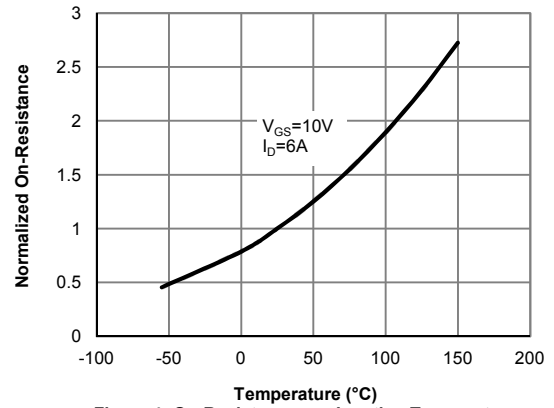


Figure 4: On-Resistance vs. Junction Temperature

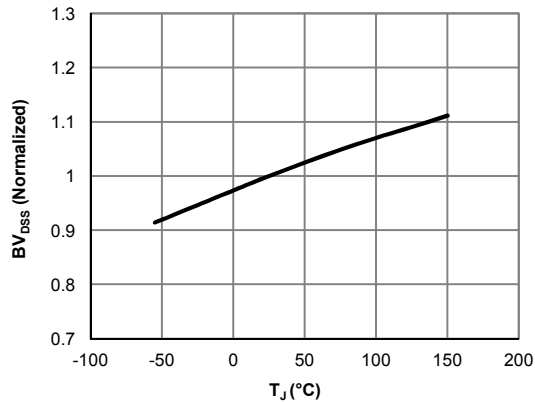


Figure 5: Break Down vs. Junction Temperature

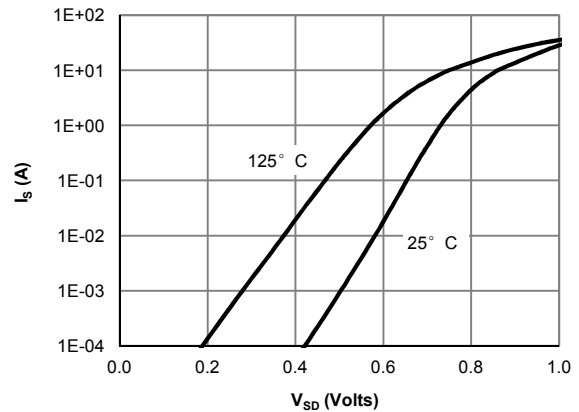


Figure 6: Body-Diode Characteristics

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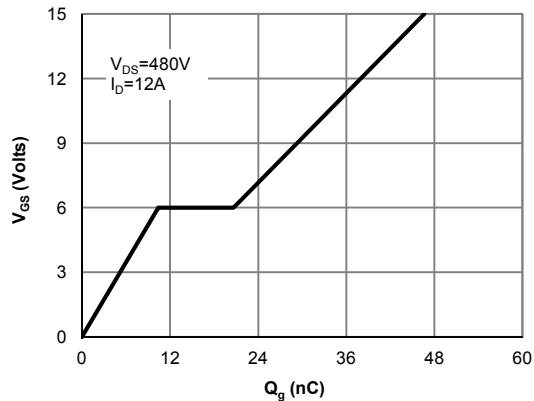


Figure 7: Gate-Charge Characteristics

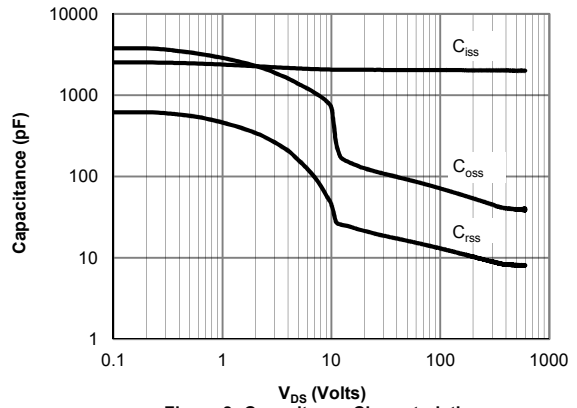


Figure 8: Capacitance Characteristics

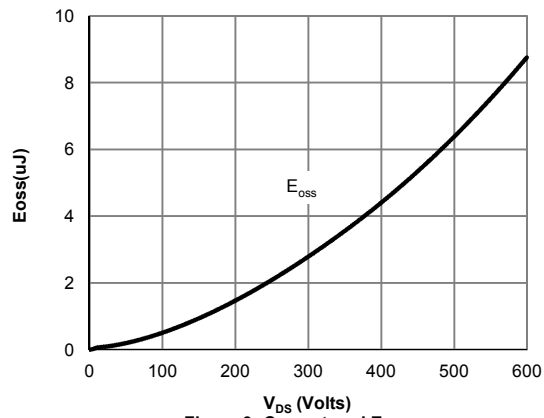


Figure 9: C_{oss} stored Energy

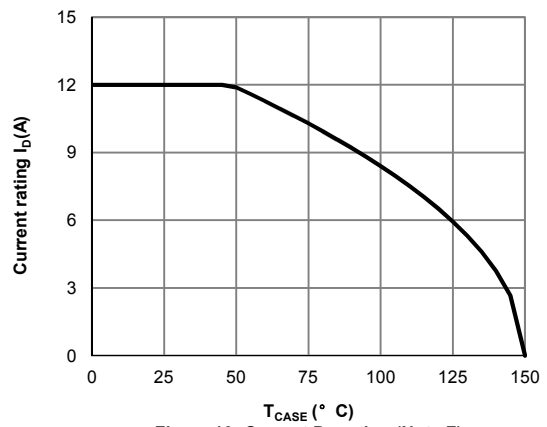


Figure 10: Current De-rating (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

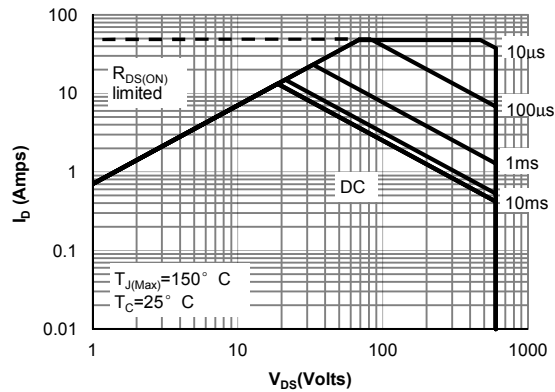


Figure 11: Maximum Forward Biased Safe Operating Area for TO-263 (Note F)

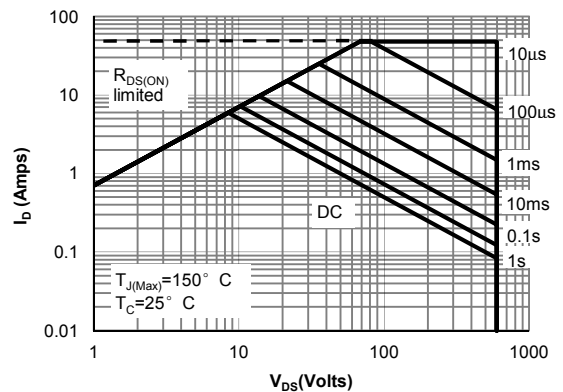


Figure 12: Maximum Forward Biased Safe Operating Area for TO-220F Pb Free (Note F)

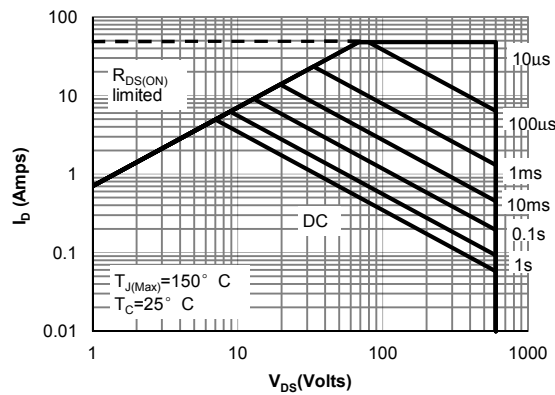


Figure 13: Maximum Forward Biased Safe Operating Area for TO-220F Green (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

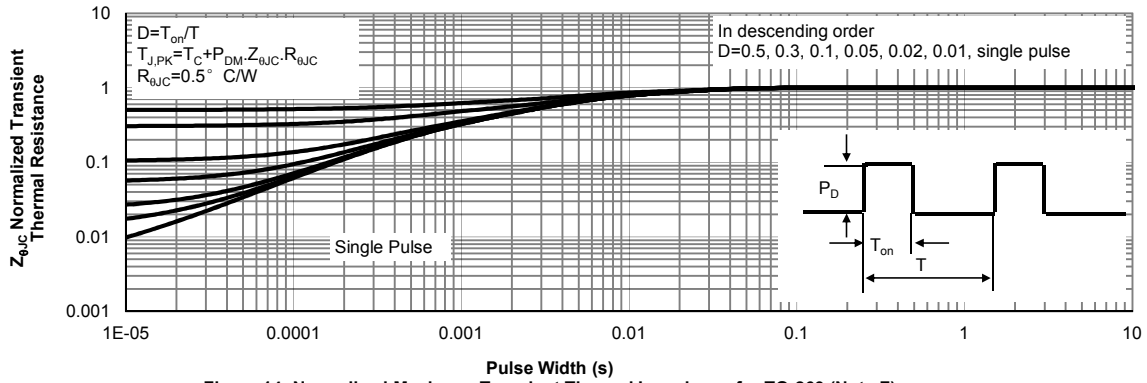


Figure 14: Normalized Maximum Transient Thermal Impedance for TO-263 (Note F)

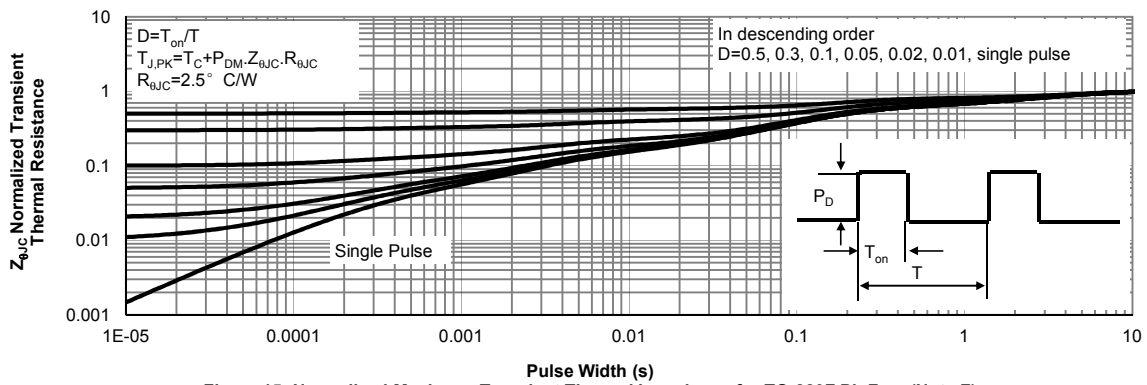


Figure 15: Normalized Maximum Transient Thermal Impedance for TO-220F Pb Free (Note F)

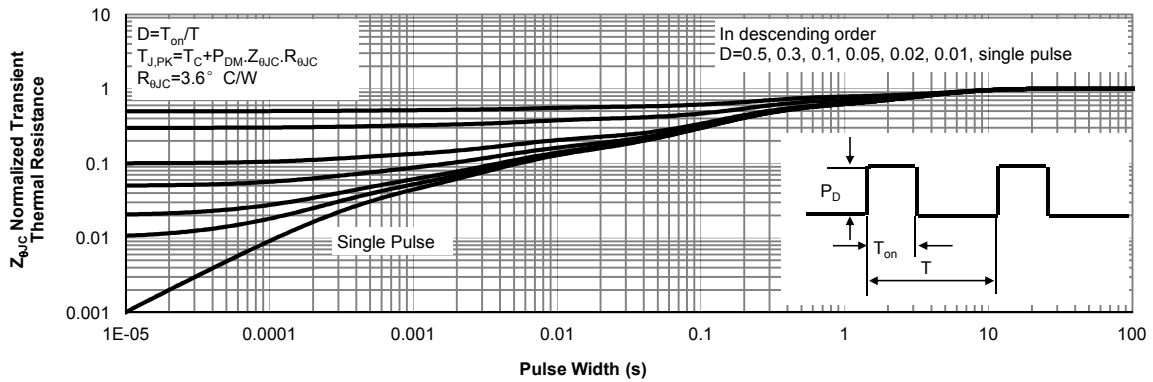
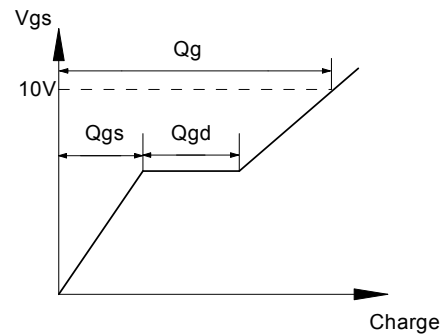
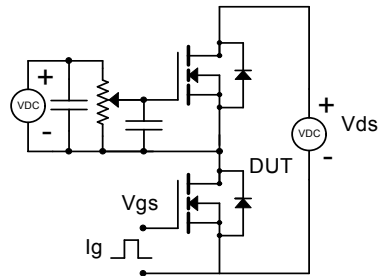
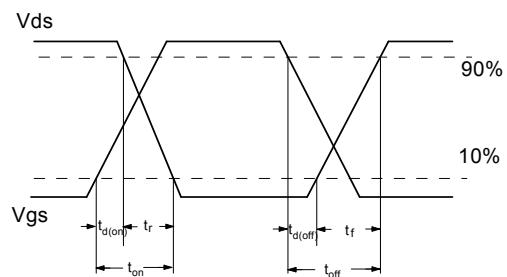
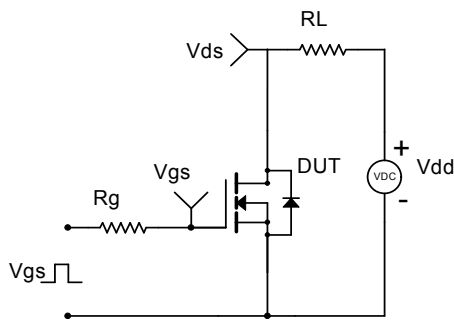


Figure 16: Normalized Maximum Transient Thermal Impedance for TO-220F Green (Note F)

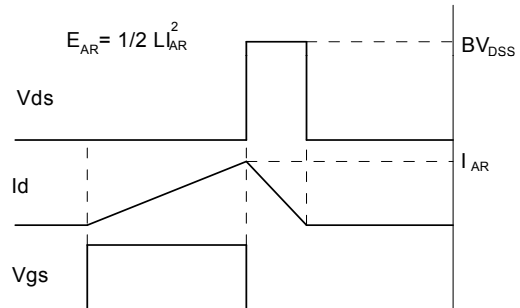
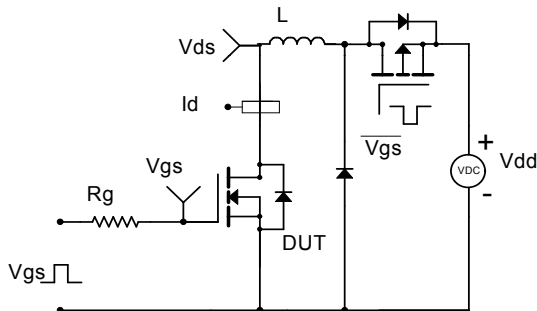
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

