

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter		Rating	Unit
Common Ratings				
V _{DSS}	Drain-Source Voltage		30	V
V _{GSS}	Gate-Source Voltage		±20	
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55 to 150	
I _S	Diode Continuous Forward Current	T _A =25°C	0.6	A
I _D	Continuous Drain Current	T _A =25°C	0.8	
		T _A =70°C	0.7	
I _{DM} ^a	Pulsed Drain Current	T _A =25°C	1.3	
P _D ^b	Maximum Power Dissipation	T _A =25°C	0.81	W
		T _A =70°C	0.5	
R _{θJA} ^b	Thermal Resistance-Junction to Ambient	t ≤ 10s	120	°C/W
		Steady State	155	
I _{AS} ^c	Avalanche Current, Single pulse	L=0.1mH	0.5	A
E _{AS} ^c	Avalanche Energy, Single pulse	L=0.1mH	0.012	mJ

Note a : Pulse width is limited by maximum junction temperature.

Note b : $R_{\theta\text{JA}}$ steady state $t = 999\text{s}$.

Note c : UIS tested and pulse width limited by maximum junction temperature (initial temperature $T_J = 25^\circ\text{C}$).

Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

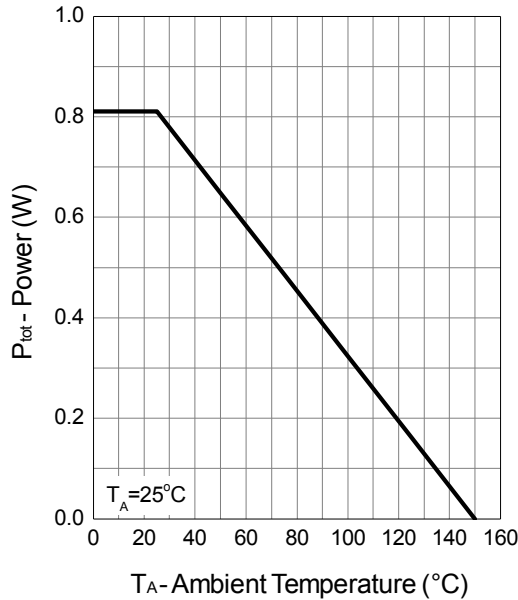
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	30	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =24V, V _{GS} =0V	-	-	1	μA
		T _J =85°C	-	-	30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	0.8	1.1	1.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	±2	±9	μA
R _{DS(ON)} ^d	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =0.4A	-	0.5	0.8	Ω
		V _{GS} =4.5V, I _{DS} =0.3A	-	0.8	1.1	
		V _{GS} =2.5V, I _{DS} =0.2A	-	1.4	2.1	
G _{fs}	Forward Transconductance	V _{DS} =3 , I _D =10mA	-	0.9	-	S
Diode Characteristics						
V _{SD} ^d	Diode Forward Voltage	I _{SD} =0.4A, V _{GS} =0V	-	0.85	1.1	V
t _{rr}	Reverse Recovery Time	I _{sd} =1A, dI _{SD} /dt=100A/μs	-	8.6	-	ns
Q _{rr}	Reverse Recovery Charge		-	2.7	-	nC
Dynamic Characteristics ^e						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, Frequency=1.0MHz	-	23	-	pF
C _{oss}	Output Capacitance		-	5	-	
C _{rss}	Reverse Transfer Capacitance		-	2	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =10V, R _L =10Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	1.4	-	ns
t _r	Turn-on Rise Time		-	11.8	-	
t _{d(OFF)}	Turn-off Delay Time		-	8	-	
t _f	Turn-off Fall Time		-	2	-	
Gate Charge Characteristics ^e						
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =10V, I _{DS} =1A	-	1.6	-	nC
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =4.5V, I _{DS} =1A	-	0.7	-	
Q _{gth}	Threshold Gate Charge		-	0.2	-	
Q _{gs}	Gate-Source Charge		-	0.54	-	
Q _{gd}	Gate-Drain Charge		-	0.03	-	

Note d : Pulse test; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

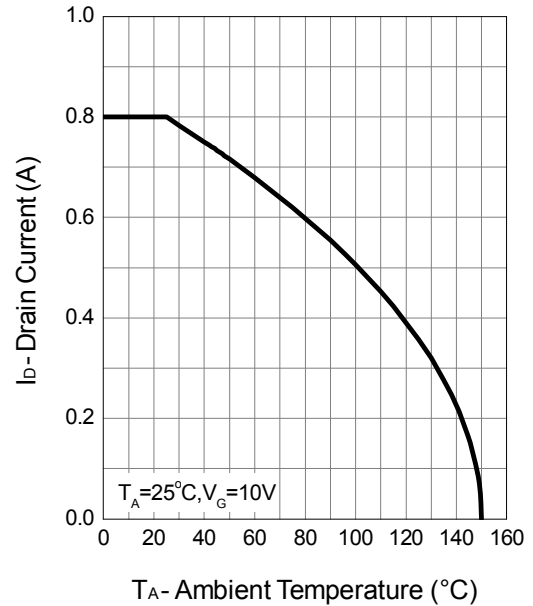
Note e : Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

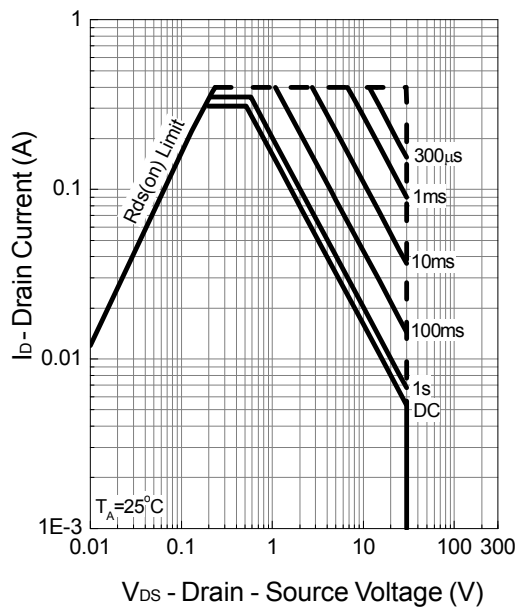
Power Dissipation



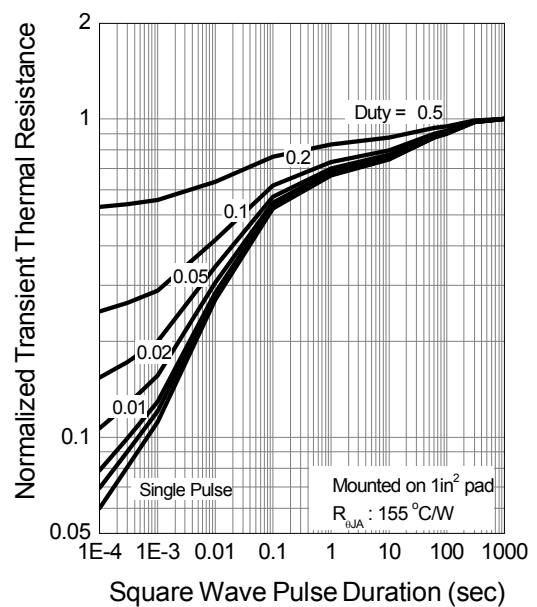
Drain Current



Safe Operation Area

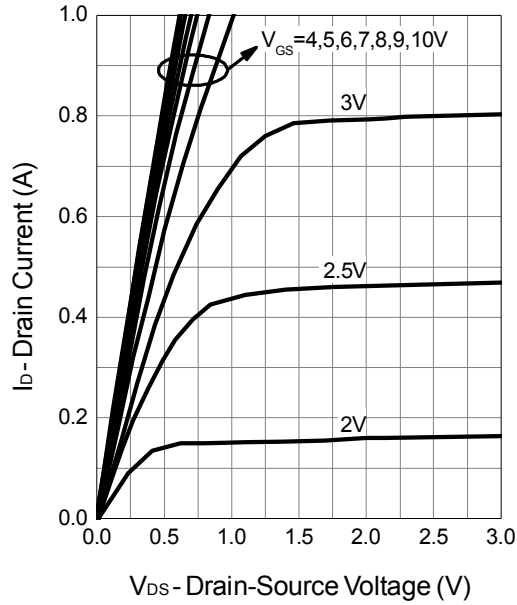


Thermal Transient Impedance

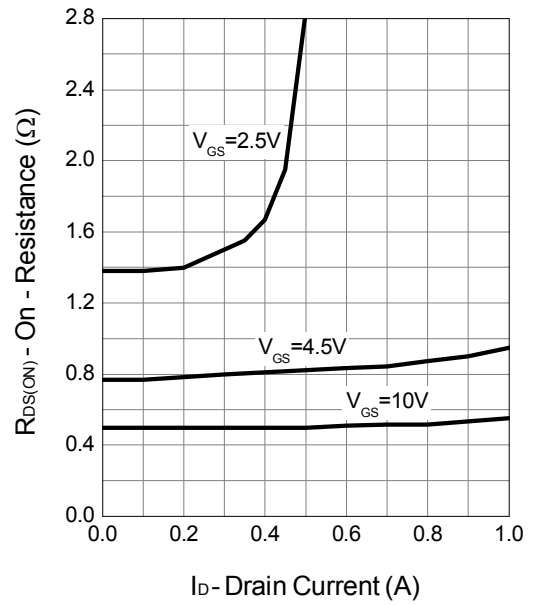


Typical Operating Characteristics (Cont.)

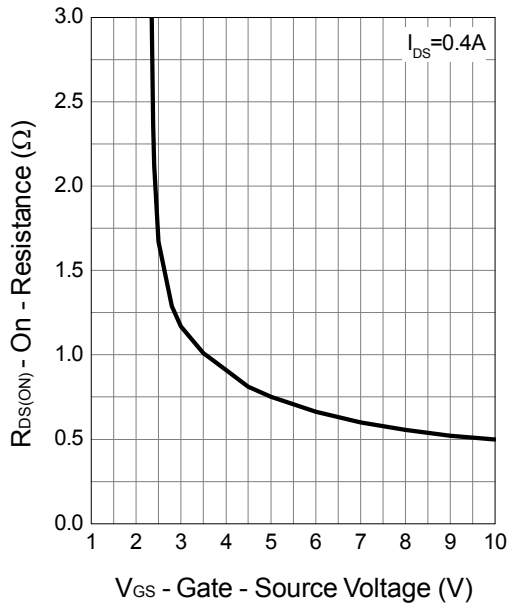
Output Characteristics



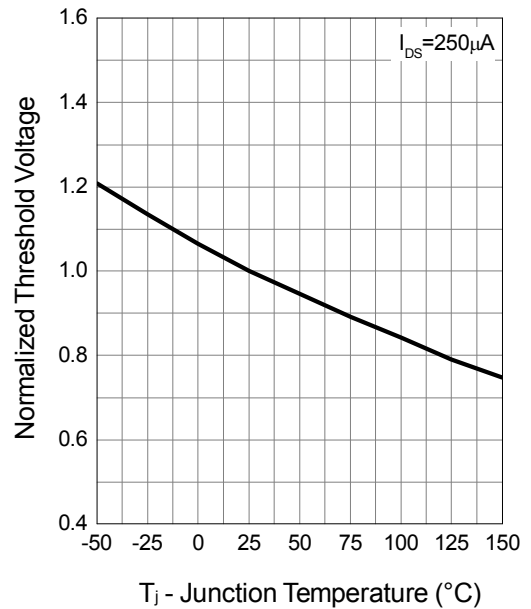
Drain-Source On Resistance



Gate-Source On Resistance

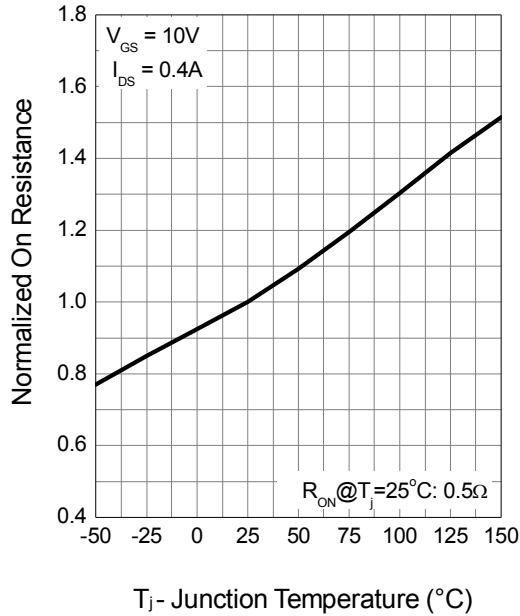


Gate Threshold Voltage

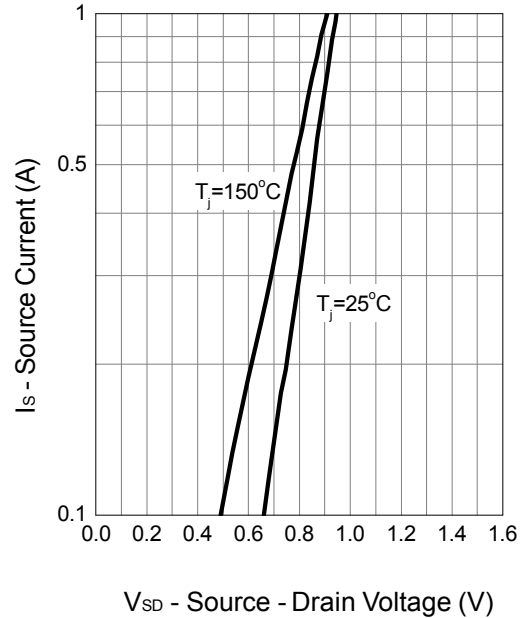


Typical Operating Characteristics (Cont.)

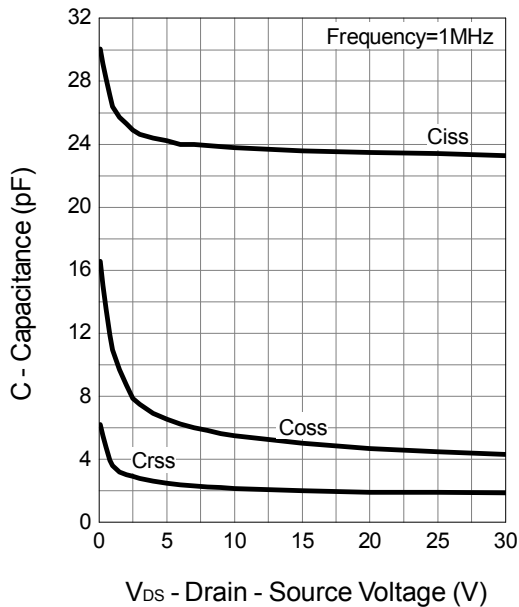
Drain-Source On Resistance



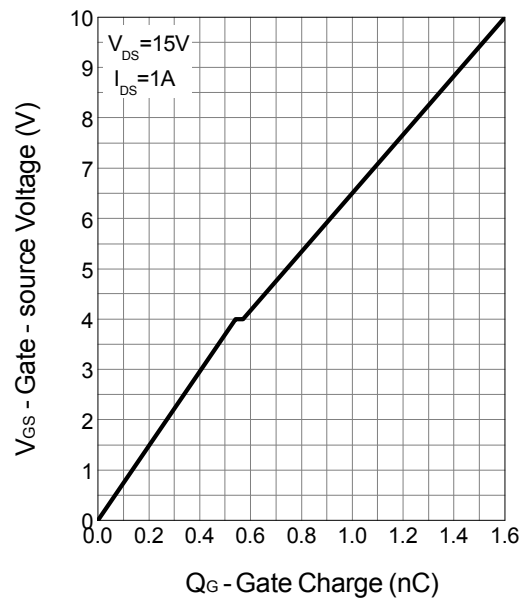
Source-Drain Diode Forward



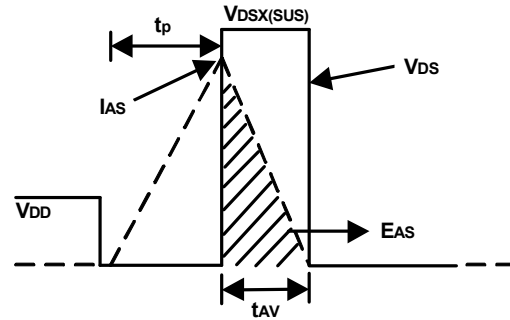
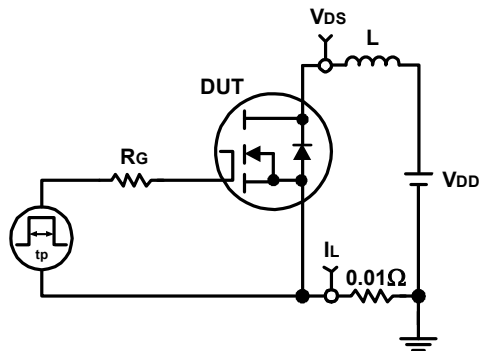
Capacitance



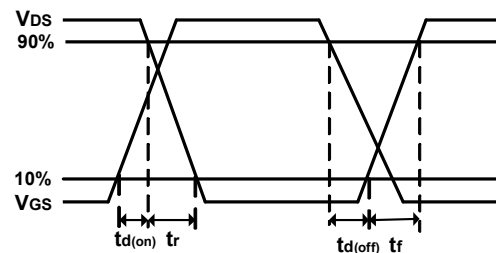
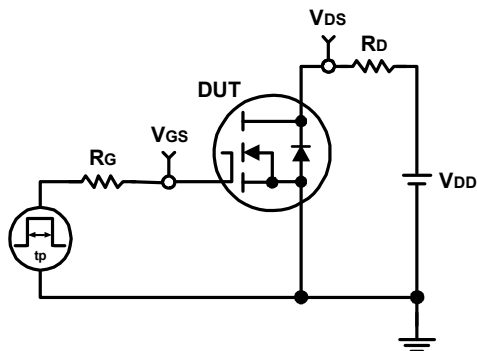
Gate Charge



Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms



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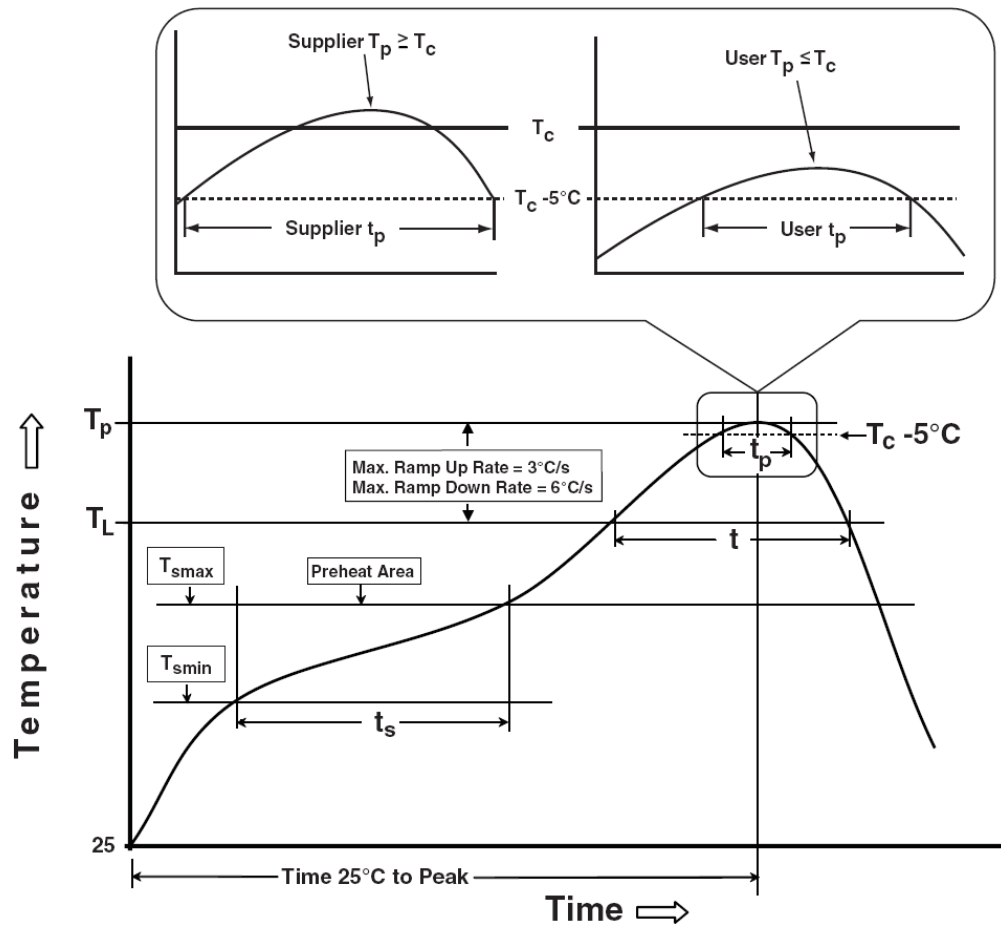
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Classification Profile



Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak Temperature min (T_{smin}) Temperature max (T_{smax}) Time (T_{smin} to T_{smax}) (t_s)	100 °C 150 °C 60-120 seconds	150 °C 200 °C 60-120 seconds
Average ramp-up rate (T_{smax} to T_p)	3 °C/second max.	3°C/second max.
Liquidous temperature (T_L) Time at liquidous (t_L)	183 °C 60-150 seconds	217 °C 60-150 seconds
Peak package body Temperature (T_p)*	See Classification Temp in table 1	See Classification Temp in table 2
Time (t_p)** within 5°C of the specified classification temperature (T_c)	20** seconds	30** seconds
Average ramp-down rate (T_p to T_{smax})	6 °C/second max.	6 °C/second max.
Time 25°C to peak temperature	6 minutes max.	8 minutes max.
* Tolerance for peak profile Temperature (T_p) is defined as a supplier minimum and a user maximum. ** Tolerance for time at peak profile temperature (t_p) is defined as a supplier minimum and a user maximum.		

Table 1. SnPb Eutectic Process – Classification Temperatures (T_c)

Package Thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

Table 2. Pb-free Process – Classification Temperatures (T_c)

Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm – 2.5 mm	260 °C	250 °C	245 °C
≥2.5 mm	250 °C	245 °C	245 °C

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