

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

Symbol	Parameter	N Channel	P Channel	Unit
V_{DSS}	Drain-Source Voltage	20	-20	V
V_{GSS}	Gate-Source Voltage	± 8	± 8	
I_D^*	Continuous Drain Current	1.8	-1.2	A
I_{DM}^*	300 μs Pulsed Drain Current			
I_S^*	Diode Continuous Forward Current	1	-1	A
T_J	Maximum Junction Temperature	150		$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150		
P_D^*	Power Dissipation	$T_A=25^\circ\text{C}$	0.83	W
		$T_A=100^\circ\text{C}$	0.3	
$R_{\theta JA}^*$	Thermal Resistance-Junction to Ambient	150		$^\circ\text{C}/\text{W}$

Note:

*Surface Mounted on 1in² pad area, $t \leq 10\text{sec}$.

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

Symbol	Parameter	Test Condition	APM2700C			Unit	
			Min.	Typ.	Max.		
Static Characteristics							
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0\text{V}, I_{DS}=250\mu\text{A}$	N-Ch	20		V	
		$V_{GS}=0\text{V}, I_{DS}=-250\mu\text{A}$	P-Ch	-20			
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=16\text{V}, V_{GS}=0\text{V}$ $T_J=85^\circ\text{C}$	N-Ch		1	μA	
			P-Ch		-1		
		$V_{DS}=-16\text{V}, V_{GS}=0\text{V}$ $T_J=85^\circ\text{C}$	N-Ch		30		
			P-Ch		-30		
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu\text{A}$	N-Ch	0.45	0.6	1.2	V
		$V_{DS}=V_{GS}, I_{DS}=-250\mu\text{A}$	P-Ch	-0.45	-0.6	-1.2	
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 8\text{V}, V_{DS}=0\text{V}$	N-Ch			± 2	μA
		$V_{GS}=\pm 8\text{V}, V_{DS}=0\text{V}$	P-Ch			± 100	nA
$R_{DS(ON)}^a$	Drain-Source On-State Resistance	$V_{GS}=4.5\text{V}, I_{DS}=1.8\text{A}$	N-Ch		170	220	m Ω
		$V_{GS}=-4.5\text{V}, I_{DS}=-1.2\text{A}$	P-Ch		360	470	
		$V_{GS}=2.5\text{V}, I_{DS}=0.9\text{A}$	N-Ch		270	350	
		$V_{GS}=-2.5\text{V}, I_{DS}=-0.7\text{A}$	P-Ch		530	690	

Electrical Characteristics (Cont.) (T_A = 25°C unless otherwise noted)

Symbol	Parameter	Test Condition	APM2700C			Unit	
			Min.	Typ.	Max.		
Static Characteristics (Cont.)							
V _{SD} ^a	Diode Forward Voltage	I _{SD} =0.5A, V _{GS} =0V	N-Ch		0.8	1.3	V
		I _{SD} =-0.5A, V _{GS} =0V	P-Ch		-0.8	-1.3	
Dynamic Characteristics^b							
C _{iss}	Input Capacitance	N-Channel V _{GS} =0V, V _{DS} =20V, Frequency=1.0MHz	N-Ch		130		pF
			P-Ch		140		
C _{oss}	Output Capacitance	P-Channel V _{GS} =0V, V _{DS} =-20V, Frequency=1.0MHz	N-Ch		25		pF
			P-Ch		40		
C _{rss}	Reverse Transfer Capacitance	N-Channel V _{GS} =0V, V _{DS} =-20V, Frequency=1.0MHz	N-Ch		15		pF
			P-Ch		30		
t _{d(ON)}	Turn-on Delay Time	N-Channel V _{DD} =10V, R _L =10Ω, I _{DS} =1A, V _{GEN} =4.5V, R _G =6Ω	N-Ch		2	4	ns
			P-Ch		3	6	
T _r	Turn-on Rise Time	P-Channel V _{DD} =-10V, R _L =10Ω, I _{DS} =-1A, V _{GEN} =-4.5V, R _G =6Ω	N-Ch		17	32	ns
			P-Ch		18	33	
t _{d(OFF)}	Turn-off Delay Time	N-Channel V _{DD} =10V, R _L =10Ω, I _{DS} =1A, V _{GEN} =4.5V, R _G =6Ω	N-Ch		4	8	ns
			P-Ch		10	19	
T _f	Turn-off Fall Time	P-Channel V _{DD} =-10V, R _L =10Ω, I _{DS} =-1A, V _{GEN} =-4.5V, R _G =6Ω	N-Ch		18	33	ns
			P-Ch		20	37	
Gate Charge Characteristics^b							
Q _g	Total Gate Charge	N-Channel V _{DS} =10V, V _{GS} =4.5V, I _{DS} =1.8A	N-Ch		4.2	5.5	nC
			P-Ch		7	9	
Q _{gs}	Gate-Source Charge	P-Channel V _{DS} =-10V, V _{GS} =-4.5V, I _{DS} =-1.2A	N-Ch		0.6		nC
			P-Ch		1.1		
Q _{gd}	Gate-Drain Charge	N-Channel V _{DS} =10V, V _{GS} =4.5V, I _{DS} =1.8A	N-Ch		0.6		nC
			P-Ch		1.1		

Notes:

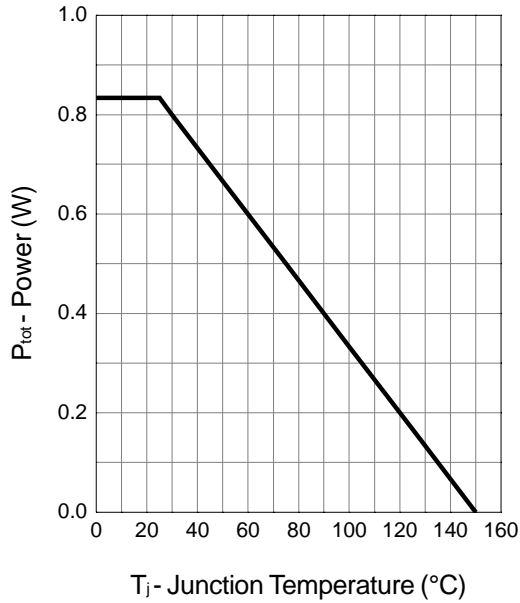
a : Pulse test ; pulse width ≤300μs, duty cycle ≤ 2%.

b : Guaranteed by design, not subject to production testing.

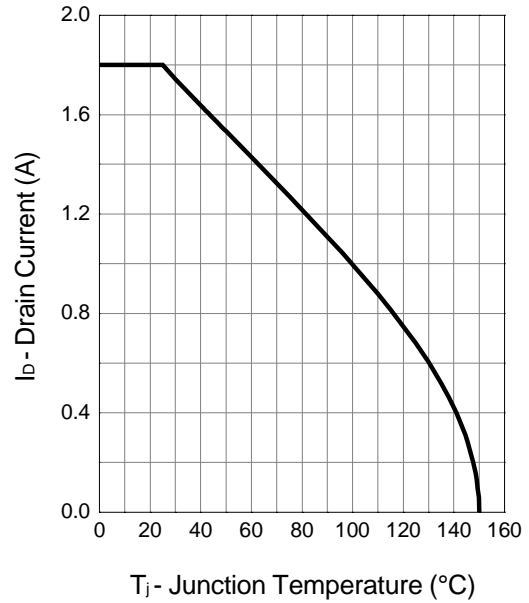
Typical Characteristics

N-Channel

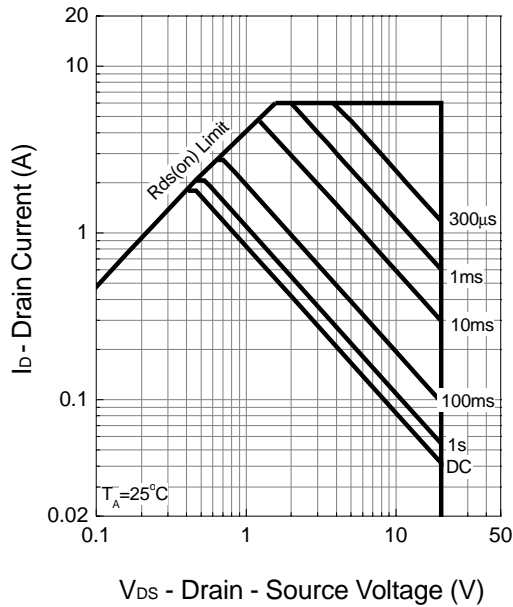
Power Dissipation



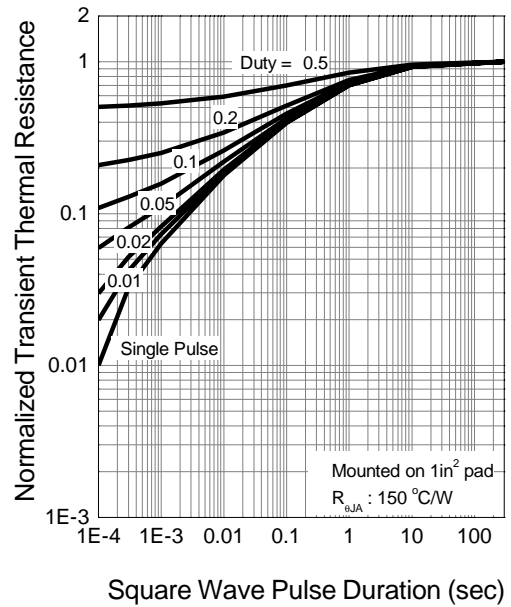
Drain Current



Safe Operation Area



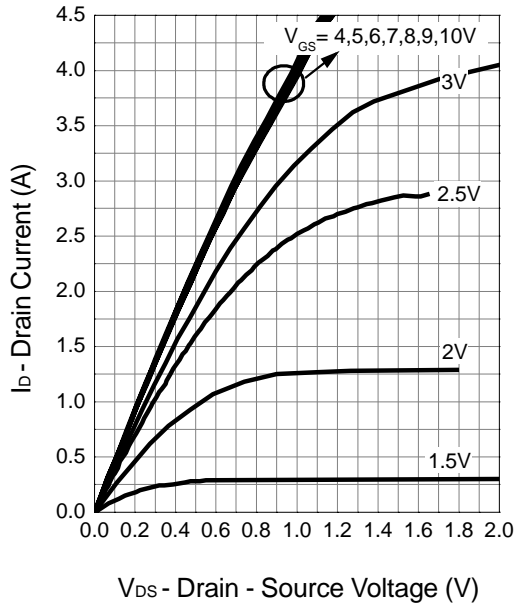
Thermal Transient Impedance



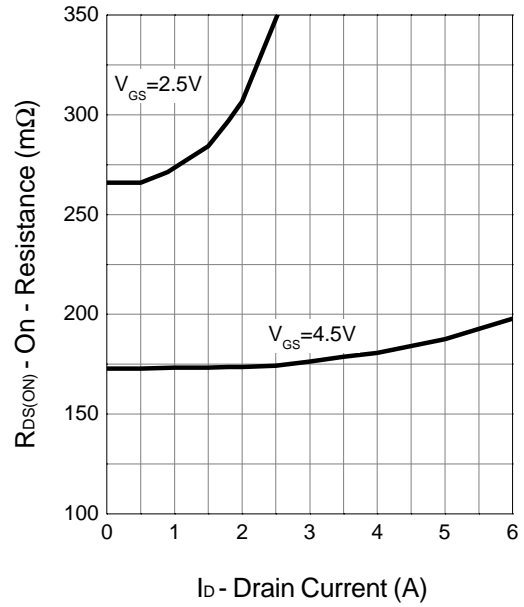
Typical Characteristics (Cont.)

N-Channel

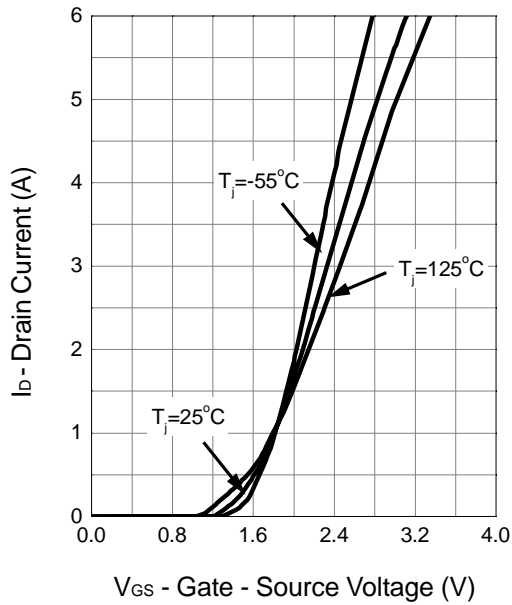
Output Characteristics



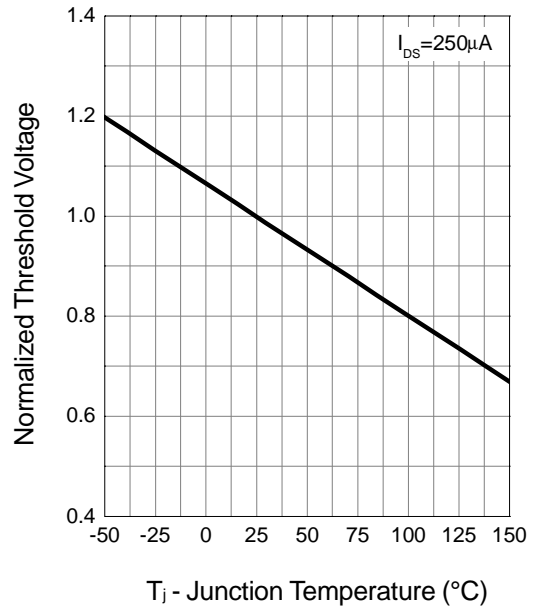
Drain-Source On Resistance



Transfer Characteristics



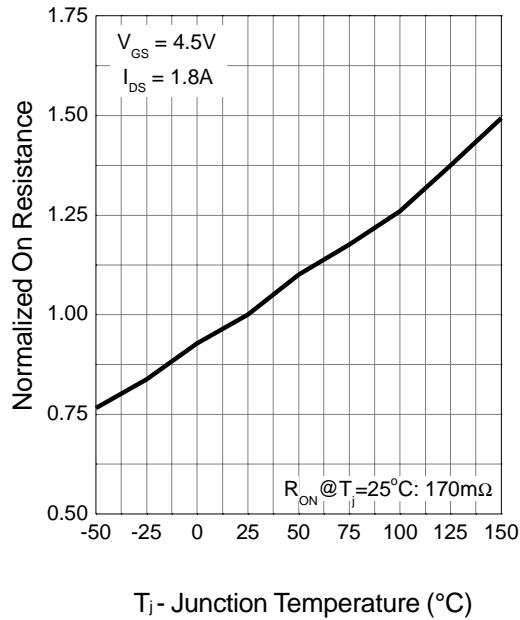
Gate Threshold Voltage



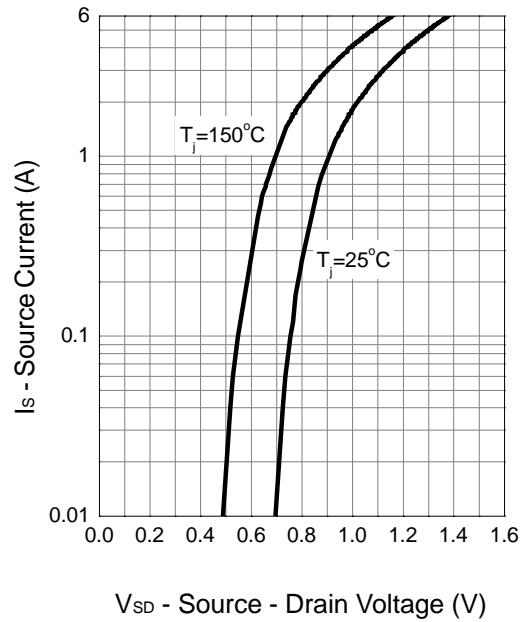
Typical Characteristics (Cont.)

N-Channel

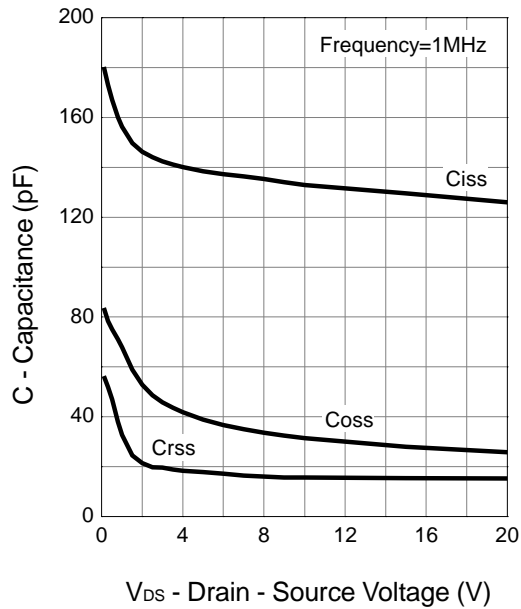
Drain-Source On Resistance



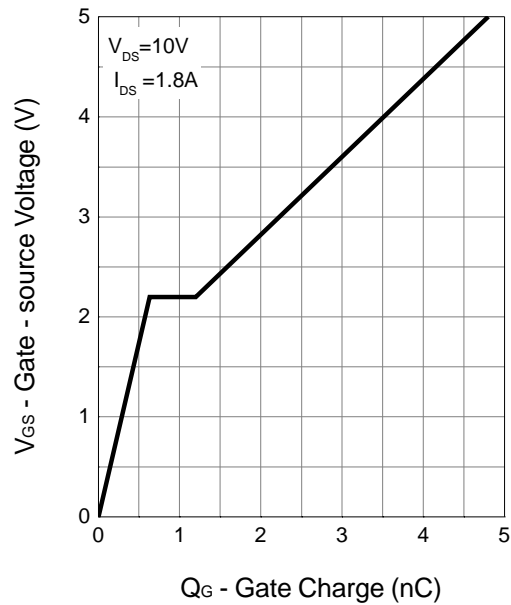
Source-Drain Diode Forward



Capacitance



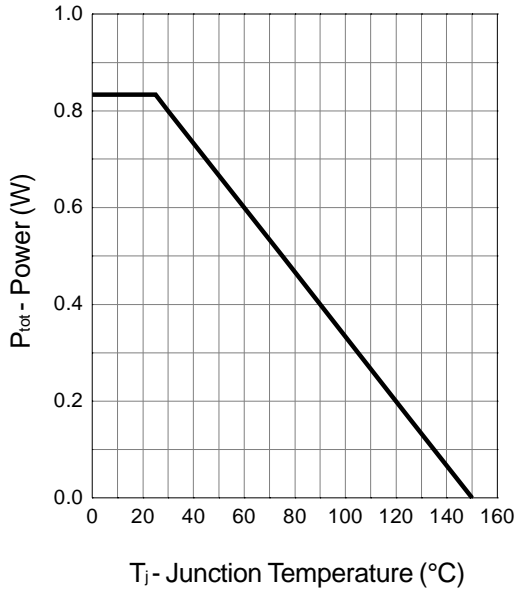
Gate Charge



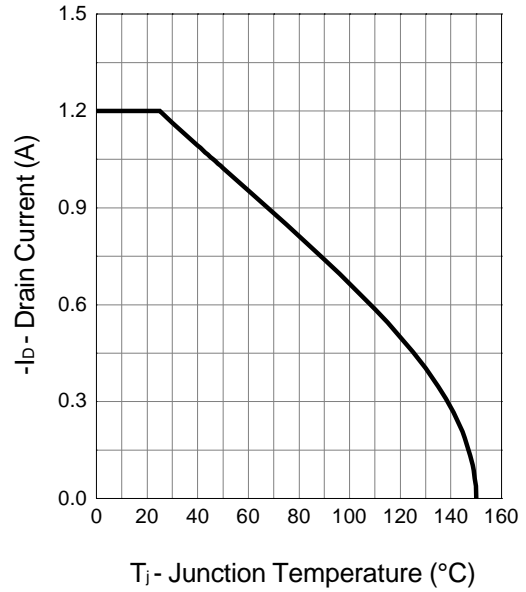
Typical Characteristics

P-Channel

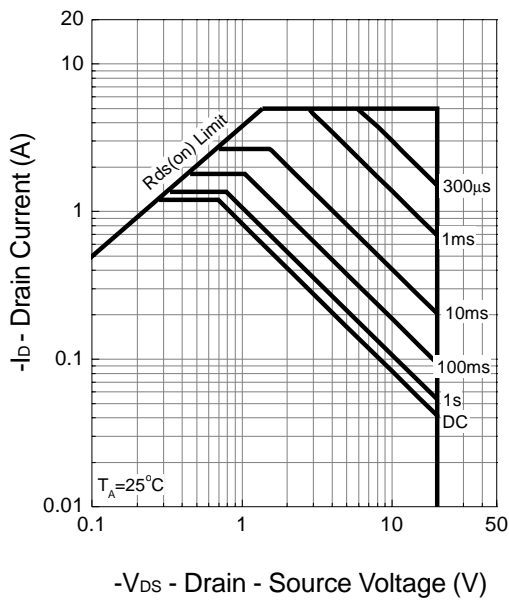
Power Dissipation



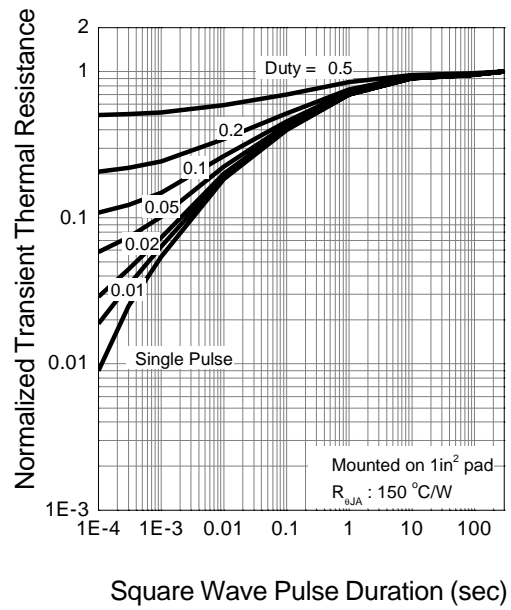
Drain Current



Safe Operation Area



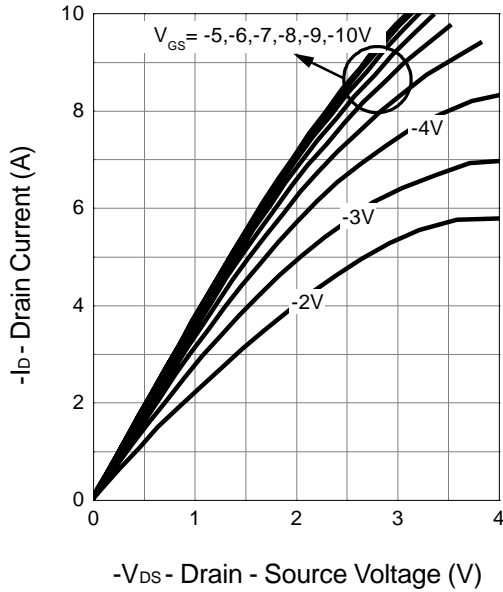
Thermal Transient Impedance



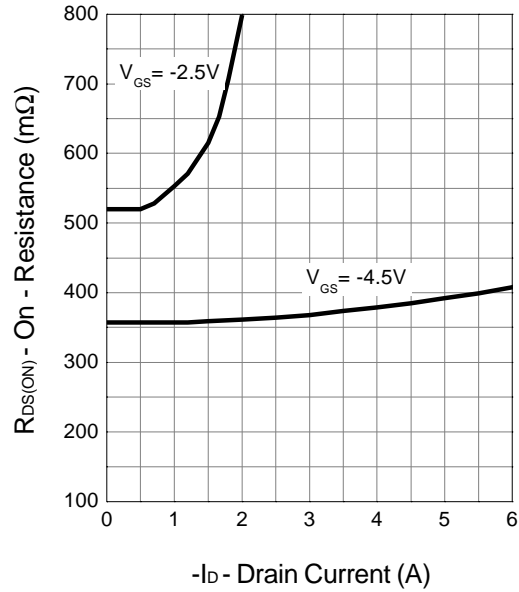
Typical Characteristics (Cont.)

P-Channel

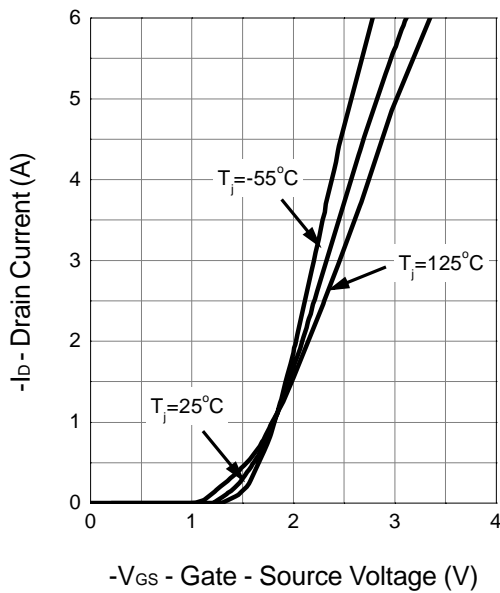
Output Characteristics



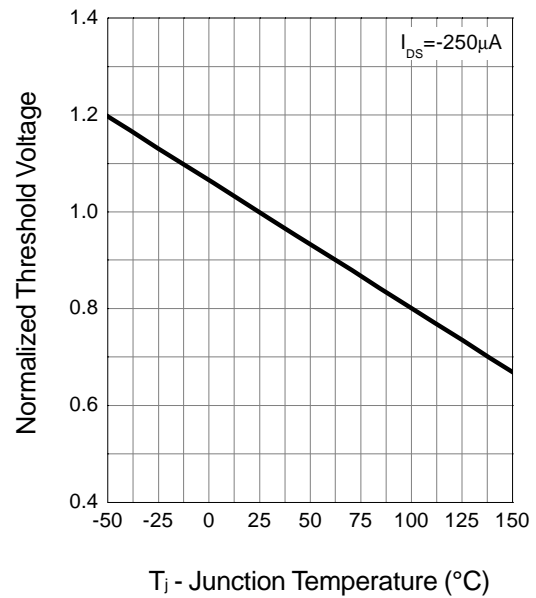
Drain-Source On Resistance



Transfer Characteristics



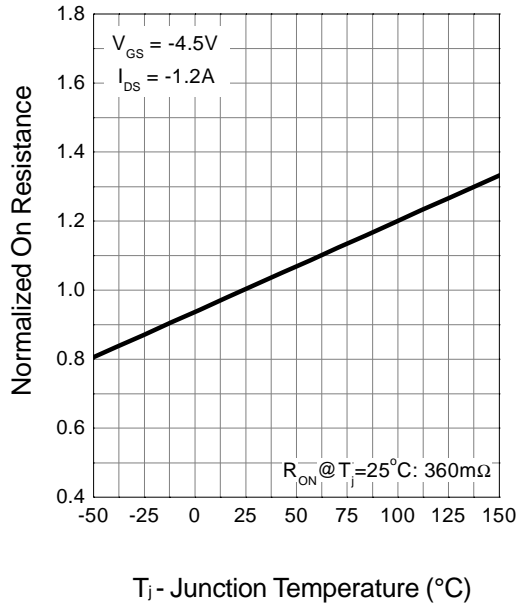
Gate Threshold Voltage



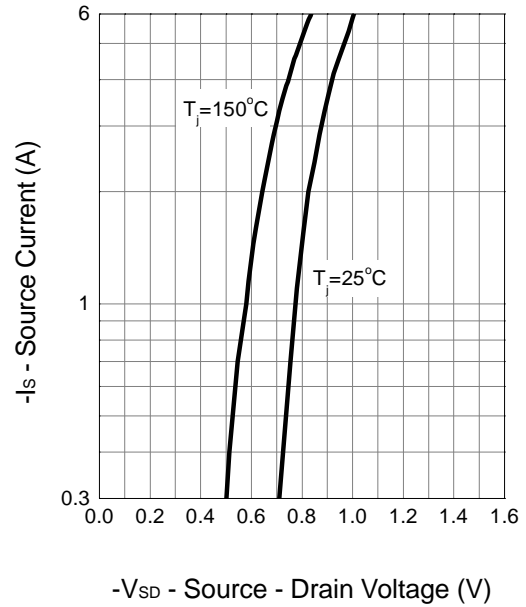
Typical Characteristics (Cont.)

P-Channel

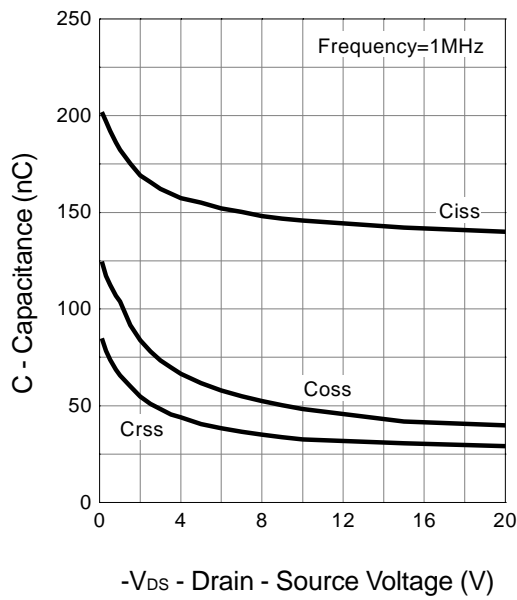
Drain-Source On Resistance



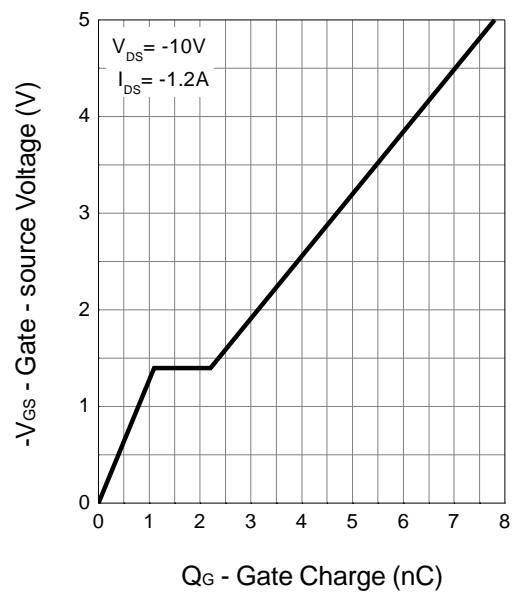
Source-Drain Diode Forward



Capacitance

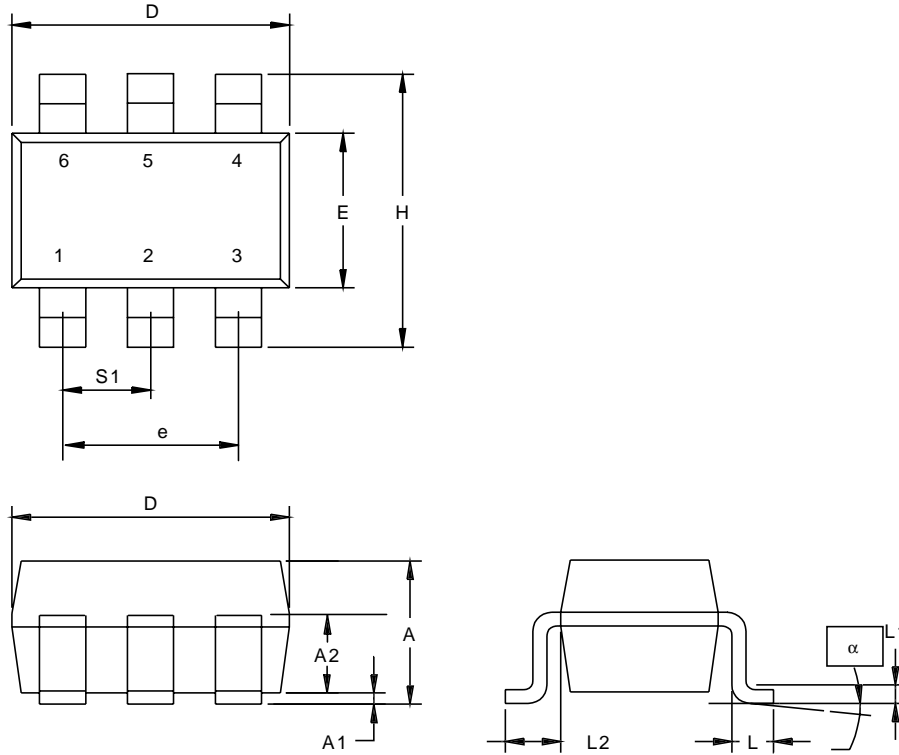


Gate Charge



Packaging Information

SOT-23-6

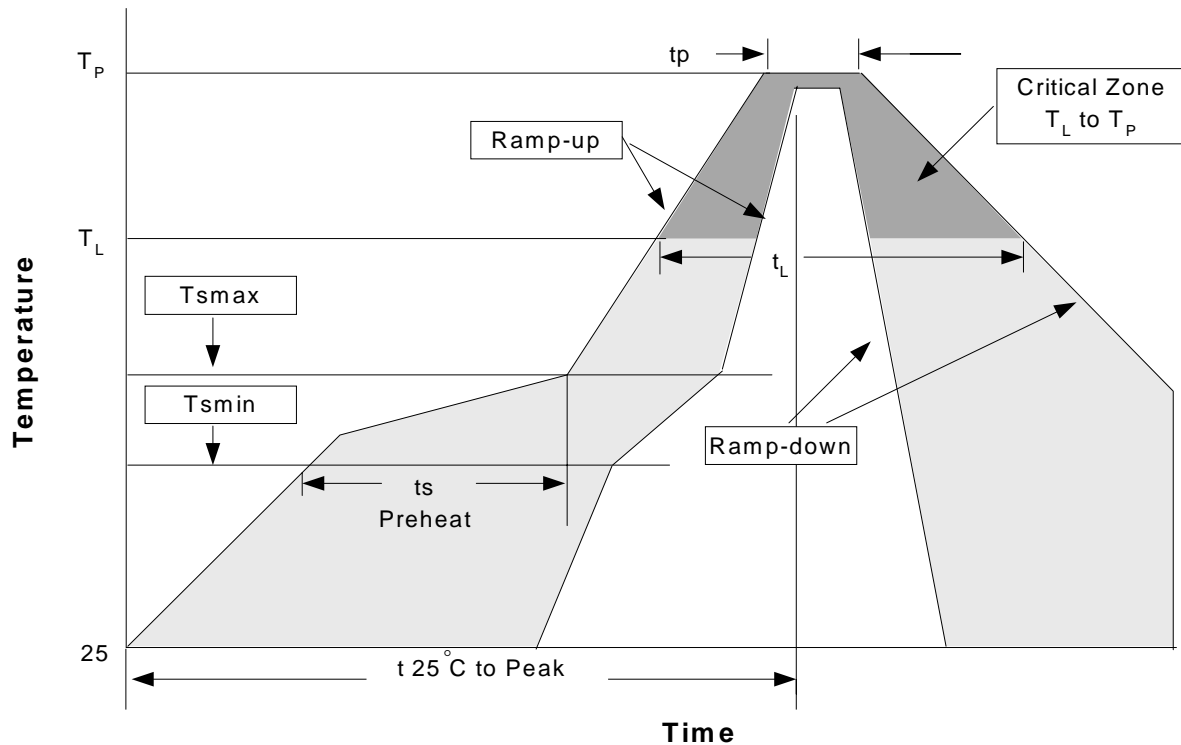


Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.00	1.45	0.0394	0.0571
A1	0.00	0.15	0.0000	0.0591
A2	0.70	1.25	0.0276	0.0492
b	0.35	0.55	0.0138	0.0217
D	2.70	3.10	0.1063	0.1220
E	1.40	1.80	0.50551	0.0709
e	1.90 BSC		0.07480 BSC	
H	2.60	3.00	0.1024	0.1181
L	0.30	-	0.00118	-
L1	0.08	0.25	0.0031	0.0098
L2	0.60 REF		0.024 REF	
α	0°	10°	0°	10°
S1	0.85	1.05	0.0335	0.0413

Physical Specifications

Terminal Material	Solder-Plated Copper (Solder Material : 90/10 or 63/37 SnPb), 100%Sn
Lead Solderability	Meets EIA Specification RSI86-91, ANSI/J-STD-002 Category 3.

Reflow Condition (IR/Convection or VPR Reflow)



Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	3°C/second max.	3°C/second max.
Preheat		
- Temperature Min (T_{smin})	100°C	150°C
- Temperature Max (T_{smax})	150°C	200°C
- Time (min to max) (t_s)	60-120 seconds	60-180 seconds
Time maintained above:		
- Temperature (T_L)	183°C	217°C
- Time (t_L)	60-150 seconds	60-150 seconds
Peak/Classification Temperature (T_P)	See table 1	See table 2
Time within 5°C of actual Peak Temperature (t_p)	10-30 seconds	20-40 seconds
Ramp-down Rate	6°C/second max.	6°C/second max.
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.

Notes: All temperatures refer to topside of the package .Measured on the body surface.

Classification Reflow Profiles(Cont.)

Table 1. SnPb Eutectic Process – Package Peak Reflow Temperatures

Package Thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5 mm	240 +0/-5°C	225 +0/-5°C
≥2.5 mm	225 +0/-5°C	225 +0/-5°C

Table 2. Pb-free Process – Package Classification Reflow Temperatures

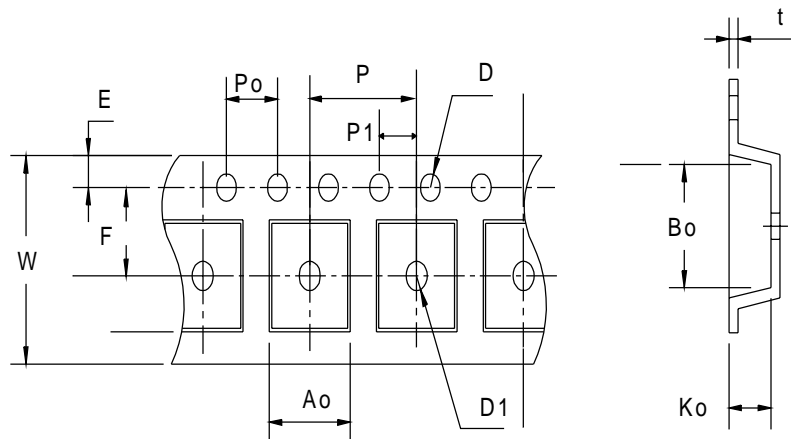
Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >2000
<1.6 mm	260 +0°C*	260 +0°C*	260 +0°C*
1.6 mm – 2.5 mm	260 +0°C*	250 +0°C*	245 +0°C*
≥2.5 mm	250 +0°C*	245 +0°C*	245 +0°C*

*Tolerance: The device manufacturer/supplier **shall** assure process compatibility up to and including the stated classification temperature (this means Peak reflow temperature +0°C. For example 260°C+0°C) at the rated MSL level.

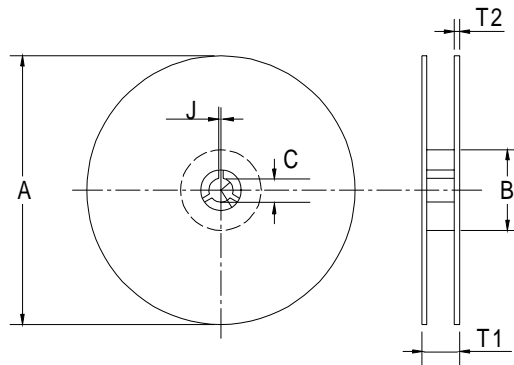
Reliability Test Program

Test item	Method	Description
SOLDERABILITY	MIL-STD-883D-2003	245°C,5 SEC
HOLT	MIL-STD 883D-1005.7	1000 Hrs Bias @ 125°C
PCT	JESD-22-B, A102	168 Hrs, 100% RH, 121°C
TST	MIL-STD 883D-1011.9	-65°C ~ 150°C, 200 Cycles

Carrier Tape & Reel Dimensions



Carrier Tape & Reel Dimensions(Cont.)



Application	A	B	C	J	T1	T2	W	P	E
SOT-23-6	178±1	72 ± 1.0	13.0 + 0.2	2.5 ± 0.15	8.4 ± 2	1.5± 0.3	8.0+ 0.3 -0.3	4 ± 0.1	1.75± 0.1
	F	D	D1	Po	P1	Ao	Bo	Ko	t
	3.5 ± 0.05	1.5 + 0.1	1.5 + 0.1	4.0 ± 0.1	2.0 ± 0.1	3.15 ± 0.1	3.2± 0.1	1.4± 0.1	0.2±0.03

(mm)

Cover Tape Dimensions

Application	Carrier Width	Cover Tape Width	Devices Per Reel
SOT-23-6	8	5.3	3000

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