

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	± 10	± 10	
I_D^*	Continuous Drain Current	3	-1.5	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	APM2701CG			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
						30	
		$V_{DS}=-16\text{V}, V_{GS}=0\text{V}$ $T_J=85^\circ\text{C}$	P-Ch			-1	
						-30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu\text{A}$	N-Ch	0.45	0.6	1	V
		$V_{DS}=V_{GS}, I_{DS}=-250\mu\text{A}$	P-Ch	-0.45	-0.6	-1	
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 10\text{V}, V_{DS}=0\text{V}$	N-Ch			± 100	nA
			P-Ch			± 100	
$R_{DS(ON)}^a$	Drain-Source On-State Resistance	$V_{GS}=4.5\text{V}, I_{DS}=3\text{A}$	N-Ch		50	70	m Ω
		$V_{GS}=-4.5\text{V}, I_{DS}=-1.5\text{A}$	P-Ch		145	190	
		$V_{GS}=2.5\text{V}, I_{DS}=1.7\text{A}$	N-Ch		90	110	
		$V_{GS}=-2.5\text{V}, I_{DS}=-1\text{A}$	P-Ch		180	235	

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

Symbol	Parameter	Test Condition	APM2701CG			Unit			
			Min.	Typ.	Max.				
Static Characteristics (Cont.)									
V_{SD}^a	Diode Forward Voltage	$I_{SD}=0.5\text{A}, V_{GS}=0\text{V}$	N-Ch		0.7	1.3	V		
		$I_{SD}=-0.5\text{A}, V_{GS}=0\text{V}$	P-Ch		-0.7	-1.3			
Dynamic Characteristics^b									
C_{iss}	Input Capacitance	N-Channel $V_{GS}=0\text{V},$ $V_{DS}=10\text{V},$ Frequency=1.0MHz	N-Ch		270		pF		
			P-Ch		300				
C_{oss}	Output Capacitance		N-Ch		70				
			P-Ch		50				
C_{rss}	Reverse Transfer Capacitance		N-Ch		50				
			P-Ch		30				
$t_{d(ON)}$	Turn-on Delay Time	N-Channel $V_{DD}=10\text{V}, R_L=10\Omega,$ $I_{DS}=1\text{A}, V_{GEN}=4.5\text{V},$ $R_G=6\Omega$	N-Ch		6	12	ns		
			P-Ch		6	10			
T_r	Turn-on Rise Time		N-Ch		5	10			
			P-Ch		8	12			
$t_{d(OFF)}$	Turn-off Delay Time		P-Channel $V_{DD}=-10\text{V}, R_L=10\Omega,$ $I_{DS}=-1\text{A}, V_{GEN}=-4.5\text{V},$ $R_G=6\Omega$	N-Ch		12		23	
				P-Ch		10		15	
T_f	Turn-off Fall Time			N-Ch		6		12	
				P-Ch		5		10	
Gate Charge Characteristics^b									
Q_g	Total Gate Charge			N-Channel $V_{DS}=10\text{V}, V_{GS}=4.5\text{V},$ $I_{DS}=3\text{A}$	N-Ch			5	6.5
			P-Ch			4		6	
Q_{gs}	Gate-Source Charge		N-Ch			0.5			
		P-Ch			0.6				
Q_{gd}	Gate-Drain Charge	P-Channel $V_{DS}=-10\text{V}, V_{GS}=-4.5\text{V},$ $I_{DS}=-1.5\text{A}$	N-Ch			1.6			
			P-Ch			1			

Notes:

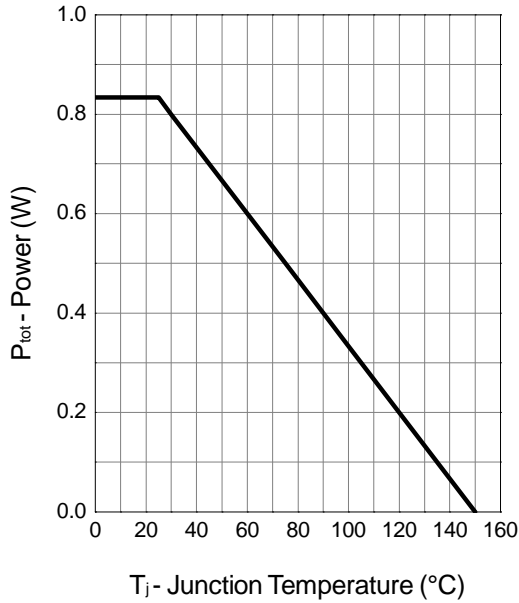
a : Pulse test ; pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

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

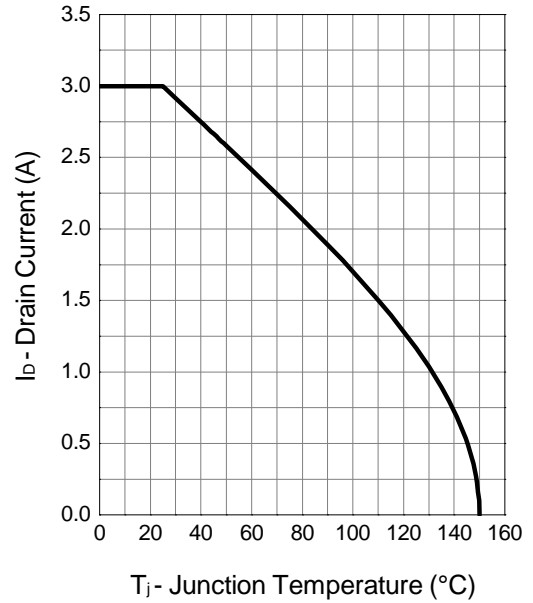
Typical Characteristics

N-Channel

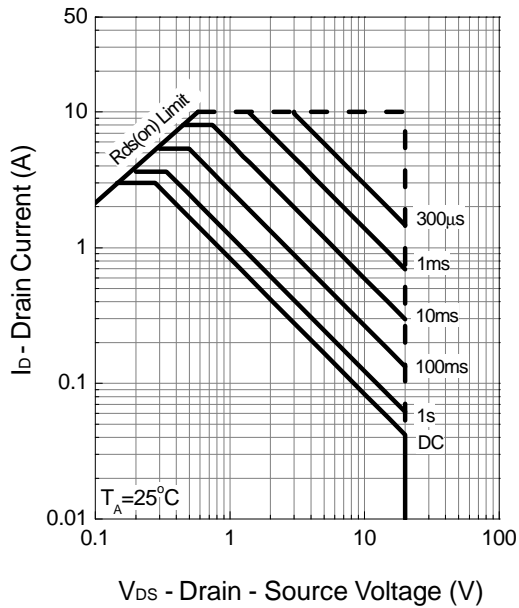
Power Dissipation



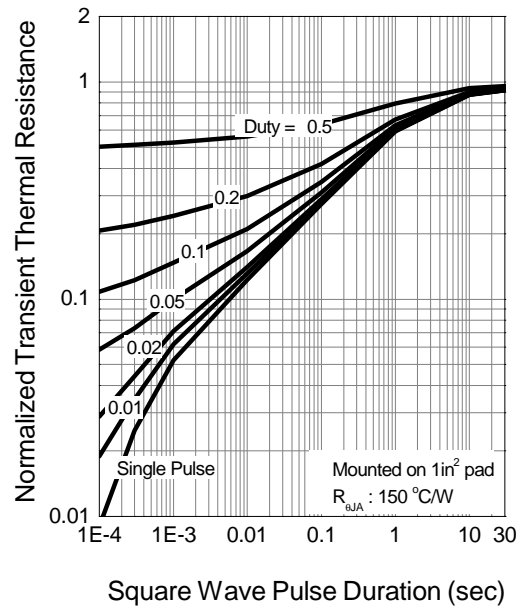
Drain Current



Safe Operation Area

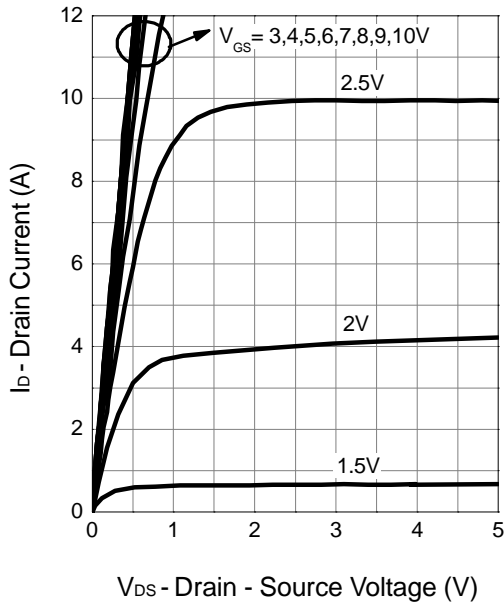


Thermal Transient Impedance

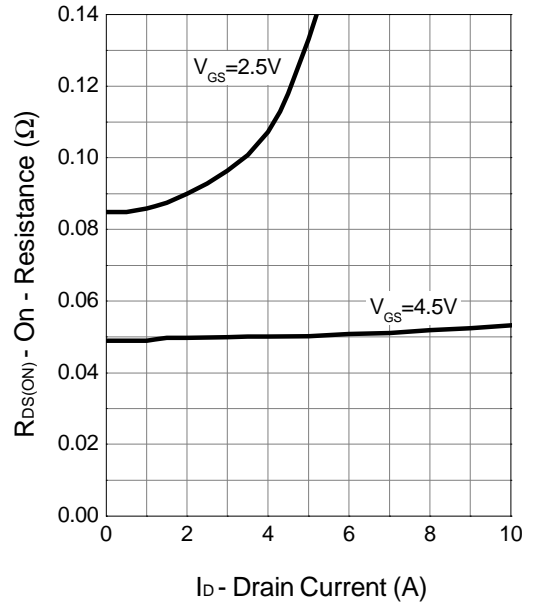


Typical Characteristics (Cont.)

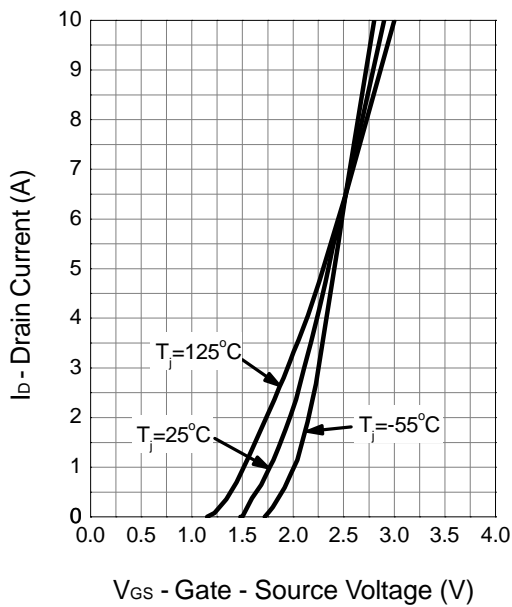
Output Characteristics



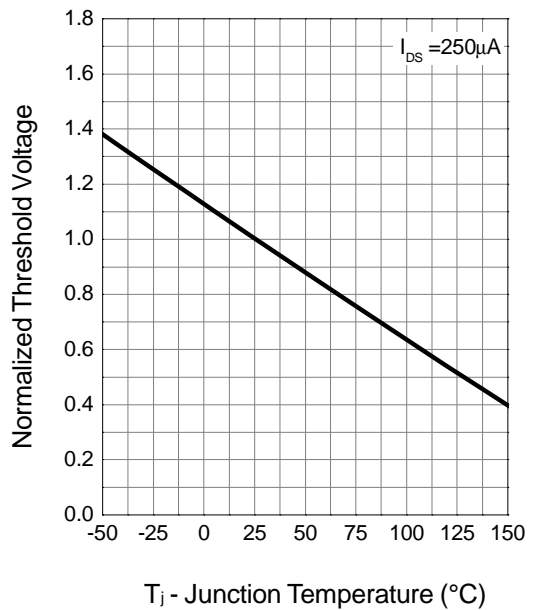
Drain-Source On Resistance



Transfer Characteristics

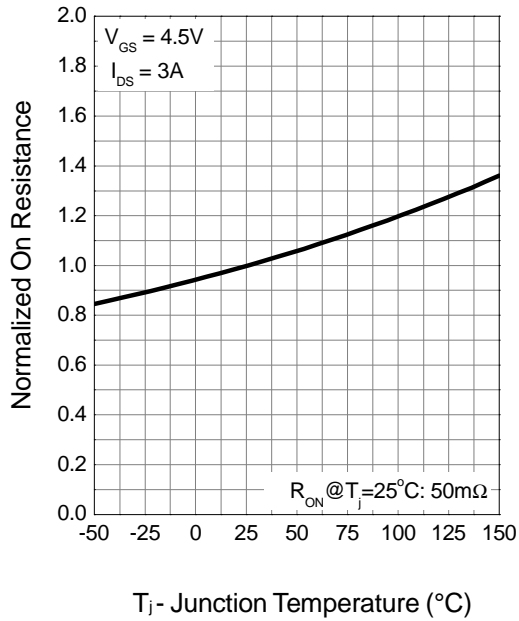


Gate Threshold Voltage

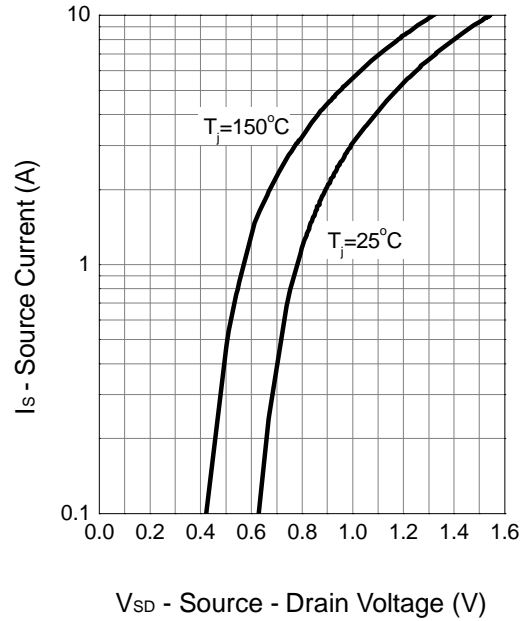


Typical Characteristics (Cont.)

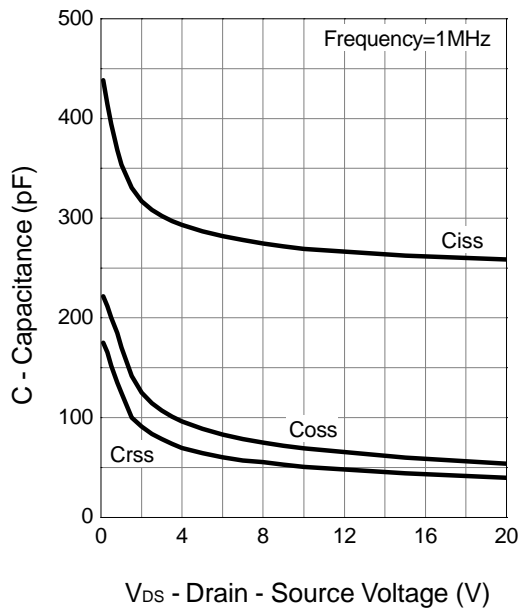
Drain-Source On Resistance



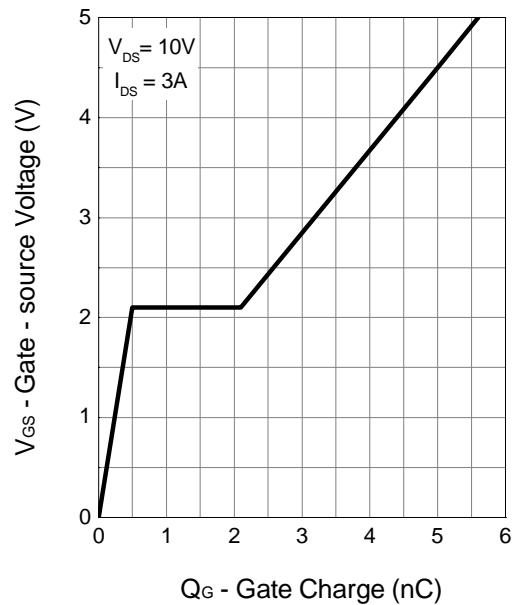
Source-Drain Diode Forward



Capacitance



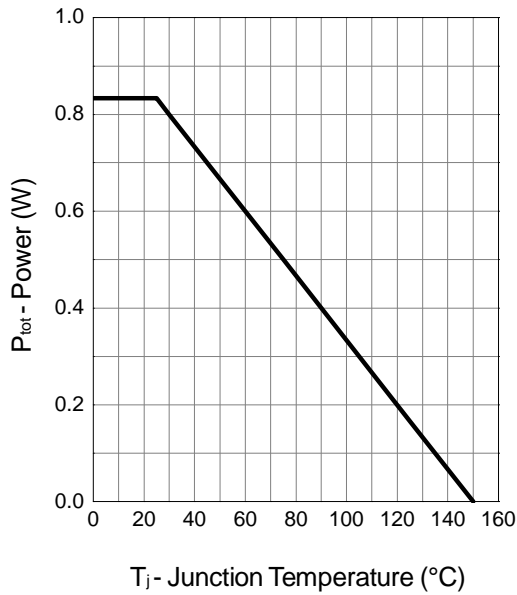
Gate Charge



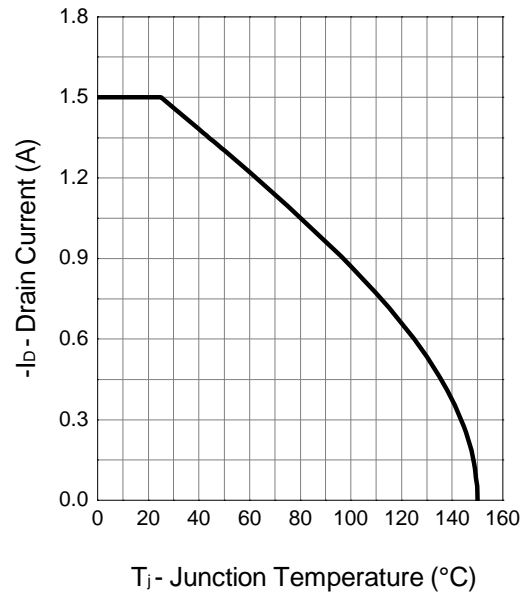
Typical Characteristics

P-Channel

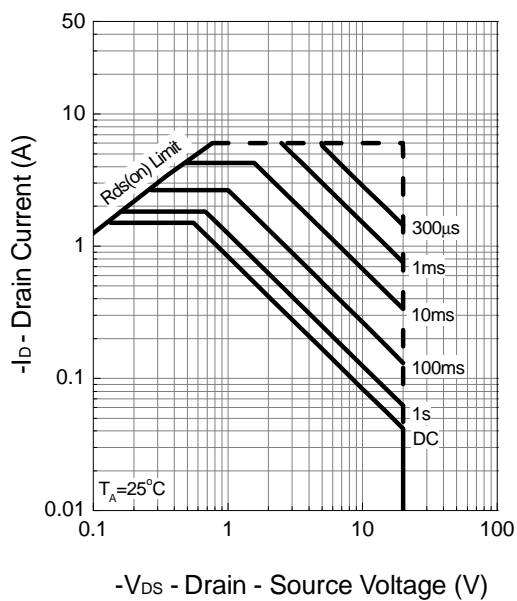
Power Dissipation



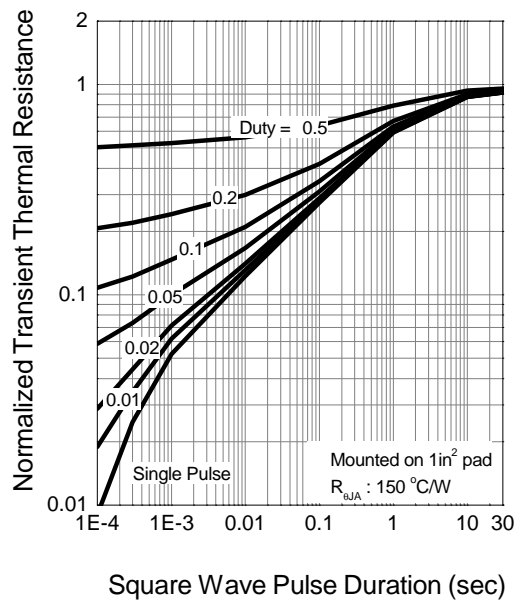
Drain Current



Safe Operation Area

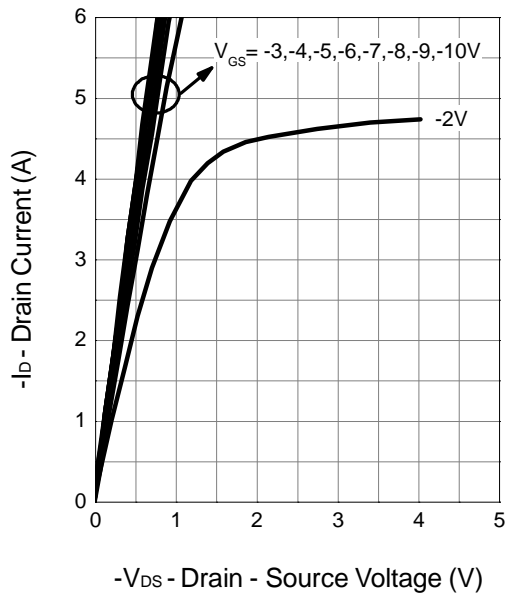


Thermal Transient Impedance

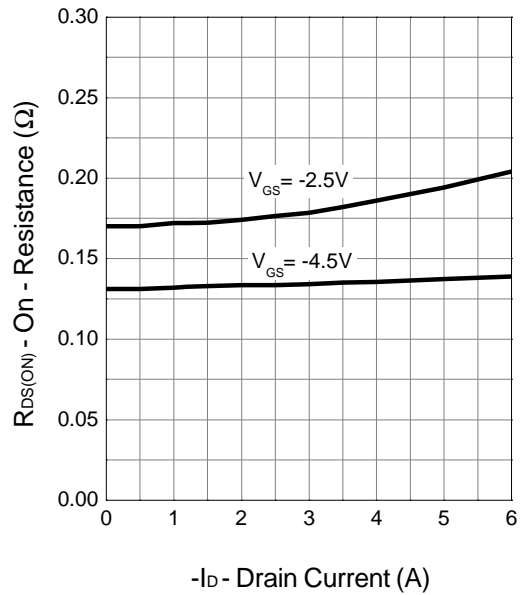


Typical Characteristics (Cont.)

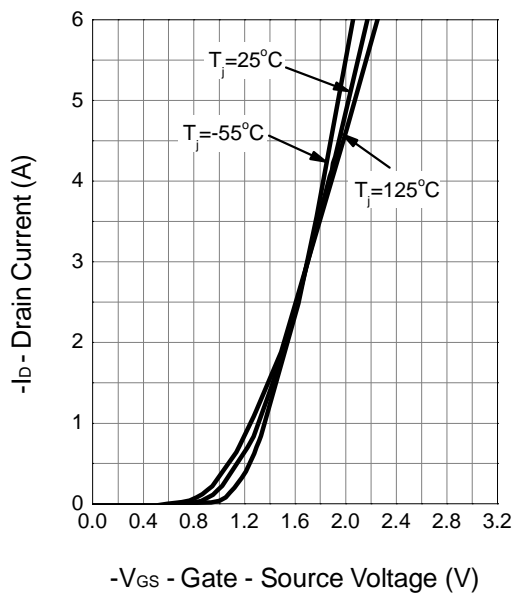
Output Characteristics



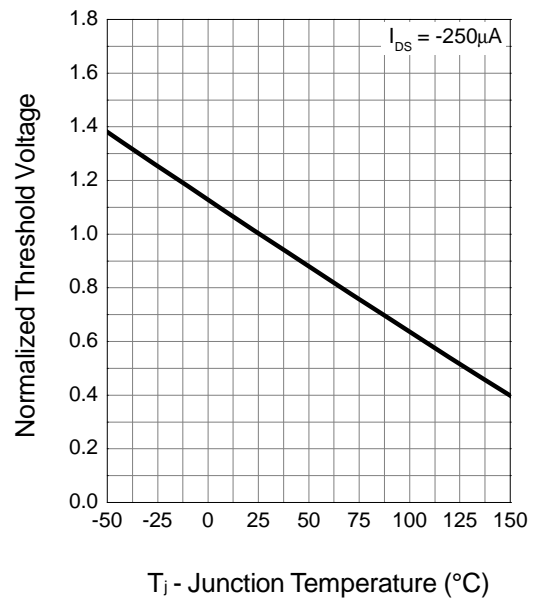
Drain-Source On Resistance



Transfer Characteristics

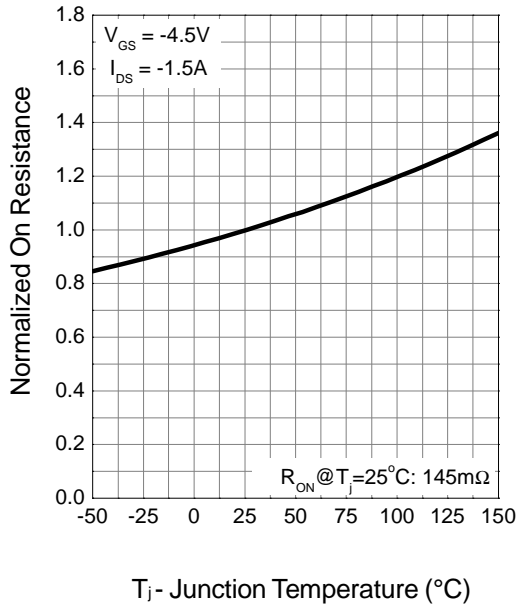


Gate Threshold Voltage

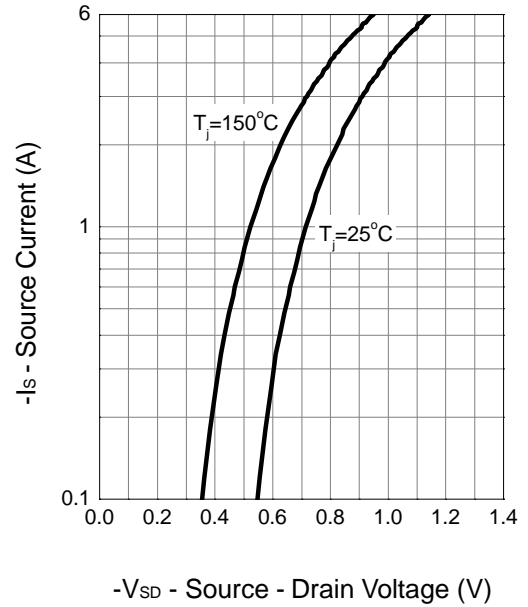


Typical Characteristics (Cont.)

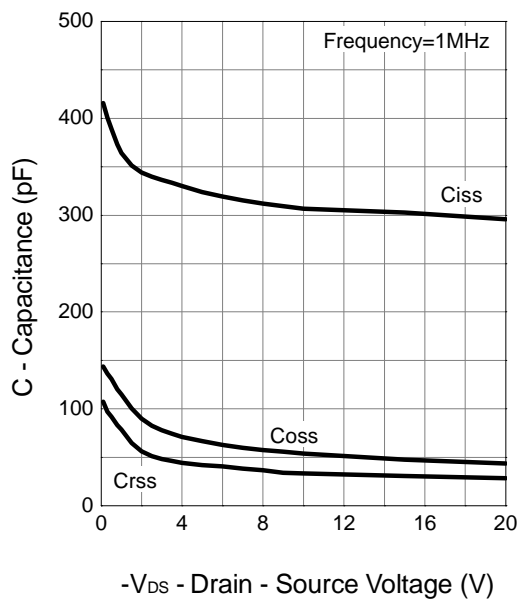
Drain-Source On Resistance



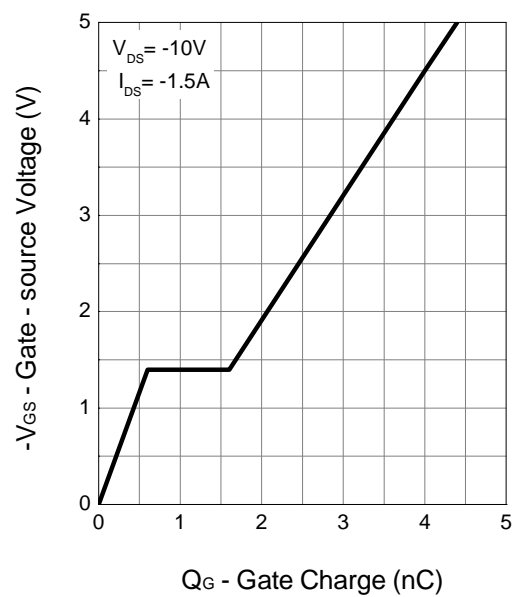
Source-Drain Diode Forward



Capacitance

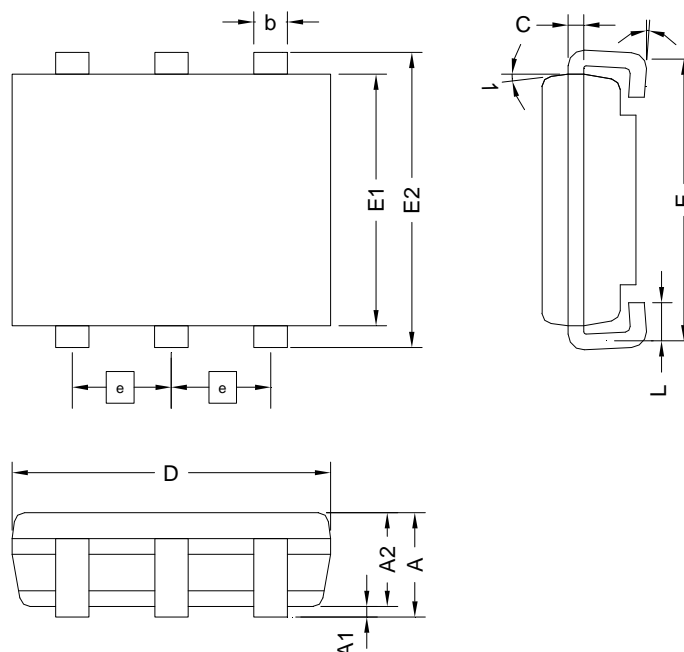


Gate Charge



Packaging Information

JSOT-6

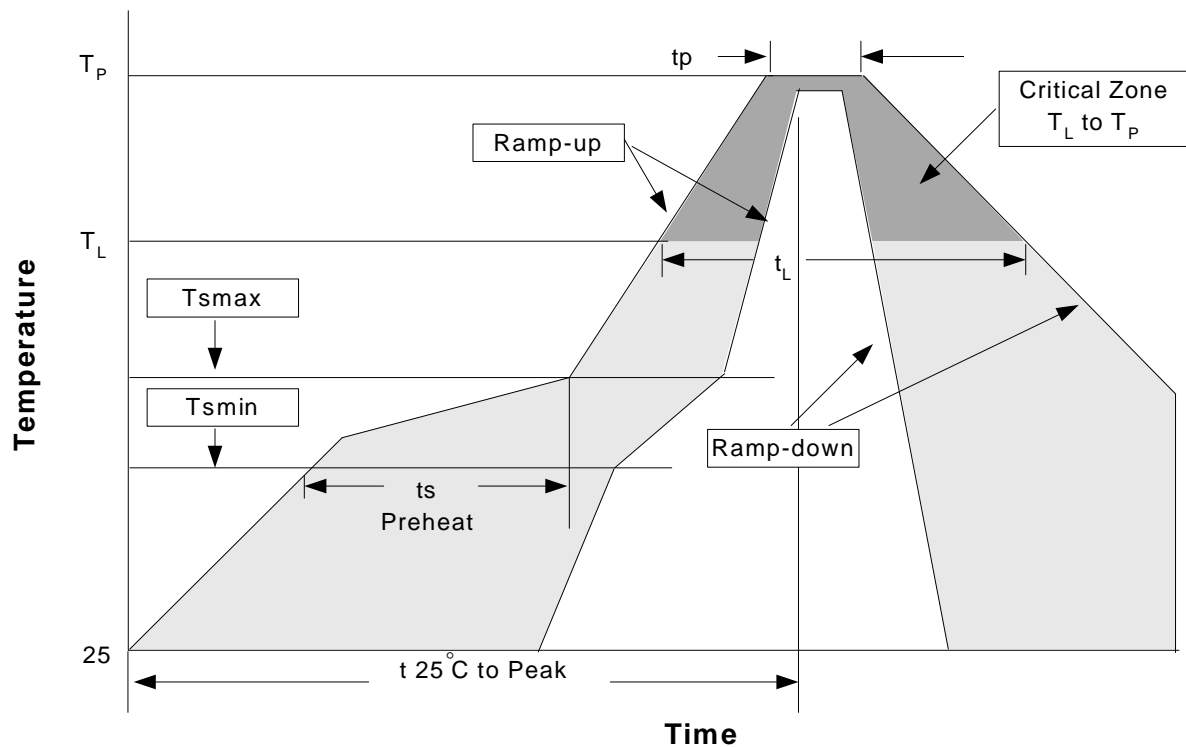


Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.935	1.10	0.037	0.043
A1	0.01	0.10	0.0004	0.004
A2	0.925	1.00	0.036	0.039
b	0.25	0.40	0.010	0.016
c	0.10	0.20	0.004	0.008
D	2.95	3.10	0.116	0.122
E	2.50	3.00	0.098	0.118
E1	2.30	2.50	0.091	0.098
E2	2.65	3.05	0.104	0.120
e	0.95 BSC		0.037 BSC	
L	0.30	0.60	0.012	0.024
?	0	8°	0	8°
?1	7° NOM.		7° NOM.	

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

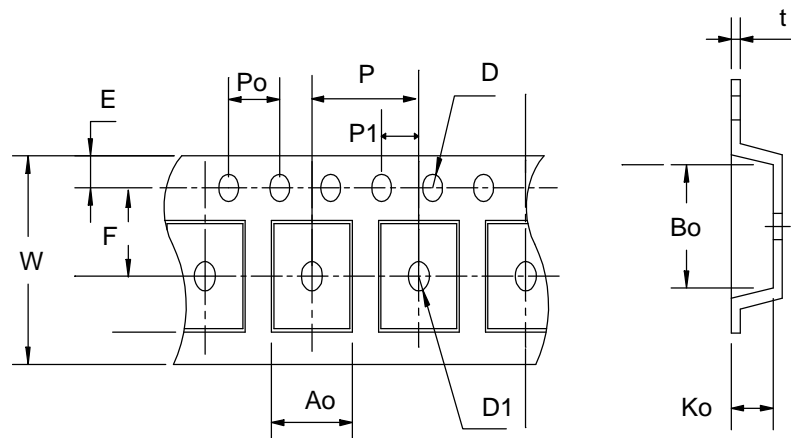
Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >2000
<1.6 mm	260 +0°C*	260 +0°C*	260 +0°C*
1.6 mm – 2.5 mm	260 +0°C*	250 +0°C*	245 +0°C*
≥2.5 mm	250 +0°C*	245 +0°C*	245 +0°C*

*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.

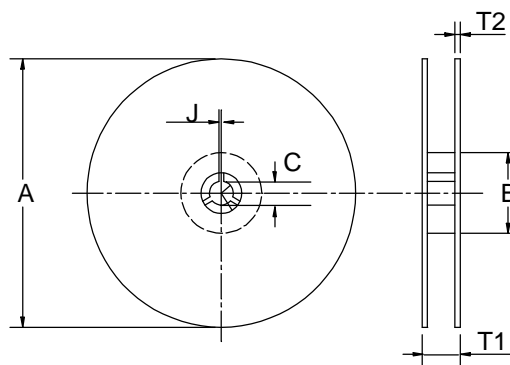
Reliability Test Program

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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