

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

Symbol	Parameter	N Channel	P Channel	Unit
V_{DSS}	Drain-Source Voltage	30	-30	V
V_{GSS}	Gate-Source Voltage	± 20	± 20	
I_D^*	Continuous Drain Current	8	-7	A
I_{DM}^*	300 μs Pulsed Drain Current			
I_S^*	Diode Continuous Forward Current	2.5	-2	A
T_J	Maximum Junction Temperature	150		$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150		
P_D^*	Power Dissipation	$T_A=25^\circ\text{C}$	2.5	W
		$T_A=100^\circ\text{C}$	1	
$R_{\theta JA}^*$	Thermal Resistance-Junction to Ambient	50		$^\circ\text{C/W}$

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	APM4550J			Unit	
			Min.	Typ.	Max.		
Static Characteristics							
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	N-Ch	30		V	
		$V_{GS}=0V, I_{DS}=-250\mu A$	P-Ch	-30			
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=24V, V_{GS}=0V$ $T_J=85^\circ\text{C}$	N-Ch		1	μA	
					30		
		$V_{DS}=-24V, V_{GS}=0V$ $T_J=85^\circ\text{C}$	P-Ch		-1		
					-30		
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	N-Ch	1	1.5	2	V
		$V_{DS}=V_{GS}, I_{DS}=-250\mu A$	P-Ch	-1	-1.5	-2	
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	N-Ch			± 100	nA
			P-Ch			± 100	
$R_{DS(ON)}^a$	Drain-Source On-State Resistance	$V_{GS}=10V, I_{DS}=8A$	N-Ch		20	27.5	m Ω
		$V_{GS}=-10V, I_{DS}=-7A$	P-Ch		40	50	
		$V_{GS}=4.5V, I_{DS}=5A$	N-Ch		30	40	
		$V_{GS}=-4.5V, I_{DS}=-4A$	P-Ch		62	80	

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

Symbol	Parameter	Test Condition	APM4550J			Unit	
			Min.	Typ.	Max.		
Diode Characteristics							
V_{SD}^a	Diode Forward Voltage	$I_{SD}=2.5A, V_{GS}=0V$	N-Ch		0.8	1.3	V
		$I_{SD}=-2A, V_{GS}=0V$	P-Ch		-0.8	-1.3	
t_{rr}	Reverse Recovery Time	N-Channel $I_{SD}=8A, dI_{SD}/dt=100A/\mu s$	N-Ch		16		ns
			P-Ch		15		
Q_{rr}	Reverse Recovery Charge	N-Channel $I_{SD}=-7A, dI_{SD}/dt=100A/\mu s$	N-Ch		9		nC
			P-Ch		6		
Dynamic Characteristics^b							
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$	N-Ch		2		Ω
			P-Ch		8.3		
C_{iss}	Input Capacitance	N-Channel $V_{GS}=0V, V_{DS}=15V,$ Frequency = 1.0MHz	N-Ch		620		pF
C_{oss}	Output Capacitance	P-Channel $V_{GS}=0V, V_{DS}=-15V,$ Frequency = 1.0MHz	P-Ch		600		
			N-Ch		90		
C_{riss}	Reverse Transfer Capacitance	P-Channel $V_{GS}=0V, V_{DS}=-15V,$ Frequency = 1.0MHz	P-Ch		100		
			N-Ch		70		
$t_{d(ON)}$	Turn-on Delay Time	N-Channel $V_{DD}=15V, R_L=15\Omega,$ $I_{DS}=1A, V_{GEN}=10V,$ $R_G=6\Omega$	N-Ch		6	11	ns
			P-Ch		8	14	
T_r	Turn-on Rise Time	P-Channel $V_{DD}=-15V, R_L=15\Omega,$ $I_{DS}=-1A, V_{GEN}=-10V,$ $R_G=6\Omega$	N-Ch		10	18	
			P-Ch		12	22	
$t_{d(OFF)}$	Turn-off Delay Time	N-Channel $V_{DD}=15V, R_L=15\Omega,$ $I_{DS}=1A, V_{GEN}=10V,$ $R_G=6\Omega$	N-Ch		22	40	
			P-Ch		27	50	
T_f	Turn-off Fall Time	P-Channel $V_{DD}=-15V, R_L=15\Omega,$ $I_{DS}=-1A, V_{GEN}=-10V,$ $R_G=6\Omega$	N-Ch		3	6	
			P-Ch		14	25	
Gate Charge Characteristics^b							
Q_g	Total Gate Charge	N-Channel $V_{DS}=15V, V_{GS}=10V,$ $I_{DS}=8A$	N-Ch		14	19	nC
			P-Ch		12	16	
Q_{gs}	Gate-Source Charge	P-Channel $V_{DS}=-15V, V_{GS}=-10V,$ $I_{DS}=-7A$	N-Ch		1.3		
			P-Ch		1.1		
Q_{gd}	Gate-Drain Charge	N-Channel $V_{DS}=15V, V_{GS}=10V,$ $I_{DS}=8A$	N-Ch		3.2		
			P-Ch		2.8		

Notes:

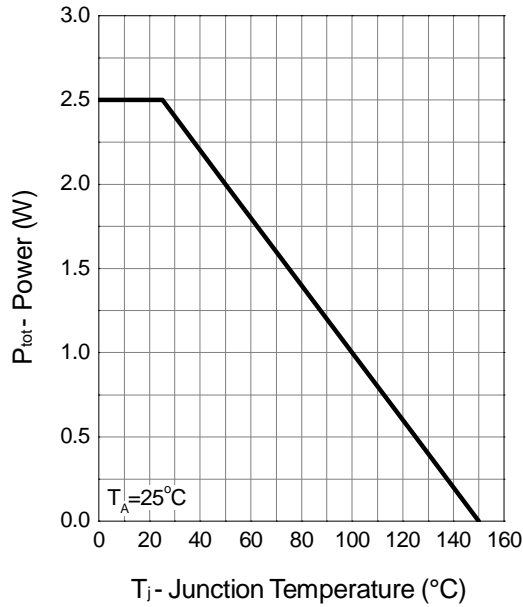
a : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

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

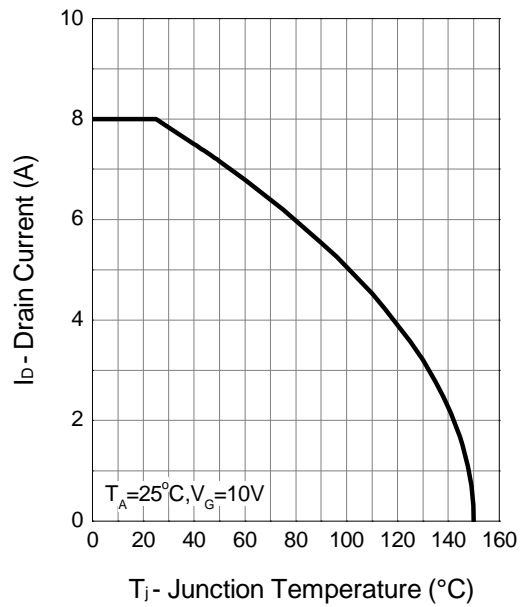
Typical Characteristics

N-Channel

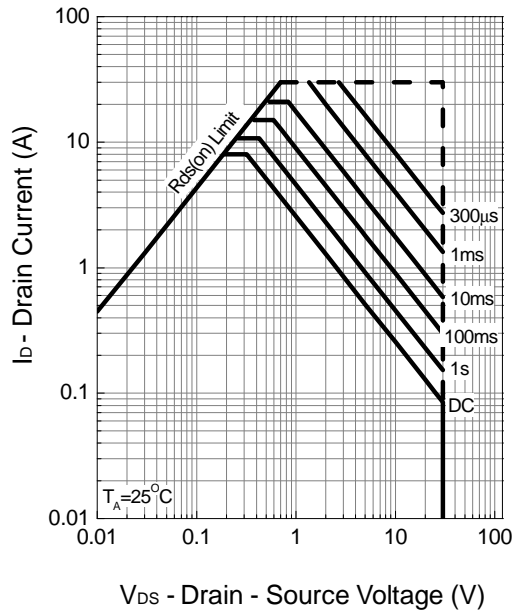
Power Dissipation



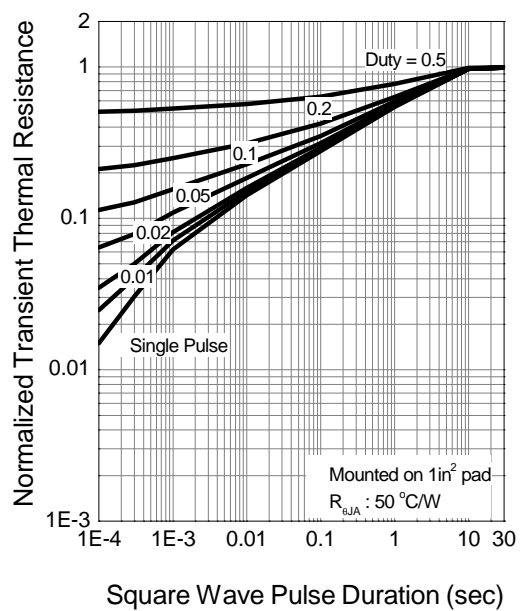
Drain Current



Safe Operation Area



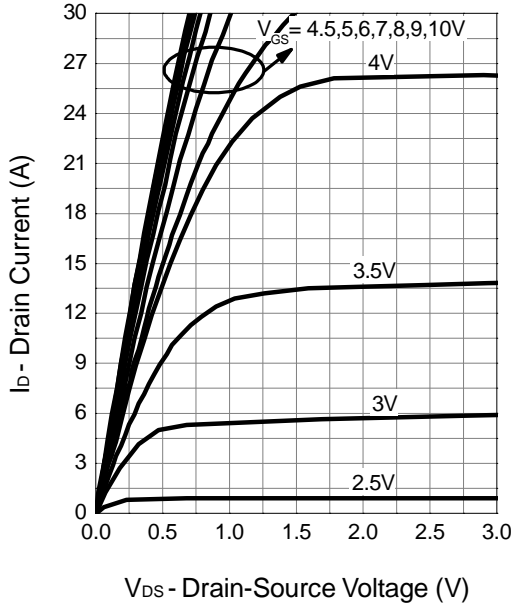
Thermal Transient Impedance



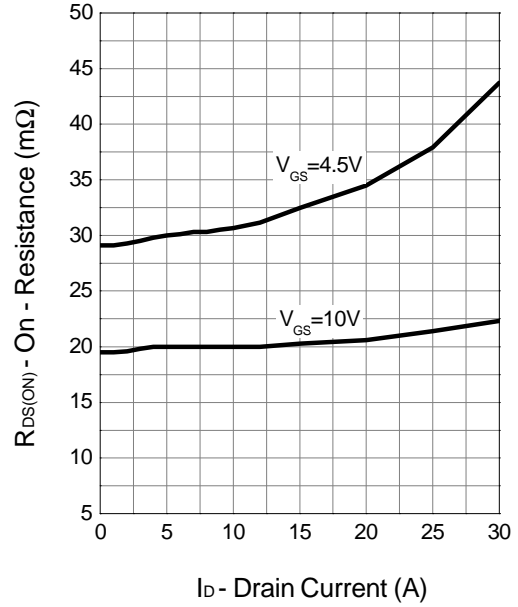
Typical Characteristics (Cont.)

N-Channel

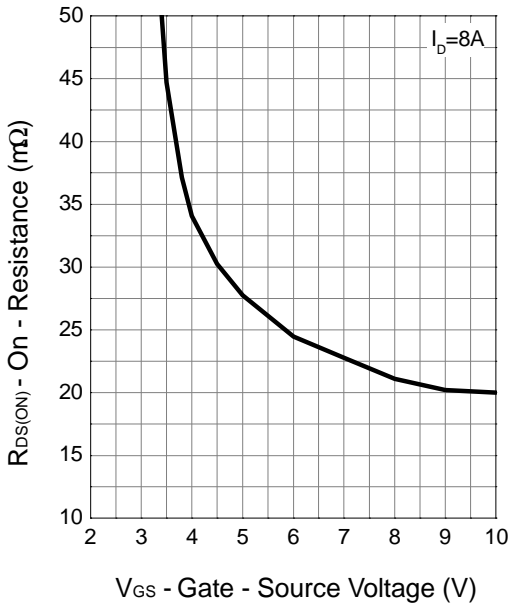
Output Characteristics



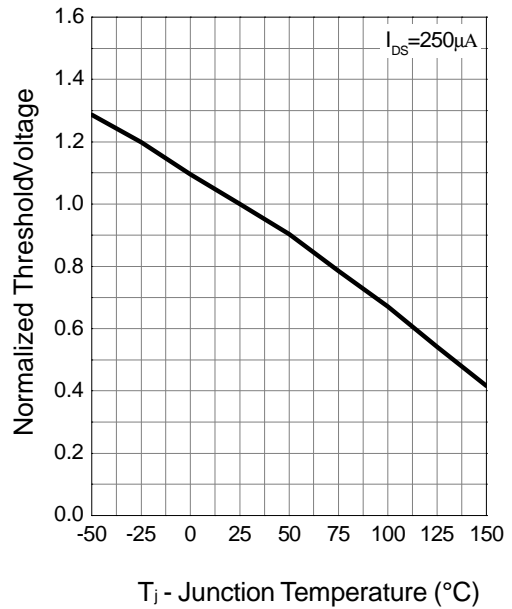
Drain-Source On Resistance



Drain-Source On Resistance



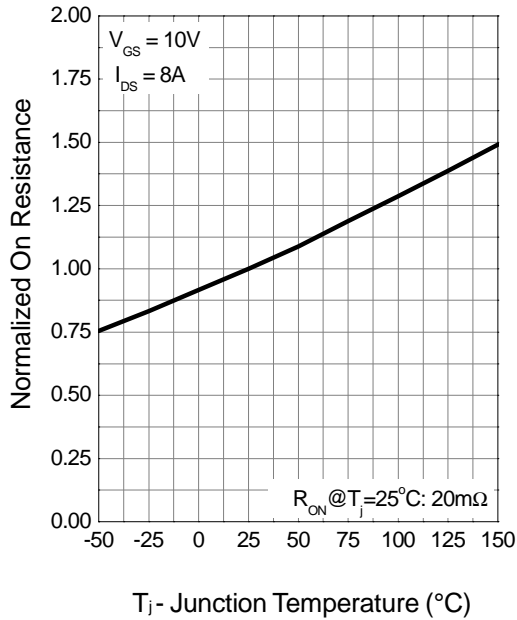
Gate Threshold Voltage



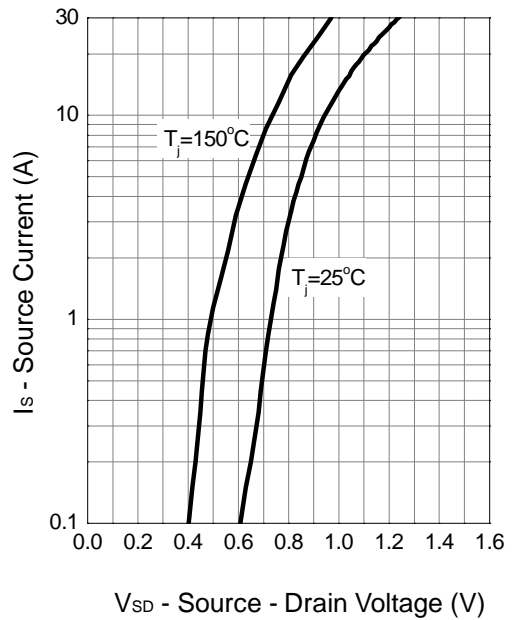
Typical Characteristics (Cont.)

N-Channel

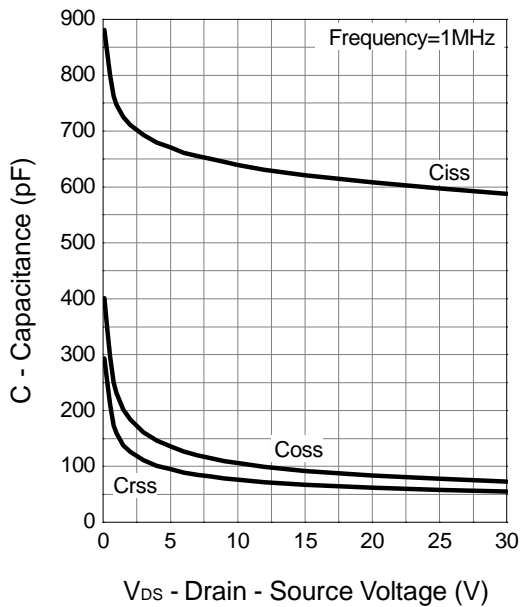
Drain-Source On Resistance



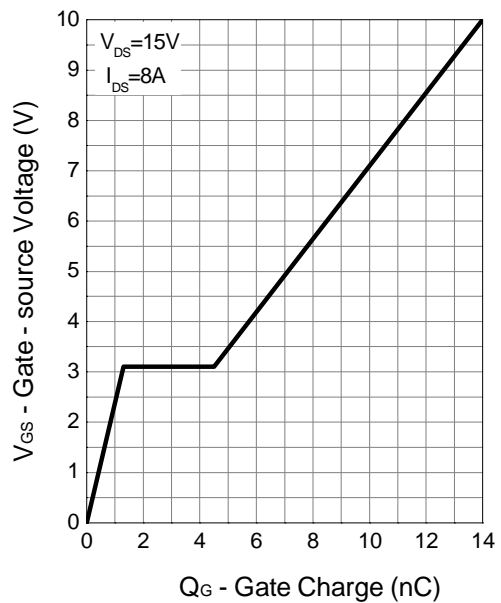
Source-Drain Diode Forward



Capacitance



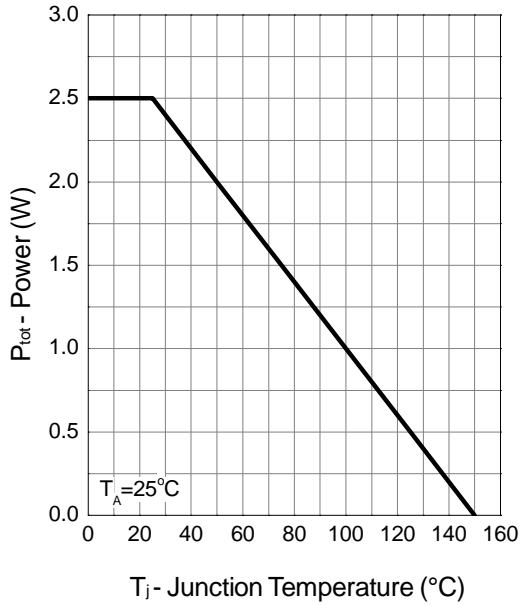
Gate Charge



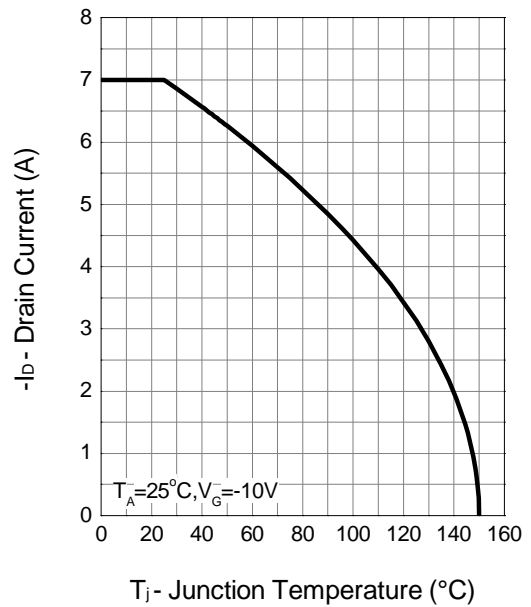
Typical Characteristics (Cont.)

P-Channel

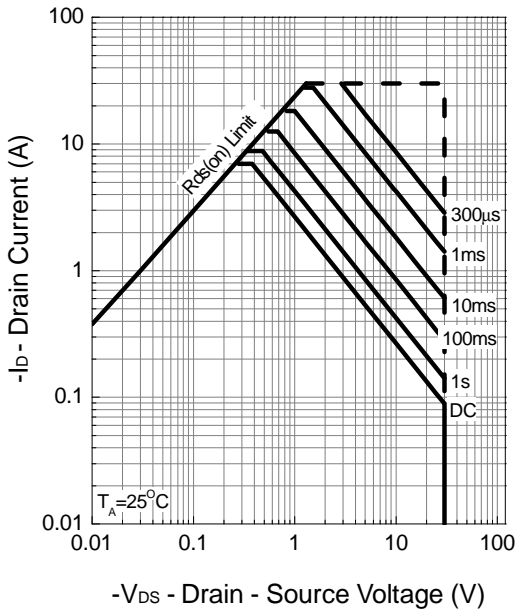
Power Dissipation



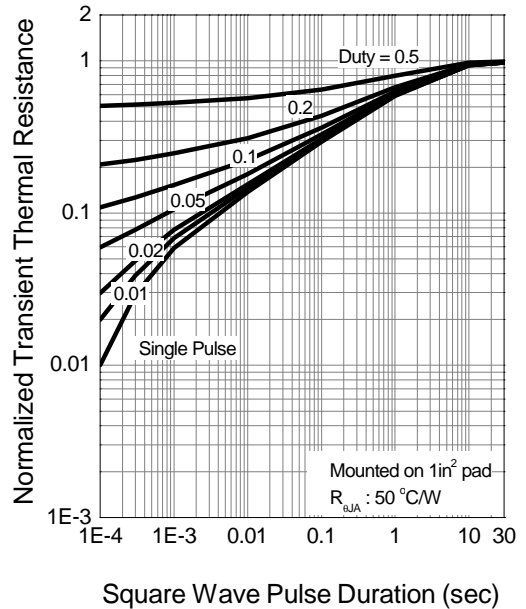
Drain Current



Safe Operation Area



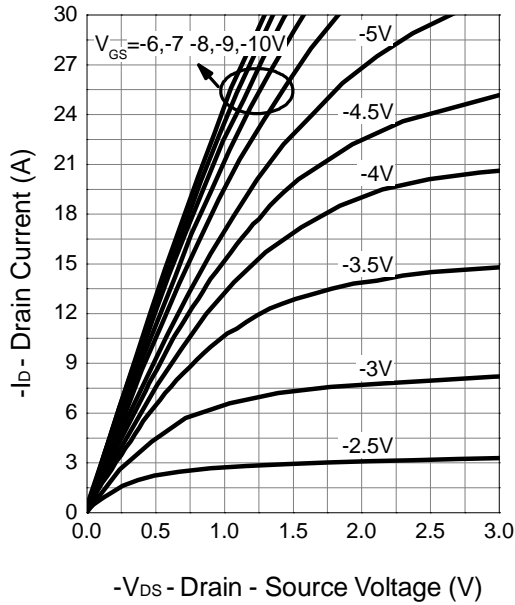
Thermal Transient Impedance



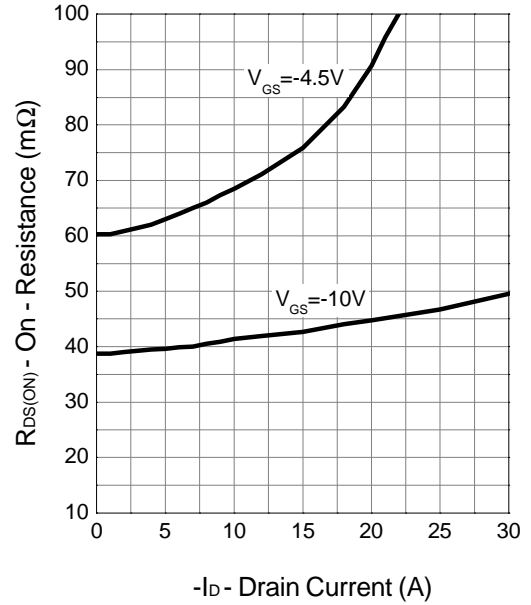
Typical Characteristics (Cont.)

P-Channel

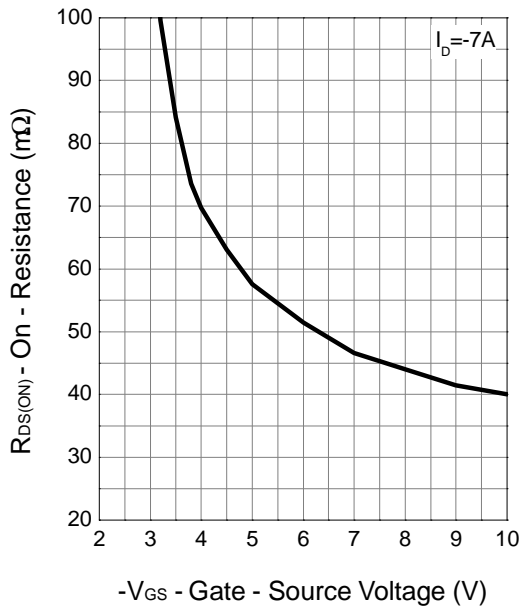
Output Characteristics



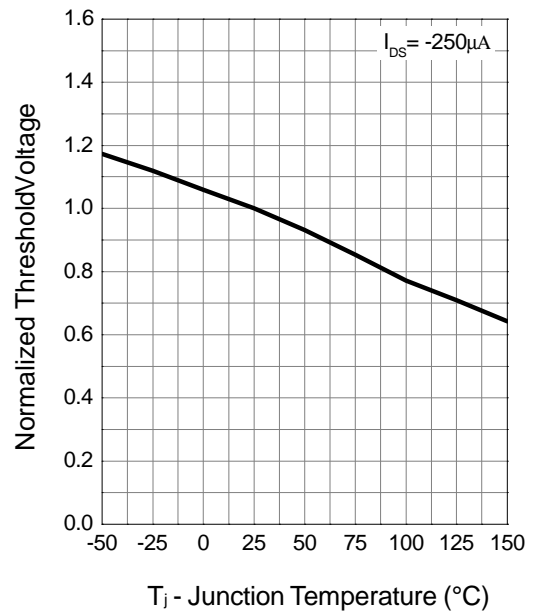
Drain-Source On Resistance



Drain-Source On Resistance



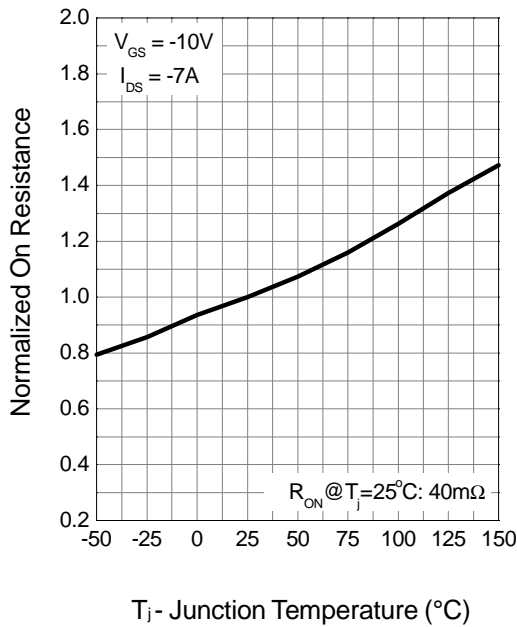
Gate Threshold Voltage



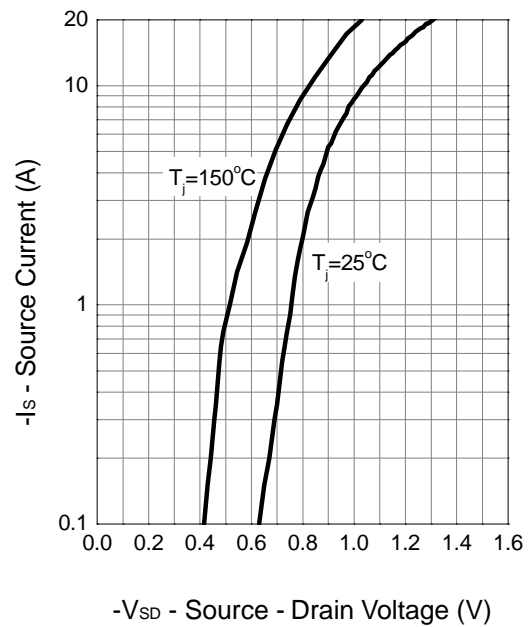
Typical Characteristics (Cont.)

P-Channel

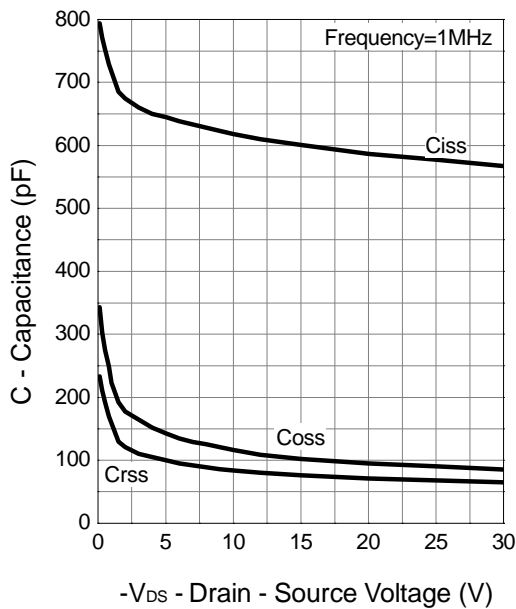
Drain-Source On Resistance



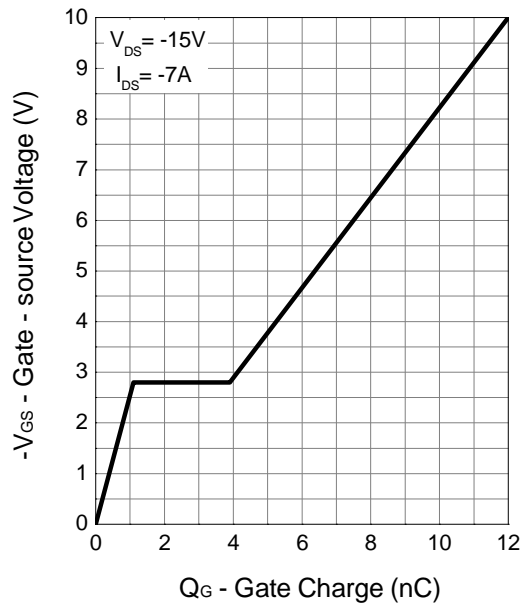
Source-Drain Diode Forward



Capacitance

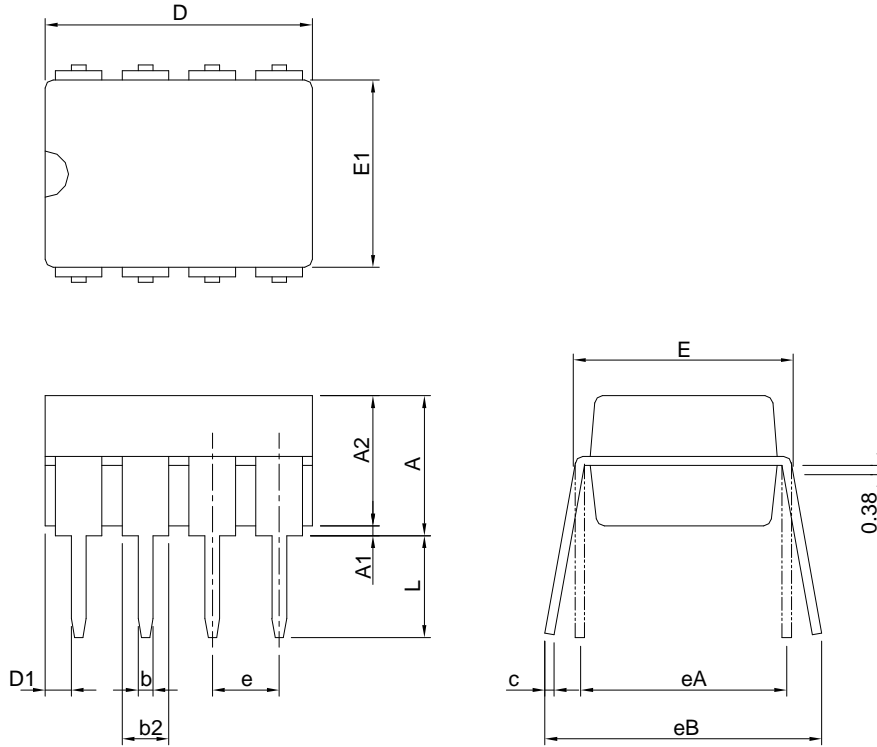


Gate Charge



Package Information

DIP-8

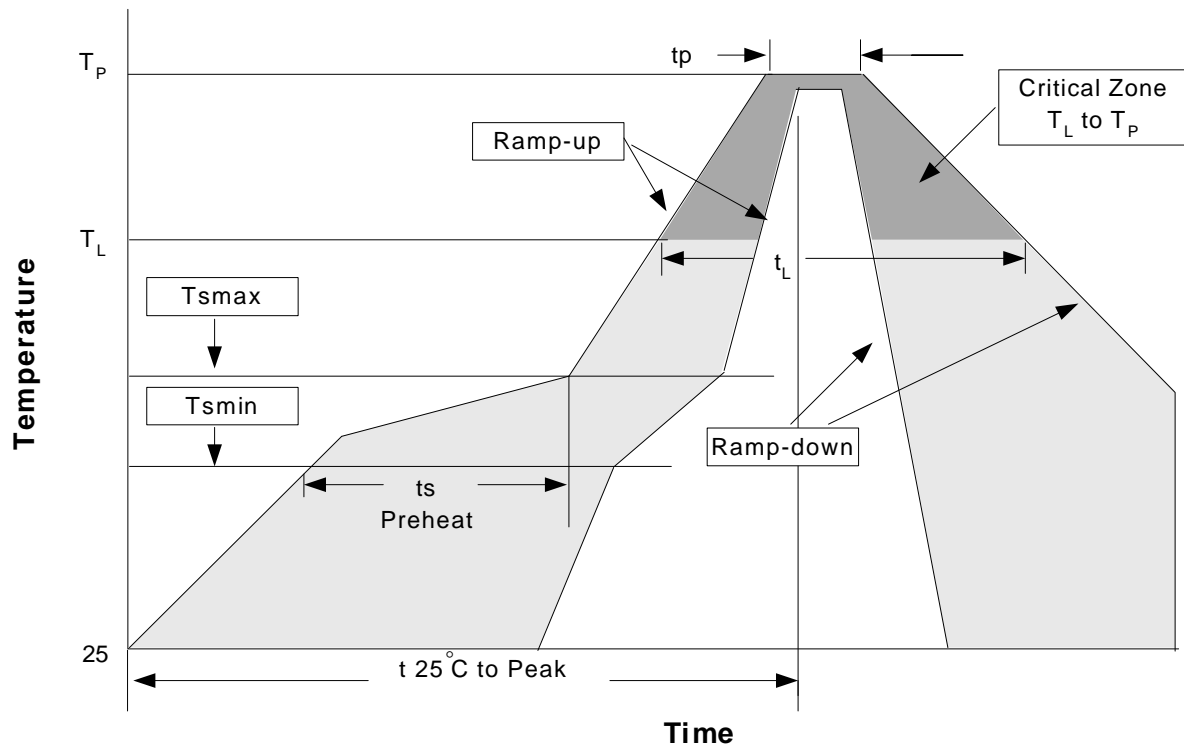


SYMBOLS	DIP-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A		5.33		0.210
A1	0.38		0.015	
A2	2.92	4.95	0.115	0.195
b	0.36	0.56	0.014	0.022
b2	1.14	1.78	0.045	0.070
c	0.20	0.35	0.008	0.014
D	9.01	10.16	0.355	0.400
D1	0.13		0.005	
E	7.62	8.26	0.300	0.325
E1	6.10	7.11	0.240	0.280
e	2.54 BSC		0.100 BSC	
eA	7.62 BSC		0.300 BSC	
eB		10.92		0.430
L	2.92	3.81	0.115	0.150

Physical Specifications

Terminal Material	Solder-Plated Copper (Solder Material : 90/10 or 63/37 SnPb), 100%Sn
Lead Solderability	Meets EIA Specification RS186-91, 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
ESD	MIL-STD-883D-3015.7	VHBM > 2KV, VMM > 200V
Latch-Up	JESD 78	10ms, 1 _{tr} > 100mA

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