

N-Channel Enhancement Mode MOSFET

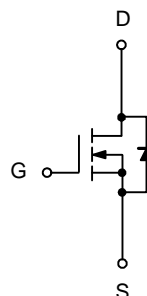
Features

- 25V/60A ,
 $R_{DS(ON)}=4.2m\Omega$ (typ.) @ $V_{GS}=10V$
 $R_{DS(ON)}=6.5m\Omega$ (typ.) @ $V_{GS}=4.5V$
- Super High Dense Cell Design
- Avalanche Rated
- Reliable and Rugged
- Lead Free Available (RoHS Compliant)

Pin Description



Top View of TO-220




N-Channel MOSFET

Applications

- Power Management in Computer or Switching Power Supply Systems

Ordering and Marking Information

<p>APM2506N □□-□□□</p> <div style="margin-left: 20px;"> <p>└─ Lead Free Code</p> <p>└─ Handling Code</p> <p>└─ Temp. Range</p> <p>└─ Package Code</p> </div>	<p>Package Code F : TO-220</p> <p>Operating Junction Temp. Range C : -55 to 150°C</p> <p>Handling Code TU : Tube</p> <p>Lead Free Code L : Lead Free Device</p>
<p>APM2506N F : </p>	<p>XXXXX - Date Code</p>

Note: ANPEC lead-free products contain molding compounds and 100% matte tin plate termination finish; which are fully compliant with RoHS and compatible with both SnPb and lead-free soldering operations. ANPEC lead-free products meet or exceed the lead-free requirements of IPC/JEDEC J STD-020C for MSL classification at lead-free peak reflow temperature.

ANPEC reserves the right to make changes to improve reliability or manufacturability without notice, and advise customers to obtain the latest version of relevant information to verify before placing orders.

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
Common Ratings ($T_A=25^\circ\text{C}$ Unless Otherwise Noted)			
V_{DSS}	Drain-Source Voltage	25	V
V_{GSS}	Gate-Source Voltage	± 20	
T_J	Maximum Junction Temperature	150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
I_S	Diode Continuous Forward Current	$T_C=25^\circ\text{C}$ 30	A
Mounted on Large Heat Sink			
I_{DP}	300 μs Pulse Drain Current Tested	$T_C=25^\circ\text{C}$ 240	A
		$T_C=100^\circ\text{C}$ 220	
I_D	Continuous Drain Current	$T_C=25^\circ\text{C}$ 60*	A
		$T_C=100^\circ\text{C}$ 55	
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$ 62.5	W
		$T_C=100^\circ\text{C}$ 25	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	2	$^\circ\text{C/W}$
Mounted on PCB of Minimum Footprint			
I_{DP}	300 μs Pulse Drain Current Tested	$T_A=25^\circ\text{C}$ 60	A
		$T_A=100^\circ\text{C}$ 35	
I_D	Continuous Drain Current	$T_A=25^\circ\text{C}$ 15	A
		$T_A=100^\circ\text{C}$ 9	
P_D	Maximum Power Dissipation	$T_A=25^\circ\text{C}$ 2	W
		$T_A=100^\circ\text{C}$ 0.8	
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	62.5	$^\circ\text{C/W}$

Notes:

* Current limited by bond wire.

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

Symbol	Parameter	Test Condition	APM2506NF			Unit
			Min.	Typ.	Max.	
Drain-Source Avalanche Ratings						
E_{AS}	Avalanche Energy, Single Pulsed	$I_{DS}=15\text{A}, V_{DD}=20\text{V}$			50	mJ
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0\text{V}, I_{DS}=250\mu\text{A}$	25			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=20\text{V}, V_{GS}=0\text{V}$ $T_J=85^\circ\text{C}$			1 30	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu\text{A}$	1.3	1.8	2.5	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 20\text{V}, V_{DS}=0\text{V}$			± 100	nA
$R_{DS(ON)}^a$	Drain-Source On-state Resistance	$V_{GS}=10\text{V}, I_{DS}=40\text{A}$ $V_{GS}=4.5\text{V}, I_{DS}=20\text{A}$		4.2 6.5	5.5 8.5	$\text{m}\Omega$
Diode Characteristics						
V_{SD}^a	Diode Forward Voltage	$I_{SD}=10\text{A}, V_{GS}=0\text{V}$		0.7	1.1	V
t_{rr}	Reverse Recovery Time	$I_{DS}=10\text{A}, di_{SD}/dt=100\text{A}/\mu\text{s}$		30		ns
Q_{rr}	Reverse Recovery Charge			14		nC
Dynamic Characteristics^b						
R_G	Gate Resistance	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, F=1\text{MHz}$		1.0	2.1	Ω
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}, V_{DS}=15\text{V},$ Frequency=1.0MHz		3100		pF
C_{oss}	Output Capacitance			680		
C_{riss}	Reverse Transfer Capacitance			520		
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=15\text{V}, R_L=15\Omega,$ $I_{DS}=1\text{A}, V_{GEN}=10\text{V},$ $R_G=6\Omega$		19		ns
T_r	Turn-on Rise Time			20		
$t_{d(OFF)}$	Turn-off Delay Time			62		
T_f	Turn-off Fall Time			43		
Gate Charge Characteristics^b						
Q_g	Total Gate Charge	$V_{DS}=15\text{V}, V_{GS}=4.5\text{V},$ $I_{DS}=40\text{A}$		37.5	56	nC
Q_{gs}	Gate-Source Charge			9.4		
Q_{gd}	Gate-Drain Charge			21		

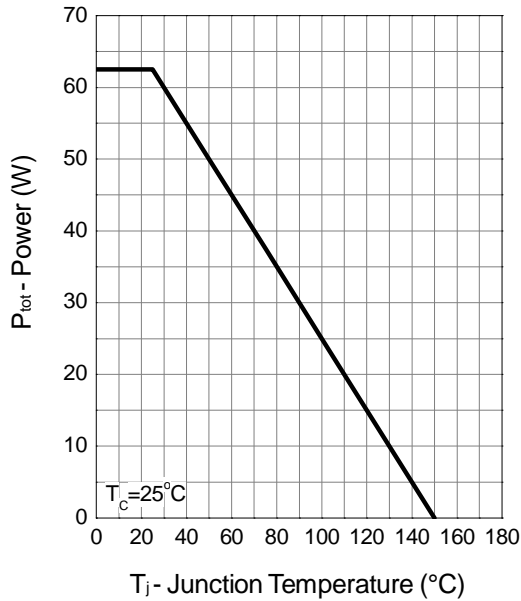
Notes:

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

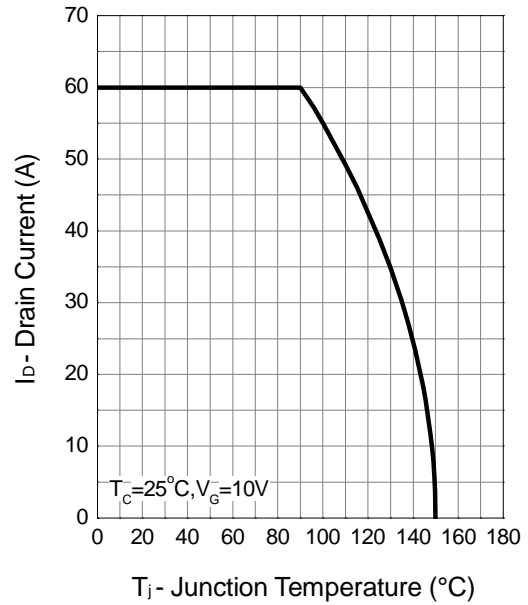
b : Guaranteed by design, not subject to production testing.

Typical Characteristics

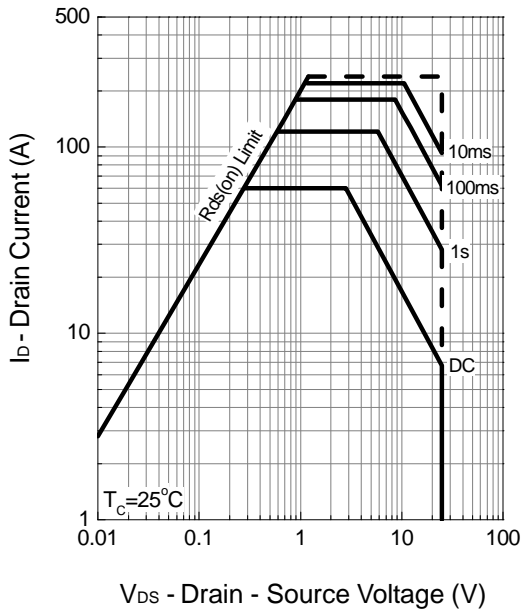
Power Dissipation



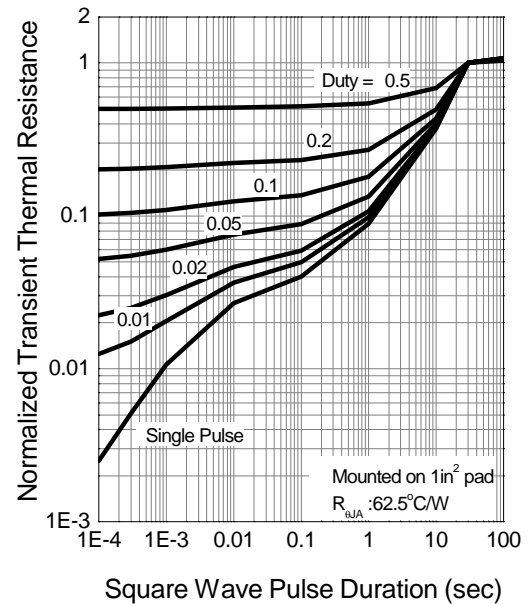
Drain Current



Safe Operation Area

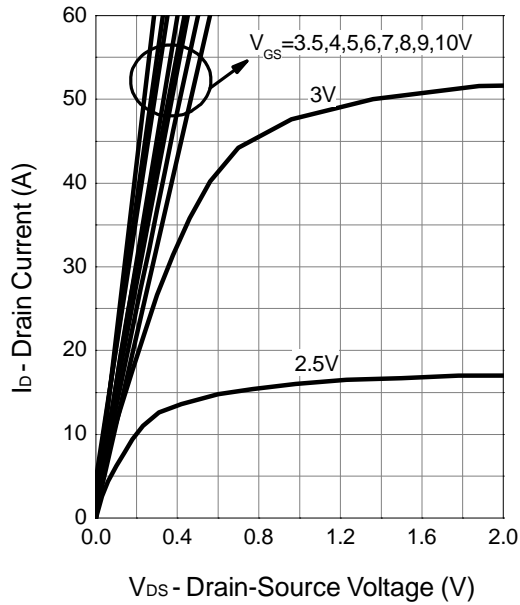


Thermal Transient Impedance

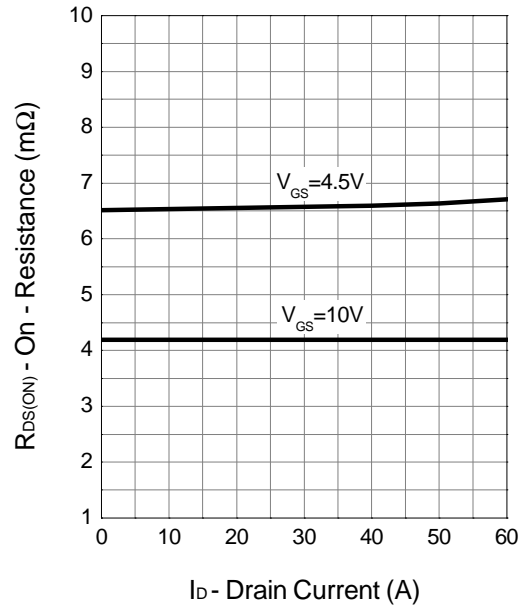


Typical Characteristics (Cont.)

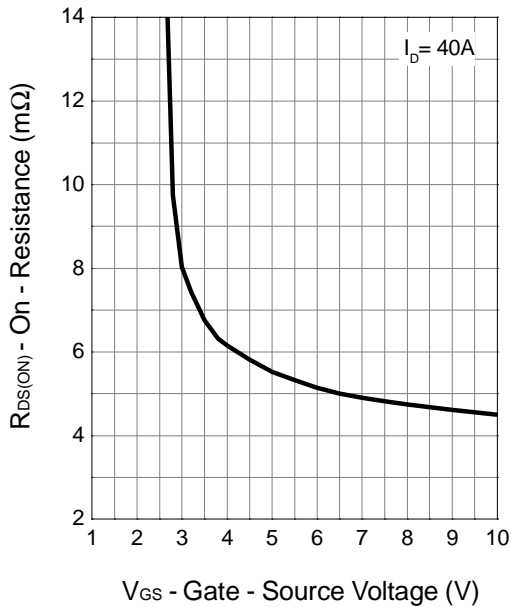
Output Characteristics



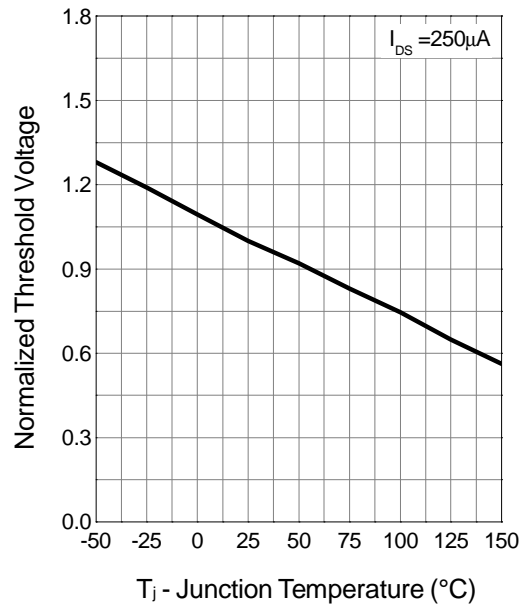
Drain-Source On Resistance



Gate-Source On Resistance

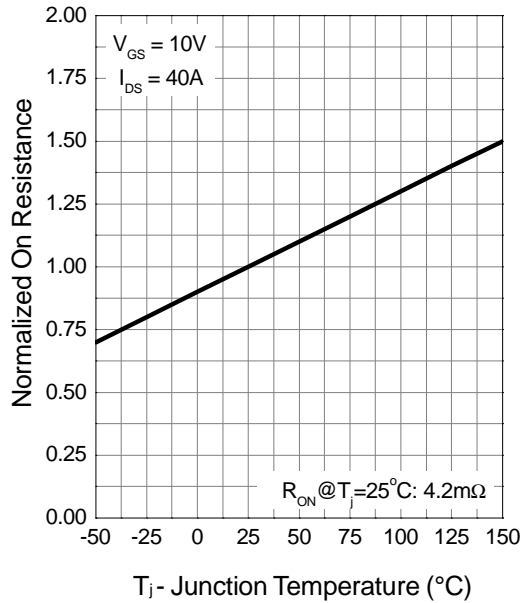


Gate Threshold Voltage

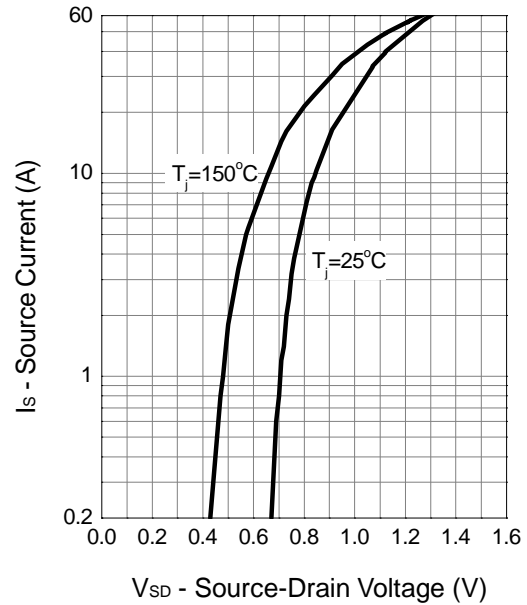


Typical Characteristics (Cont.)

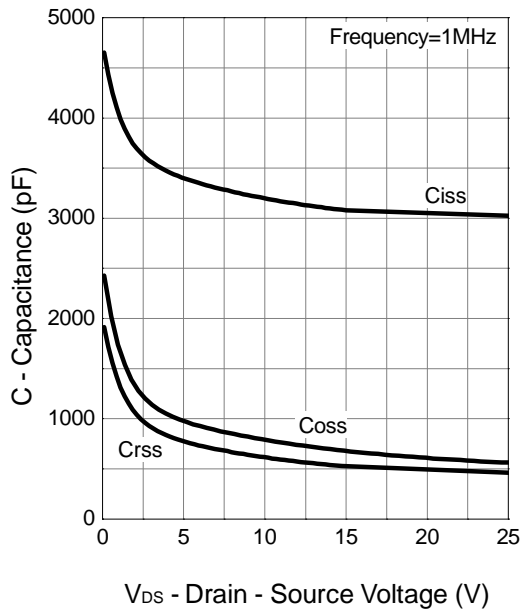
Drain-Source On Resistance



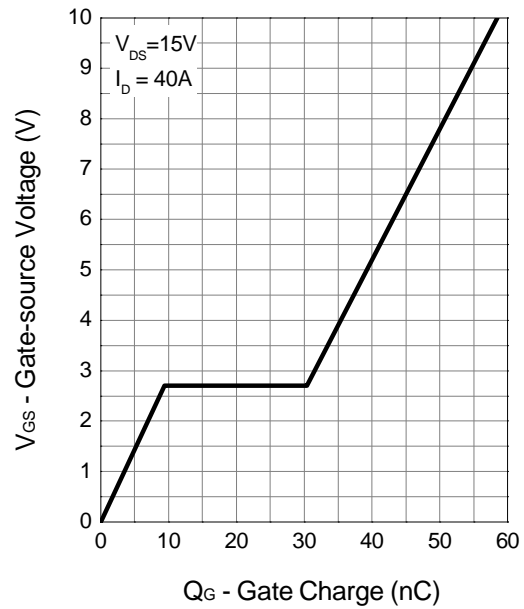
Source-Drain Diode Forward



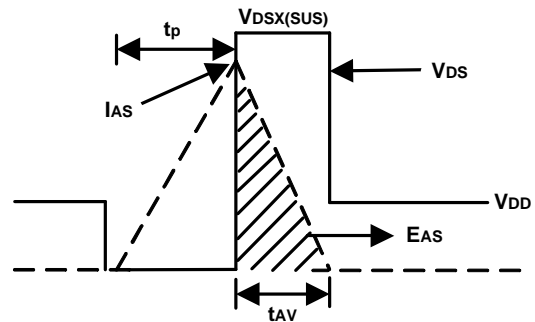
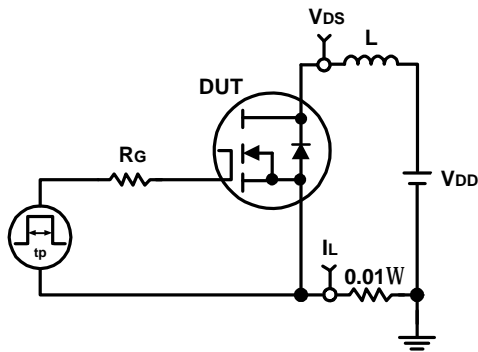
Capacitance



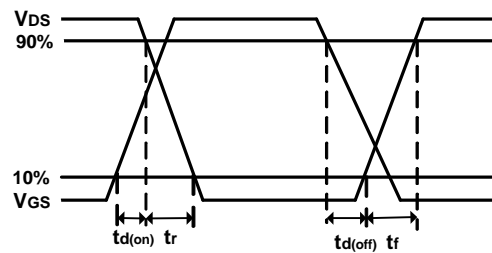
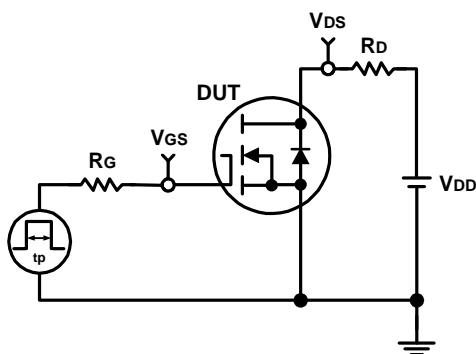
Gate Charge



Avalanche Test Circuit and Waveforms

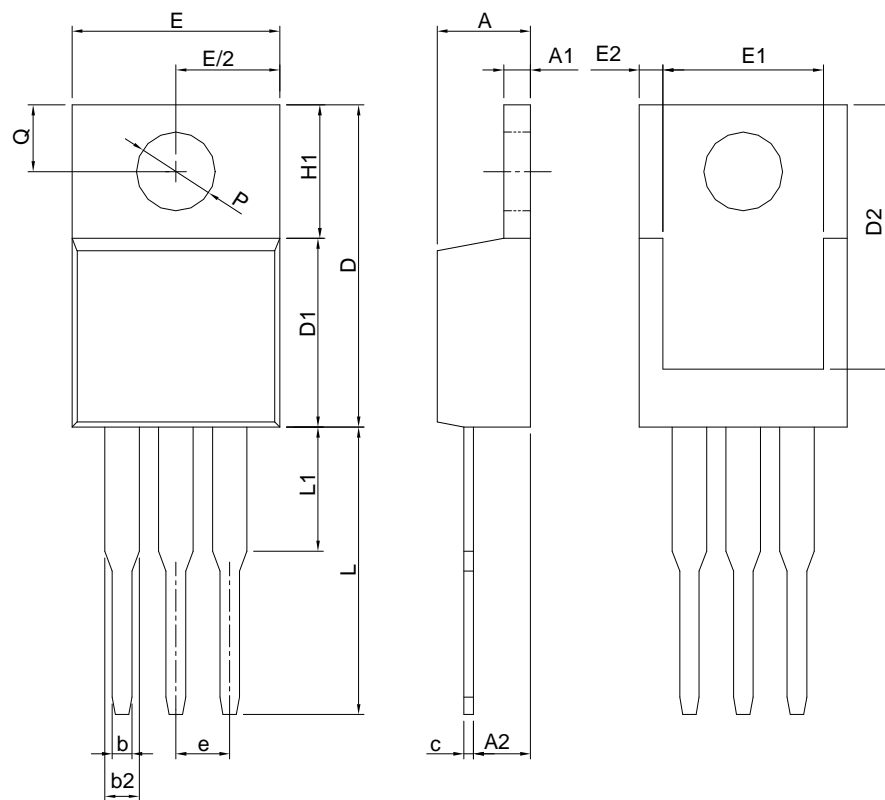


Switching Time Test Circuit and Waveforms



Package Information

TO-220



Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	3.56	4.83	0.140	0.190
A1	0.51	1.40	0.020	0.055
A2	2.03	2.92	0.080	0.115
b	0.38	1.02	0.015	0.040
b2	1.14	1.78	0.045	0.070
c	0.36	0.61	0.014	0.024
D	14.22	16.51	0.560	0.650
D1	8.38	9.02	0.330	0.355
D2	12.19	12.88	0.480	0.507
E	9.65	10.67	0.380	0.420
E1	6.86	8.89	0.270	0.350
E2	-	0.76	-	0.030
e	2.54 BSC		0.100 BSC	
H1	5.84	6.86	0.230	0.270
L	12.70	14.73	0.500	0.580
L1	-	6.35	-	0.250
P	3.53	4.09	0.139	0.161
Q	2.54	3.43	0.100	0.135

Physical Specifications

Terminal Material	Solder-Plated Copper (Solder Material : Sn)
Lead Solderability	Meets EIA Specification RSI86-91, ANSI/J-STD-002 Category 3.

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

Customer Service

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