

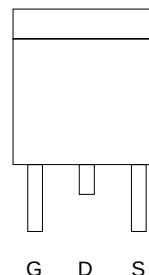
APM3095P

P-Channel Enhancement Mode MOSFET

Features

- -30V/-6A , $R_{DS(ON)}=95m\Omega(\text{typ.}) @ V_{GS}=-10V$
 $R_{DS(ON)}=140m\Omega(\text{typ.}) @ V_{GS}=-4.5V$
- Super High Dense Cell Design for Extremely Low $R_{DS(ON)}$
- Reliable and Rugged
- TO-252 Package

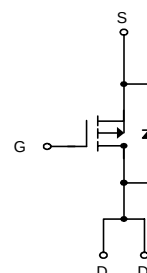
Pin Description



Top View of TO-252

Applications

- Power Management in Notebook Computer ,
 Portable Equipment and Battery Powered
 Systems.



P-Channel MOSFET

Ordering and Marking Information

APM3095P □□-□□ Handling Code Temp. Range Package Code	Package Code U : TO-252 Operating Junction Temp. Range C : -55 to 150°C Handling Code TU : Tube TR : Tape & Reel
APM3095P U : APM3095P XXXXX	XXXXX - Date Code

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

Symbol	Parameter	Rating	Unit
V_{DSS}	Drain-Source Voltage	-30	V
V_{GSS}	Gate-Source Voltage	± 25	
I_D^*	Maximum Drain Current – Continuous	-12	A
I_{DM}	Maximum Drain Current – Pulsed	-30	

* Surface Mounted on FR4 Board, $t \leq 10$ sec.

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.

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Absolute Maximum Ratings Cont. (T_A = 25°C unless otherwise noted)

Symbol	Parameter	Rating	Unit
P _D	Maximum Power Dissipation	T _A =25°C	W
		T _A =100°C	
T _J	Maximum Junction Temperature	150	°C
T _{STG}	Storage Temperature Range	-55 to 150	°C
R _{θJA}	Thermal Resistance – Junction to Ambient	50	°C/W

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

Symbol	Parameter	Test Condition	APM3095P			Unit
			Min.	Typ.	Max.	
Static						
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
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =-250μA	-1	-1.5	-2	V
I _{GSS}	Gate Leakage Current	V _{GS} =±25V , V _{DS} =0V			±100	nA
R _{DS(ON)} ^a	Drain-Source On-state Resistance	V _{GS} =-10V , I _{DS} =-6A		95	110	mΩ
		V _{GS} =-4.5V , I _{DS} =-3A		140	160	
V _{SD} ^a	Diode Forward Voltage	I _{SD} =-1.25A , V _{GS} =0V		-0.7	-1.3	V
Dynamic ^b						
Q _g	Total Gate Charge	V _{DS} =-15V , I _{DS} =-3A V _{GS} =-10V		8	13	nC
Q _{gs}	Gate-Source Charge			1.9		
Q _{gd}	Gate-Drain Charge			1.1		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =-15V , I _{DS} =-1A , V _{GEN} =-10V , R _G =6Ω R _L =15Ω		10	20	ns
T _r	Turn-on Rise Time			8	20	
t _{d(OFF)}	Turn-off Delay Time			25	50	
T _f	Turn-off Fall Time			5	15	
C _{iss}	Input Capacitance	V _{GS} =0V V _{DS} =-25V Frequency=1.0MHz		550		pF
C _{oss}	Output Capacitance			120		
C _{rss}	Reverse Transfer Capacitance			75		

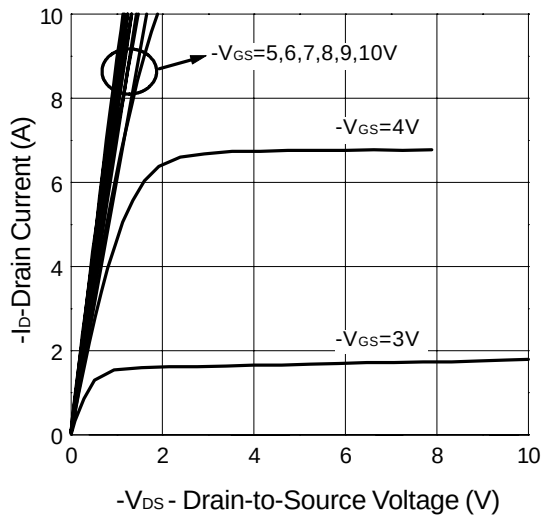
Notes

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

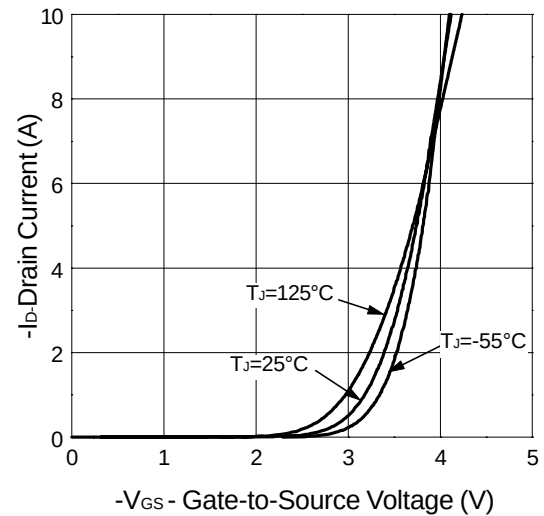
^b : Guaranteed by design, not subject to production testing

Typical Characteristics

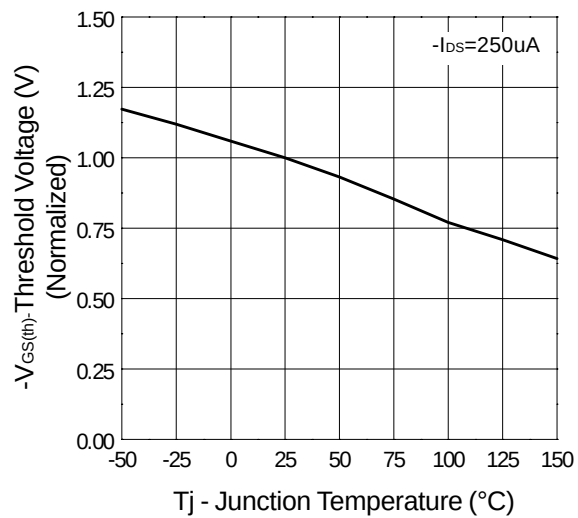
Output Characteristics



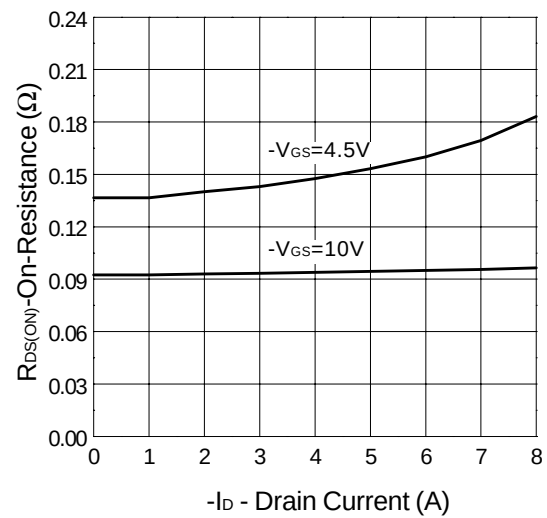
Transfer Characteristics



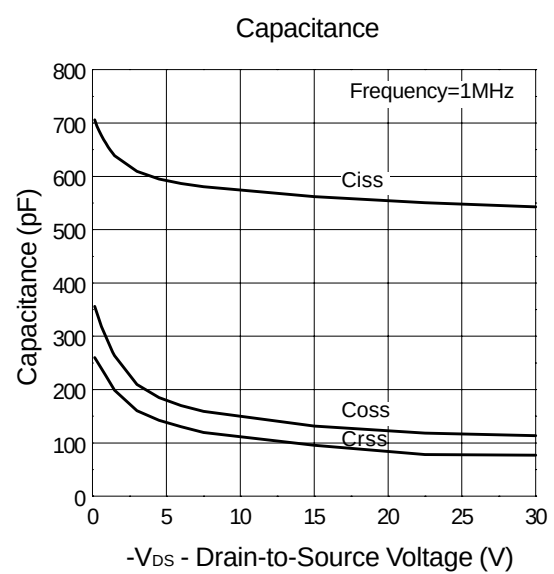
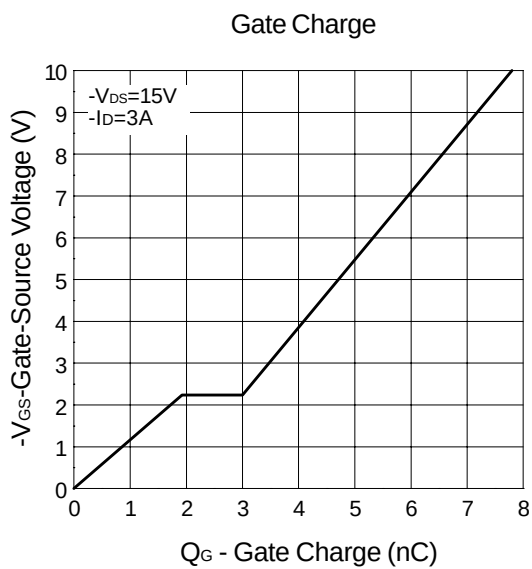
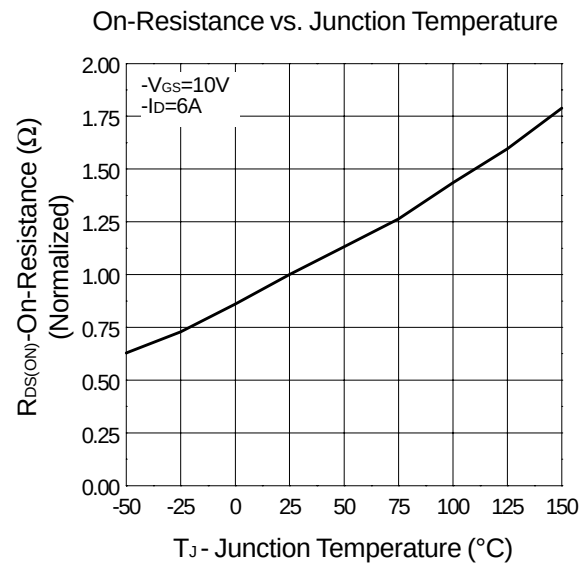
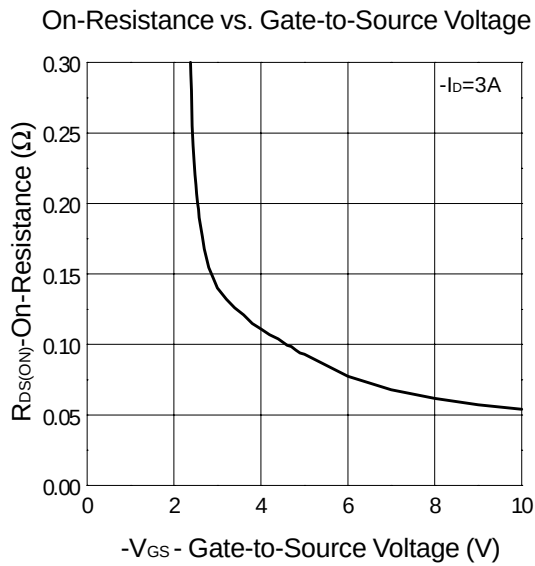
Threshold Voltage vs. Junction Temperature



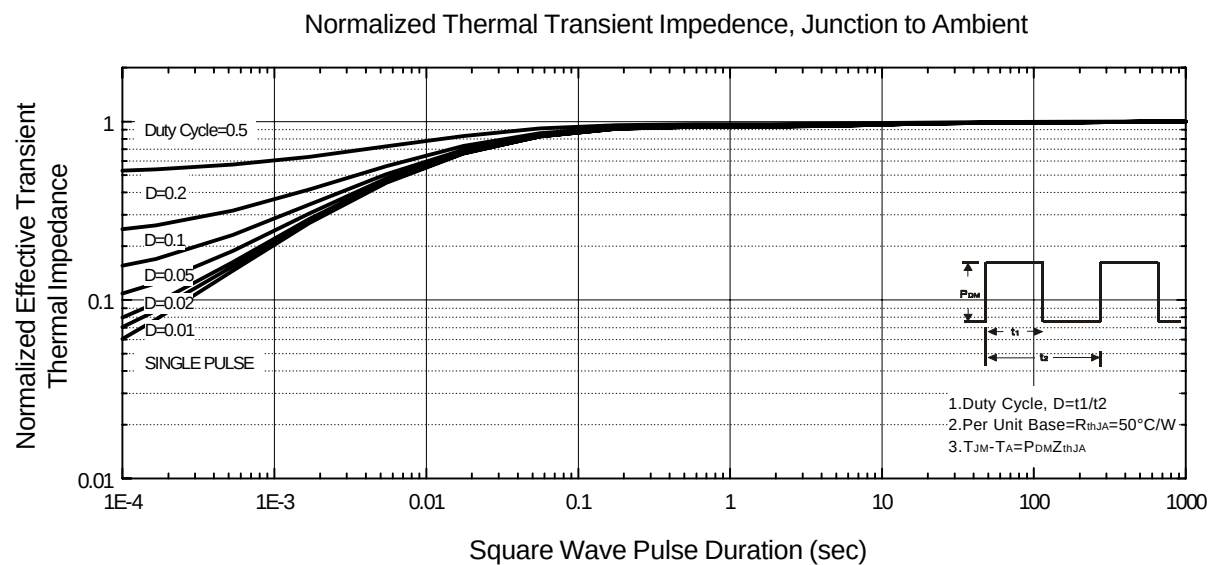
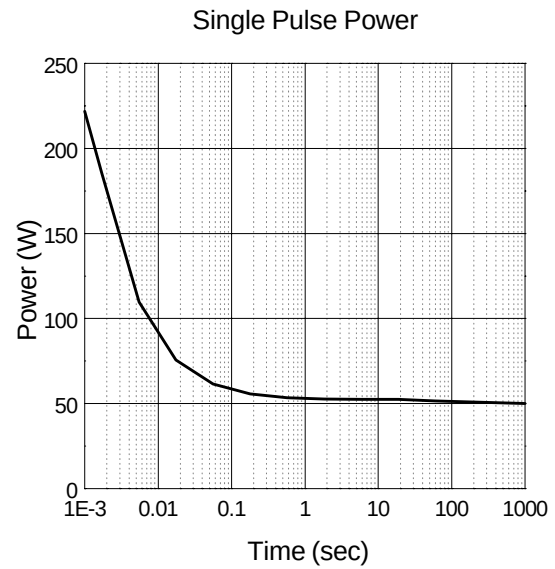
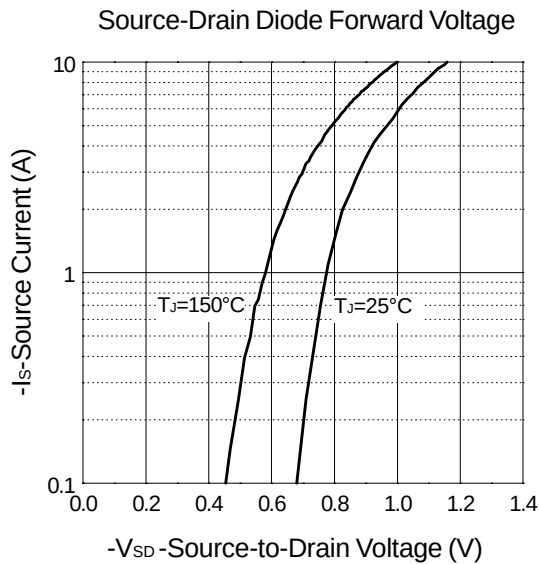
On-Resistance vs. Drain Current



Typical Characteristics



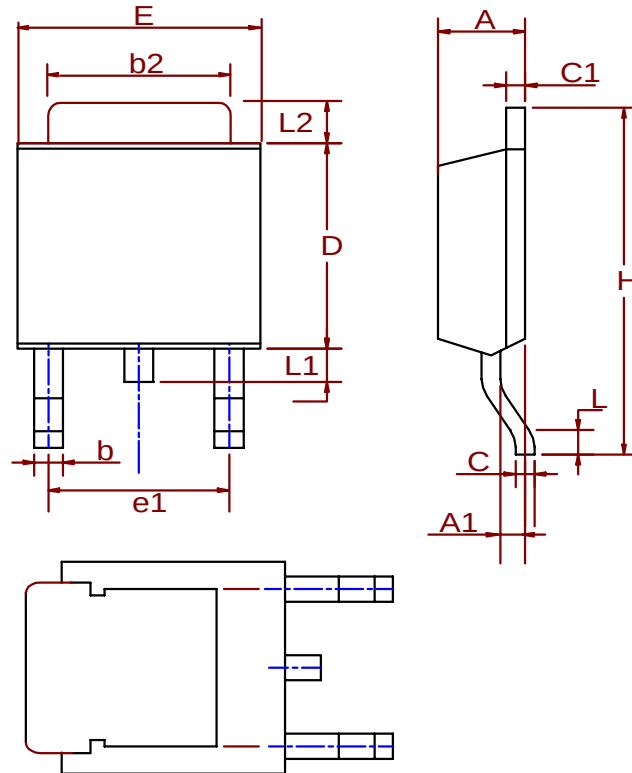
Typical Characteristics



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Packaging Information

TO-252(Reference JEDEC Registration TO-252)



Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.18	2.39	0.086	0.094
A1	0.89	1.27	0.035	0.050
b	0.508	0.89	0.020	0.035
b2	5.207	5.461	0.205	0.215
C	0.46	0.58	0.018	0.023
C1	0.46	0.58	0.018	0.023
D	5.334	6.22	0.210	0.245
E	6.35	6.73	0.250	0.265
e1	3.96	5.18	0.156	0.204
H	9.398	10.41	0.370	0.410
L	0.51		0.020	
L1	0.64	1.02	0.025	0.040
L2	0.89	2.032	0.035	0.080

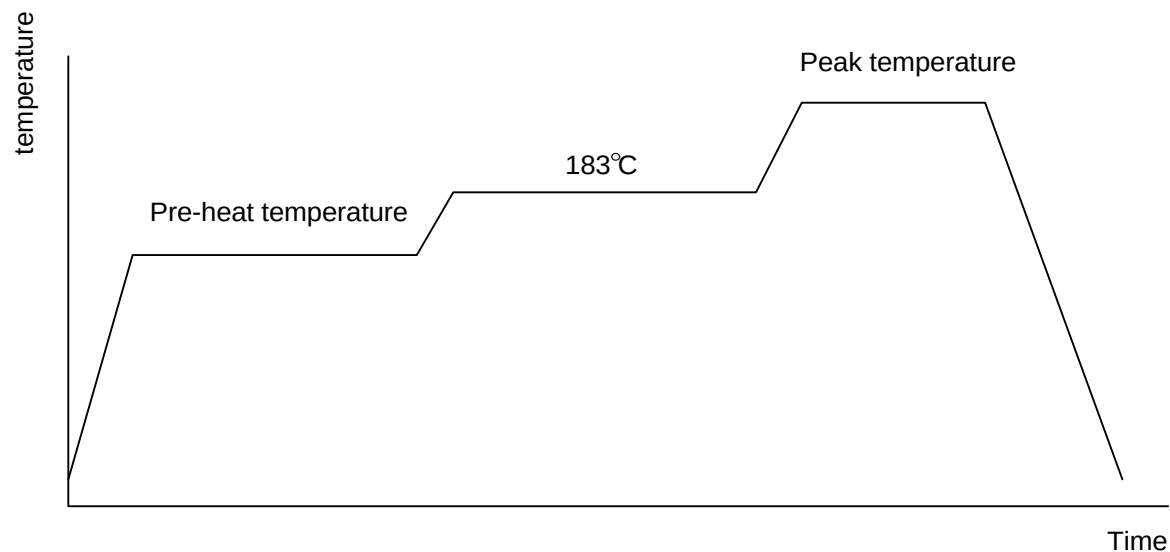
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Physical Specifications

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

Reflow Condition (IR/Convection or VPR Reflow)

Reference JEDEC Standard J-STD-020A APRIL 1999



Classification Reflow Profiles

	Convection or IR/ Convection	VPR
Average ramp-up rate(183°C to Peak)	3°C/second max.	10 °C /second max.
Preheat temperature 125 ± 25°C)	120 seconds max.	
Temperature maintained above 183°C	60 ~ 150 seconds	
Time within 5°C of actual peak temperature	10 ~ 20 seconds	60 seconds
Peak temperature range	220 +5/-0°C or 235 +5/-0°C	215~ 219°C or 235 +5/-0°C
Ramp-down rate	6 °C /second max.	10 °C /second max.
Time 25°C to peak temperature	6 minutes max.	

Package Reflow Conditions

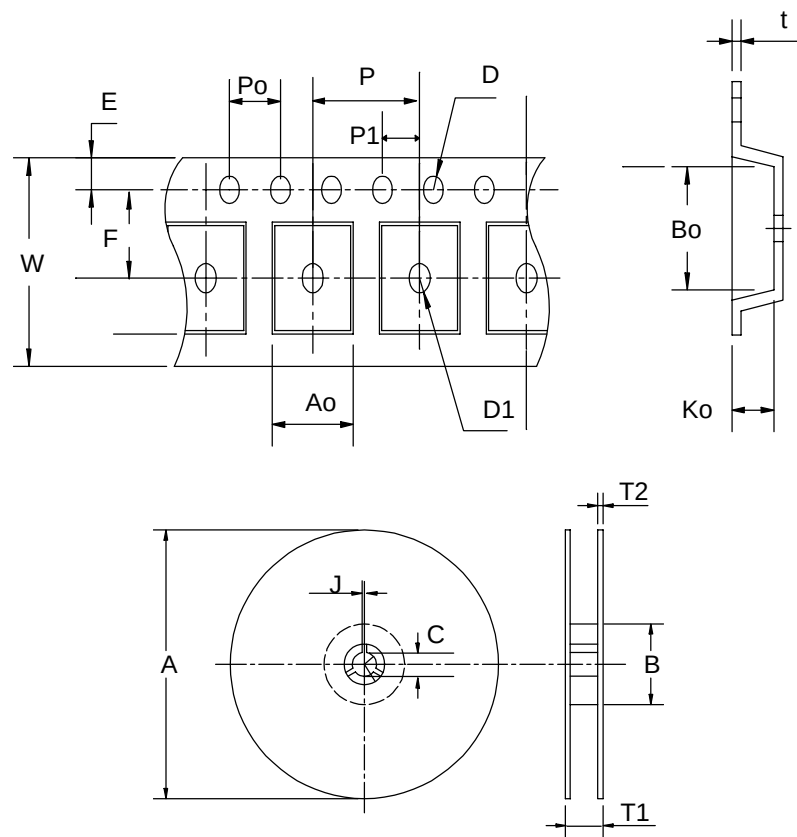
pkg. thickness ≥ 2.5mm and all bags	pkg. thickness < 2.5mm and pkg. volume ≥ 350 mm ³	pkg. thickness < 2.5mm and pkg. volume < 350mm ³
Convection 220 +5/-0 °C		Convection 235 +5/-0 °C
VPR 215-219 °C		VPR 235 +5/-0 °C
IR/Convection 220 +5/-0 °C		IR/Convection 235 +5/-0 °C

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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



Application	A	B	C	J	T1	T2	W	P	E
TO-252	330 ± 3	100 ± 2	13 ± 0.5	2 ± 0.5	$16.4 + 0.3 - 0.2$	2.5 ± 0.5	$16 + 0.3 - 0.1$	8 ± 0.1	1.75 ± 0.1
	F	D	D1	P ₀	P1	A ₀	B ₀	K ₀	t
	7.5 ± 0.1	$1.5 + 0.1$	1.5 ± 0.25	4.0 ± 0.1	2.0 ± 0.1	6.8 ± 0.1	10.4 ± 0.1	2.5 ± 0.1	0.3 ± 0.05

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Cover Tape Dimensions

Application	Carrier Width	Cover Tape Width	Devices Per Reel
TO- 252	16	13.3	2500

Customer Service

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