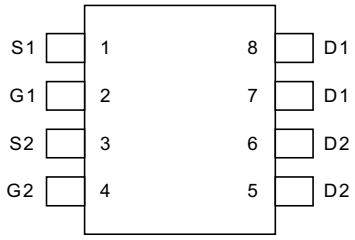
Dual P-Channel Enhancement Mode MOSFET

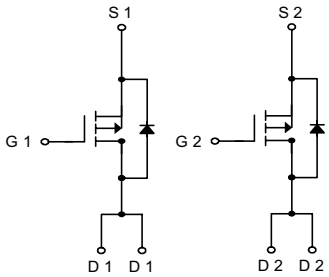
Features

- -30V/-4.9A, $R_{DS(ON)}$ = 53mΩ(typ.) @ V_{GS} = -10V
  $R_{DS(ON)}$ = 80mΩ(typ.) @ V_{GS} = -4.5V
- Super High Density Cell Design
- Reliable and Rugged
- SO-8 Package

Pin Description



SO – 8



P-Channel MOSFET

Applications

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

Ordering and Marking Information

APM4953 □□-□□

- Handling Code
- Temp. Range
- Package Code

Package Code
K : SO-8
Operation Junction Temp. Range
C : -55 to 150°C
Handling Code
TU : Tube
TR : Tape & Reel

APM4953 K : APM4953 XXXXX

XXXXX - Date Code

Absolute Maximum Ratings (T$_A$ = 25°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	T_A = 25°C	-4.9	A
I_{DM}	Maximum Drain Current – Pulsed		-30	

* Surface Mounted on FR4 Board, t ≤ 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.

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

Symbol	Parameter		Rating	Unit
P_D	Maximum Power Dissipation	T_A = 25°C	2.5	W
		T_A = 100°C	1.0	
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	
$R_{\theta JA}$*	Thermal Resistance - Junction to Ambient		50	°C/W

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

Symbol	Parameter	Test Condition	APM4953			Unit
			Min.	Typ[a].	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
$R_{DS(ON)}$	Drain-Source On-state Resistance[b]	V_{GS}=-10V , I_{DS}=-4.9A		53	60	mΩ
		V_{GS}=-4.5V , I_{DS}=-3.6A		80	95	
V_{SD}	Diode Forward Voltage[b]	I_{SD}=-1.7A , V_{GS}=0V		-0.7	-1.3	V
Dynamic[a]						
Q_g	Total Gate Charge	V_{DS}=-15V , I_{GS}=-10V		22.3	29	nC
Q_{gs}	Gate-Source Charge	I_D=-4.6A		4.65		
Q_{gd}	Gate-Drain Charge			2		
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=-15V , I_D=-2A , V_{GEN}=-10V , R_G=6Ω R_L=7.5Ω		10	18	ns
T_r	Turn-on Rise Time			15	20	
$t_{d(OFF)}$	Turn-off Delay Time			22	38	
T_f	Turn-off Fall Time			15	25	
C_{iss}	Input Capacitance	V_{GS}=0V V_{DS}=-25V Frequency=1.0MHz		1260		pF
C_{oss}	Output Capacitance			340		
C_{rss}	Reverse Transfer Capacitance			220		

Notes

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

[b] : Guaranteed by design, not subject to production testing

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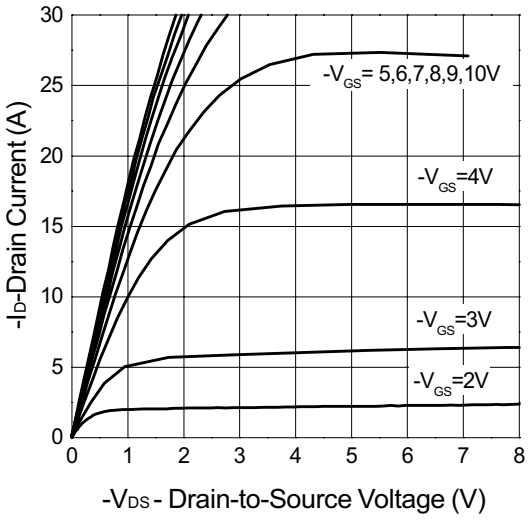
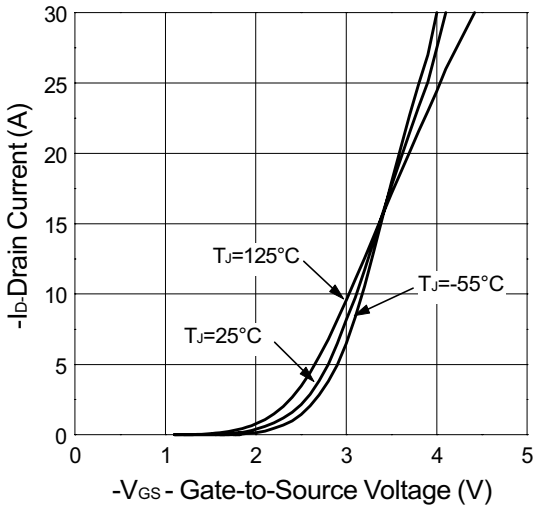
Typical Characteristics

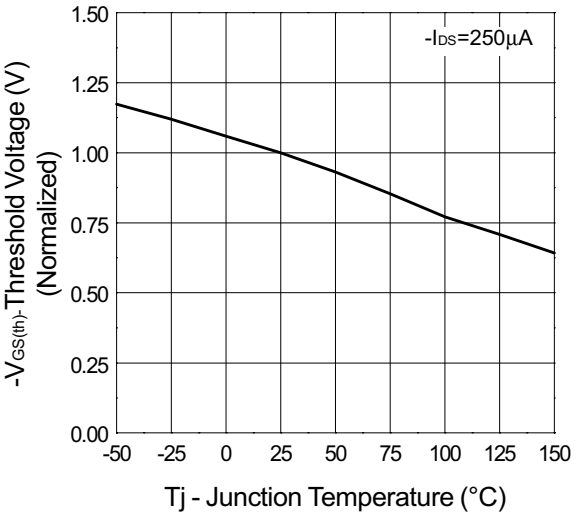
Output Characteristics



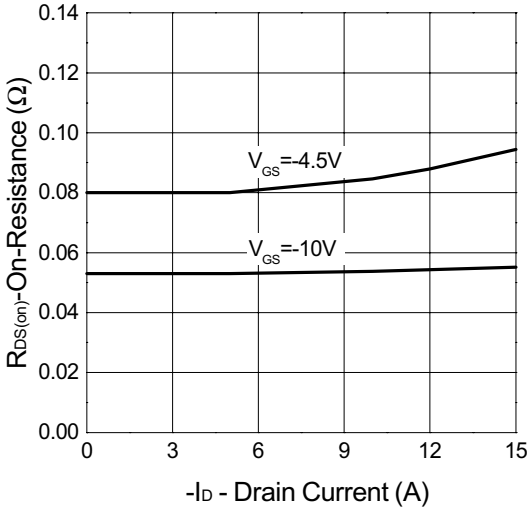
Transfer Characteristics



Threshold Voltage vs. Junction Temperature



On-Resistance vs. Drain Current



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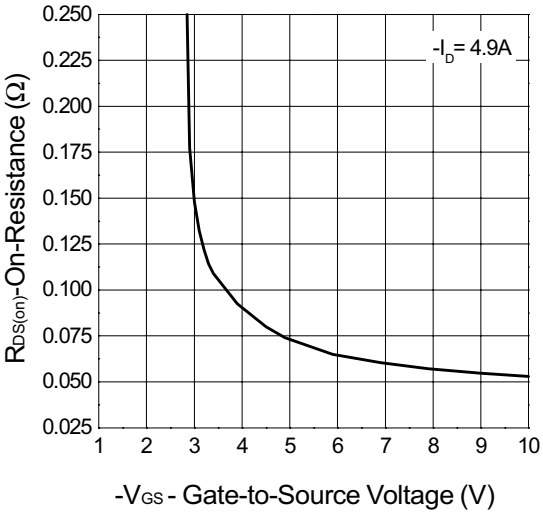
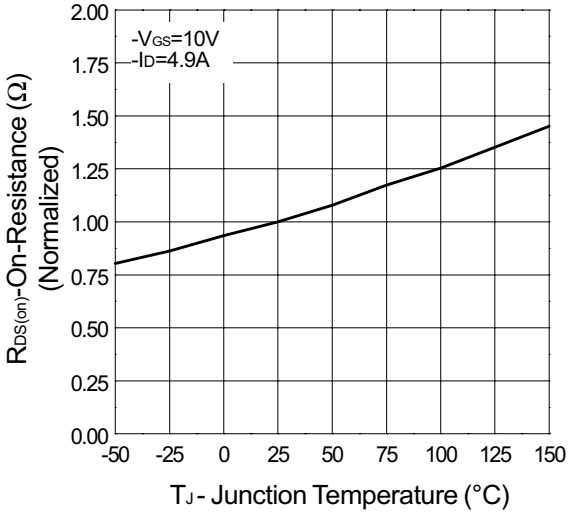
Typical Characteristics (Cont.)

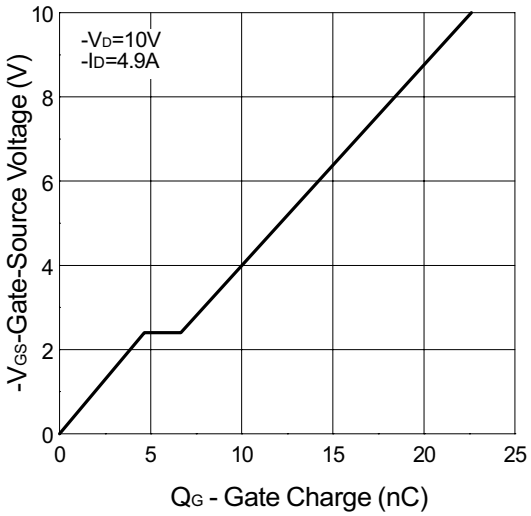
On-Resistance vs. Gate-to-Source Voltage



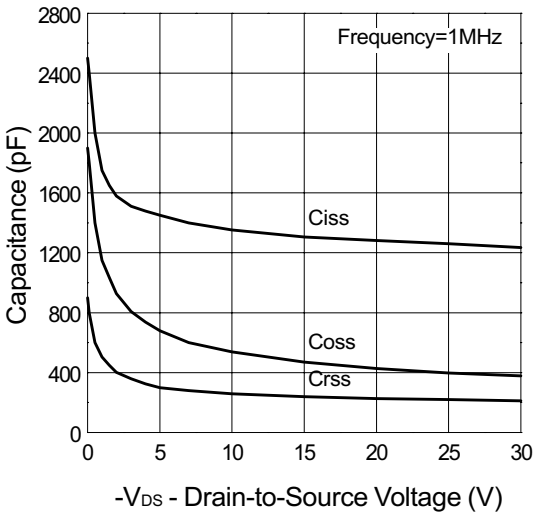
On-Resistance vs. Junction Temperature



Gate Charge



Capacitance



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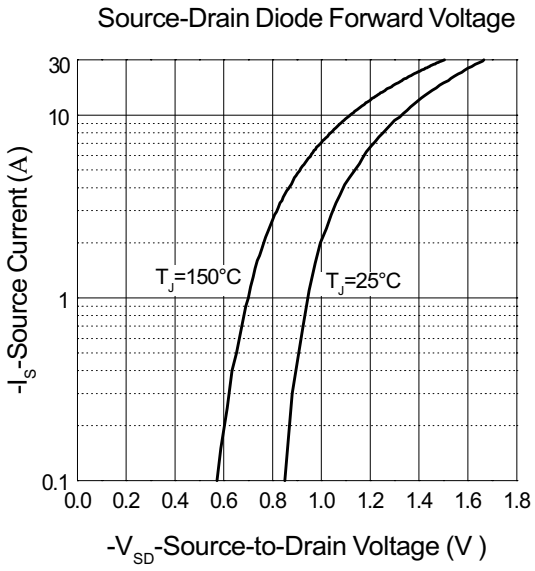
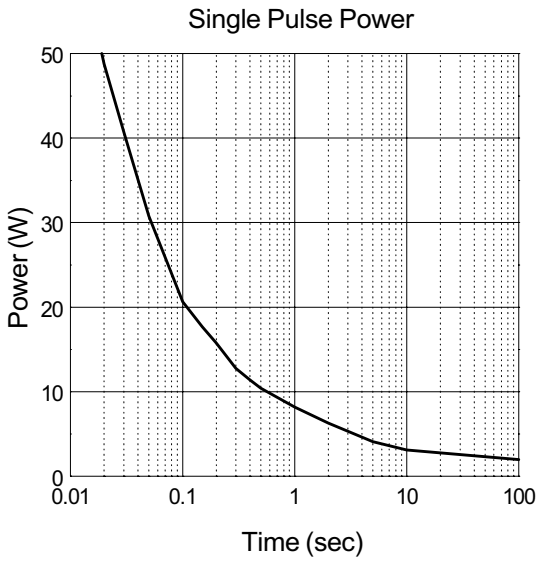
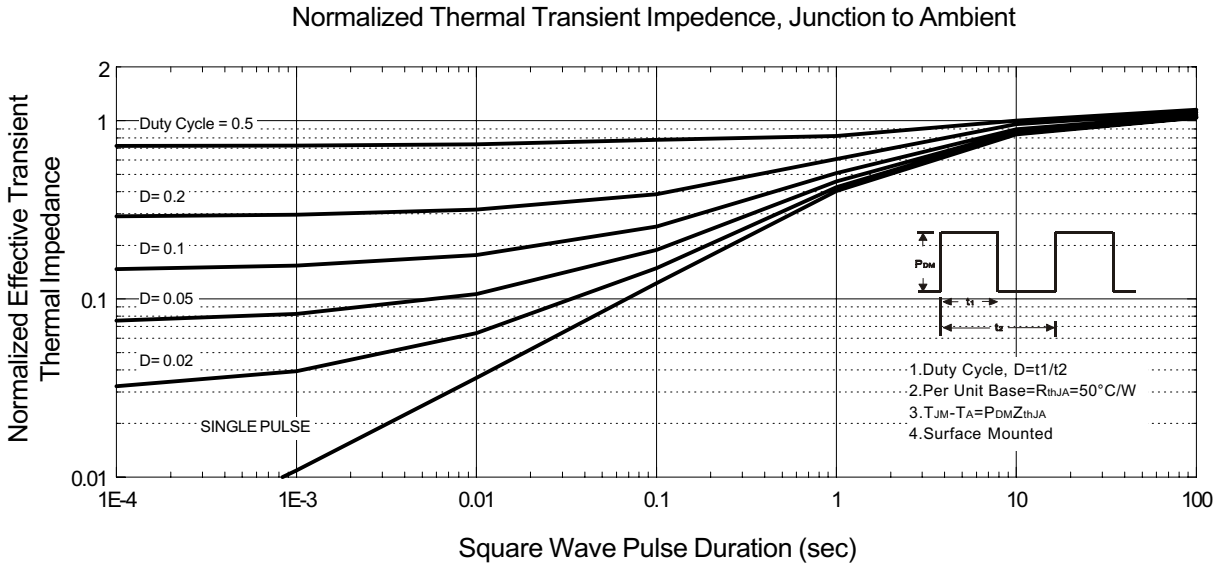
Typical Characteristics (Cont.)

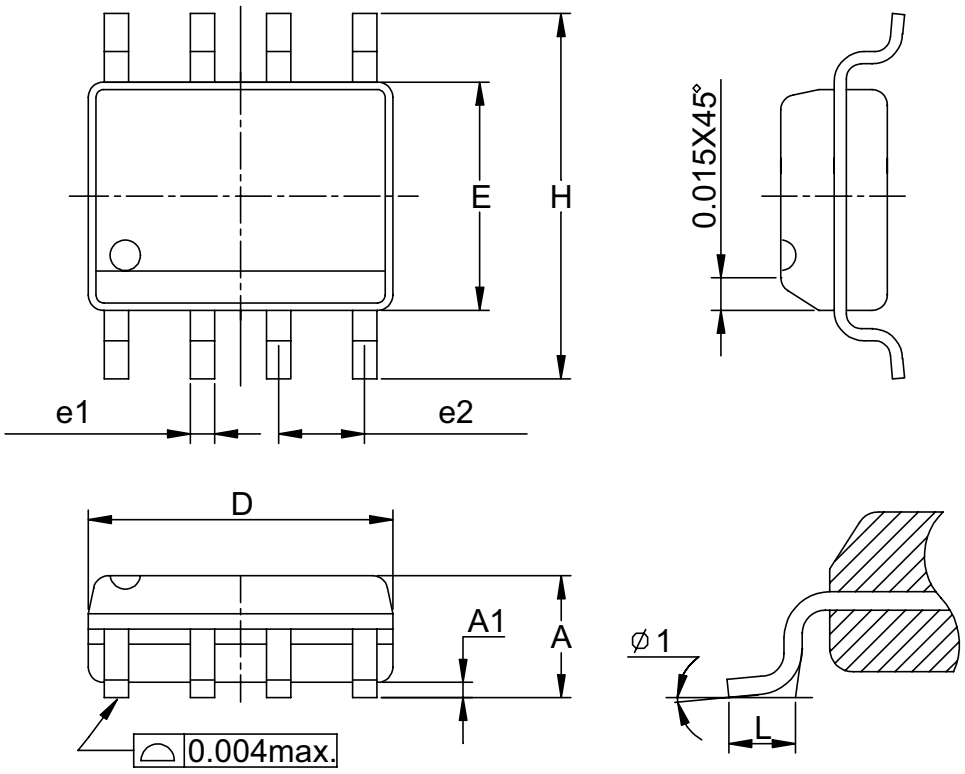






Packaging Information

SOP-8 pin (Reference JEDEC Registration MS-012)



Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
D	4.80	5.00	0.189	0.197
E	3.80	4.00	0.150	0.157
H	5.80	6.20	0.228	0.244
L	0.40	1.27	0.016	0.050
e1	0.33	0.51	0.013	0.020
e2	1.27BSC		0.50BSC	
ϕ 1	8°		8°	

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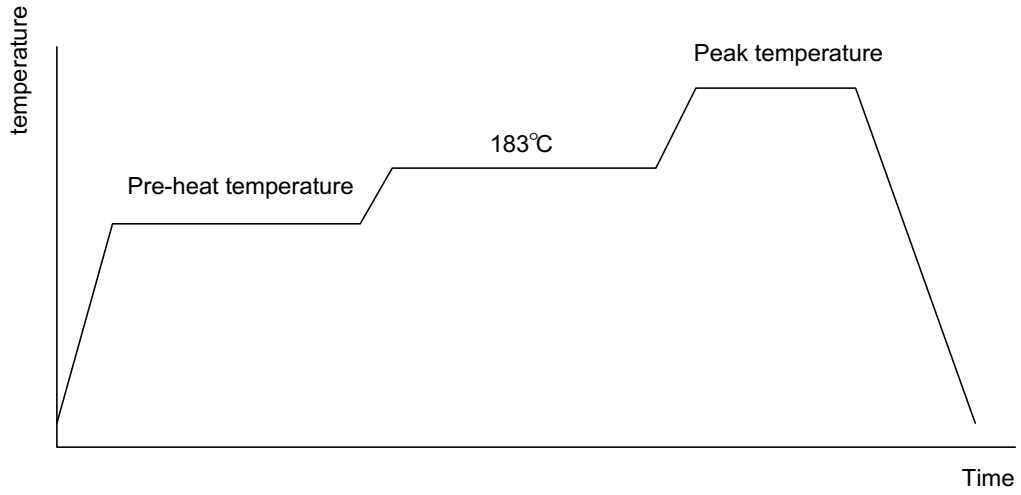
Physical Specifications

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)



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 bgas	pkg. thickness < 2.5mm and pkg. volume ≥ 350 mm³	pkg. thickness < 2.5mm and pkg. volume < 350mm³
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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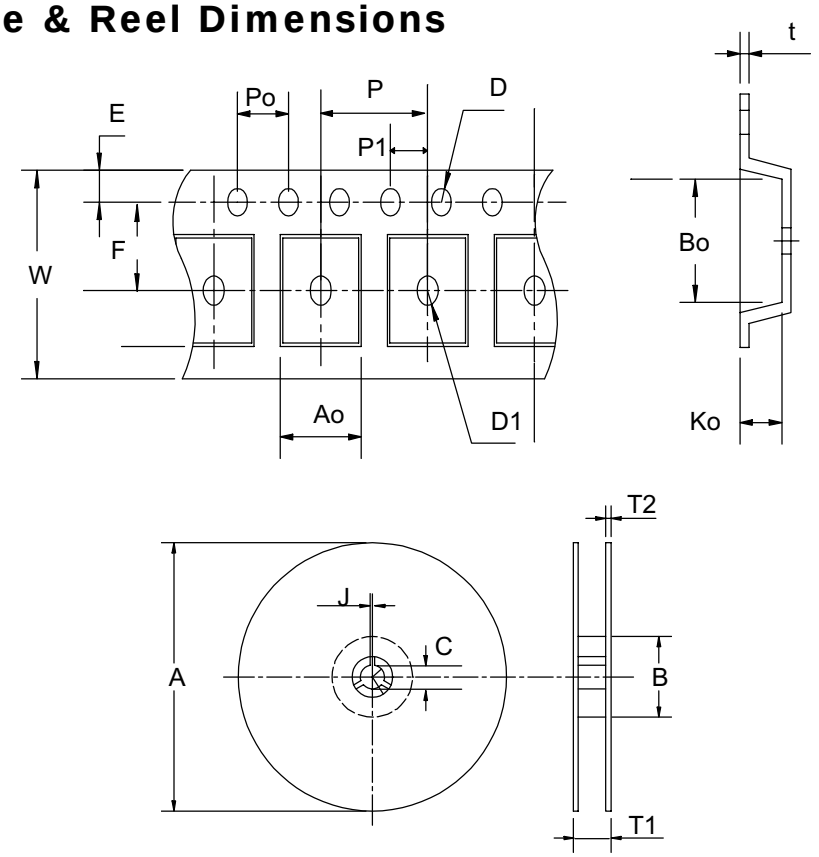
Reliability test program

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
SOP- 8	330 ± 1	62 +1.5	12.75+ 0.15	2 ± 0.5	12.4 ± 0.2	2 ± 0.2	12± 0. 3	8± 0.1	1.75±0.1
	F	D	D1	Po	P1	Ao	Bo	Ko	t
	5.5± 1	1.55 +0.1	1.55+ 0.25	4.0 ± 0.1	2.0 ± 0.1	6.4 ± 0.1	5.2± 0. 1	2.1± 0.1	0.3±0.013

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Cover Tape Dimensions

Application	Carrier Width	Cover Tape Width	Devices Per Reel
SOP- 8	12	9.3	2500

Customer Service

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