

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	± 20	
I_D^*	Continuous Drain Current	$V_{GS} = -10\text{V}$	A
I_{DM}^*	Pulsed Drain Current		
I_S^*	Diode Continuous Forward Current	-10	A
T_J	Maximum Junction Temperature	-1.7	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	150	
P_D^*	Maximum Power Dissipation	-55 to 150	W
$R_{\theta JA}^*$		Thermal Resistance-Junction to Ambient	
		$T_A = 25^\circ\text{C}$	0.8
		$T_A = 100^\circ\text{C}$	62.5

Note:

*Surface Mounted on 1in^2 pad area, $t \leq 10\text{sec}$.

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

Symbol	Parameter	Test Condition	APM4947K			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{V}, I_{DS} = -250\mu\text{A}$	-30			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = -24\text{V}, V_{GS} = 0\text{V}$			-1	μA
		$T_J = 85^\circ\text{C}$			-30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_{DS} = -250\mu\text{A}$	-1	-1.5	-2	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	$V_{GS} = -10\text{V}, I_{DS} = -2.5\text{A}$		90	120	m Ω
		$V_{GS} = -4.5\text{V}, I_{DS} = -2\text{A}$		145	185	
V_{SD}^a	Diode Forward Voltage	$I_{SD} = -1.7\text{A}, V_{GS} = 0\text{V}$		-0.8	-1.3	V
Gate Charge Characteristics^b						
Q_g	Total Gate Charge	$V_{DS} = -15\text{V}, V_{GS} = -10\text{V}, I_{DS} = -2.5\text{A}$		8	12	nC
Q_{gs}	Gate-Source Charge			1.8		
Q_{gd}	Gate-Drain Charge			1.4		

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

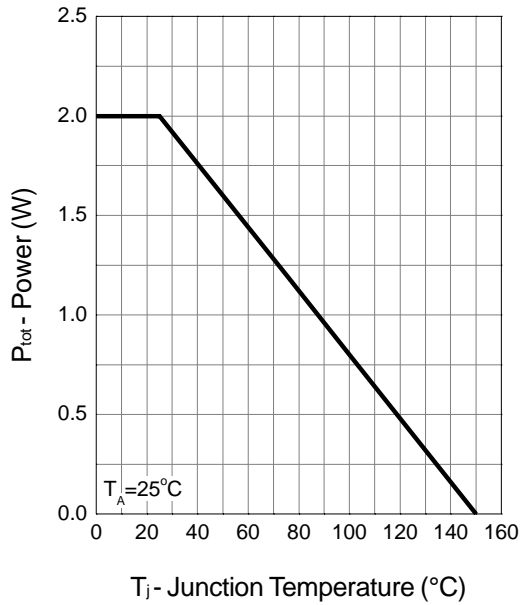
Symbol	Parameter	Test Condition	APM4947K			Unit
			Min.	Typ.	Max.	
Dynamic Characteristics^b						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz		14		Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-25V, Frequency=1.0MHz		550		pF
C _{oss}	Output Capacitance			120		
C _{rss}	Reverse Transfer Capacitance			80		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =-15V, R _L =15Ω, I _{DS} =-1A, V _{GEN} =-10V, R _G =6Ω		7	15	ns
T _r	Turn-on Rise Time			10	20	
t _{d(OFF)}	Turn-off Delay Time			13	30	
T _f	Turn-off Fall Time			10	20	

Notes:

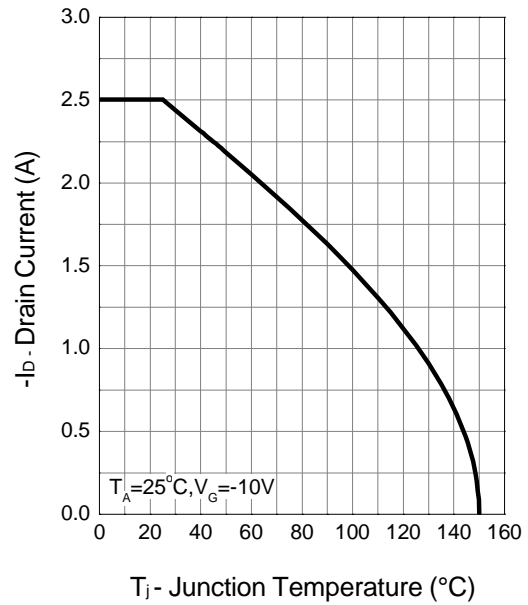
- a : Pulse test ; pulse width ≤ 300μs, duty cycle ≤ 2%.
- b : Guaranteed by design, not subject to production testing.

Typical Characteristics

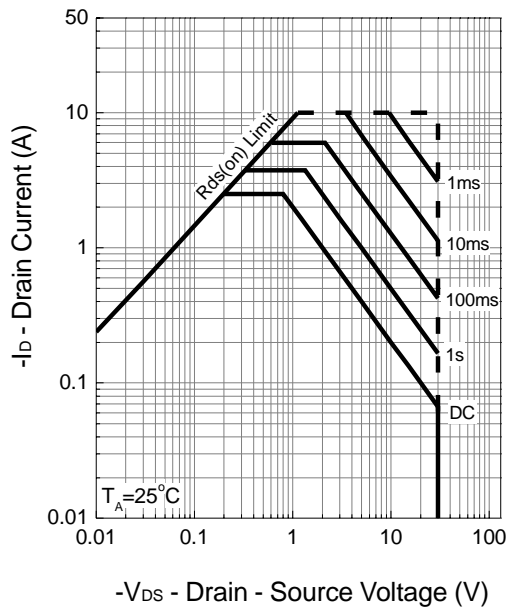
Power Dissipation



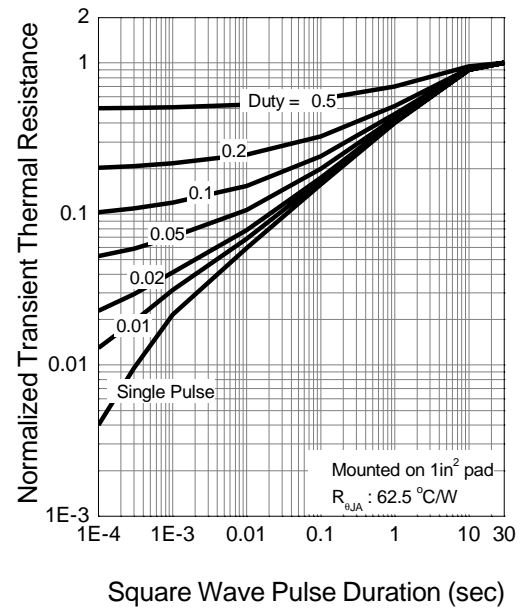
Drain Current



Safe Operation Area

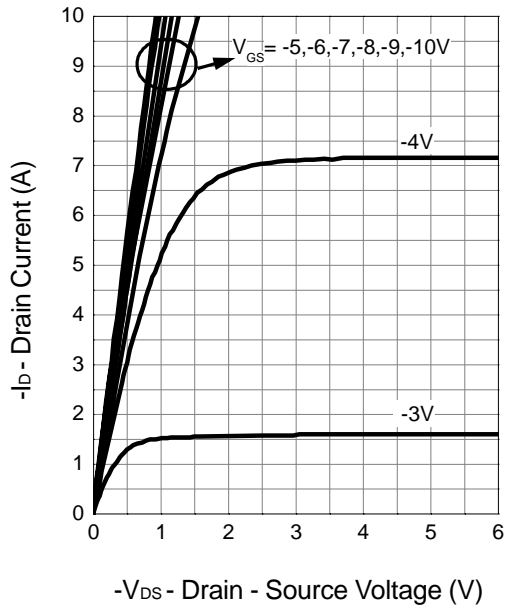


Thermal Transient Impedance

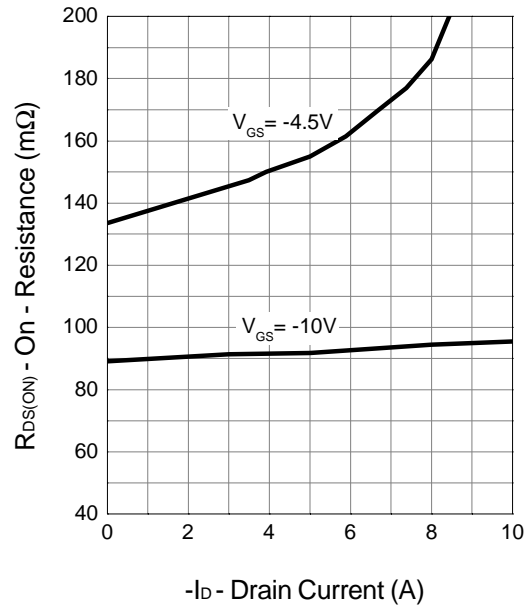


Typical Characteristics (Cont.)

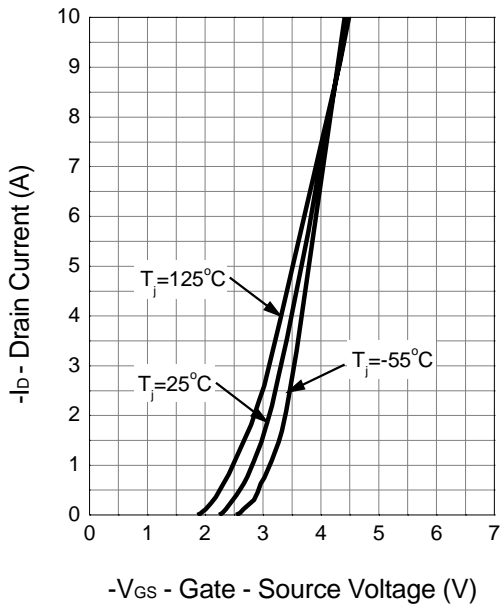
Output Characteristics



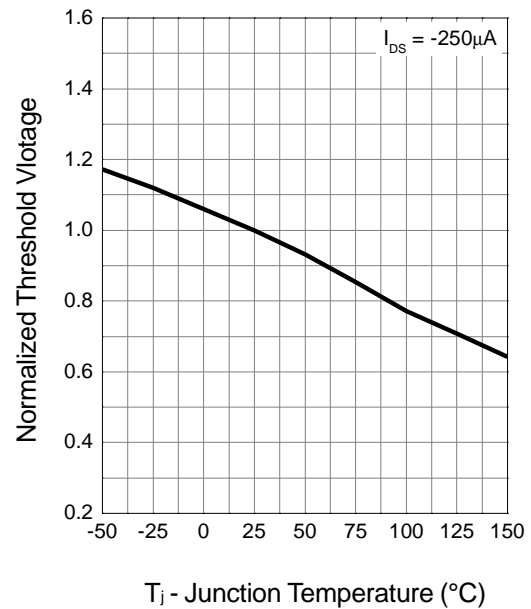
Drain-Source On Resistance



Transfer Characteristics

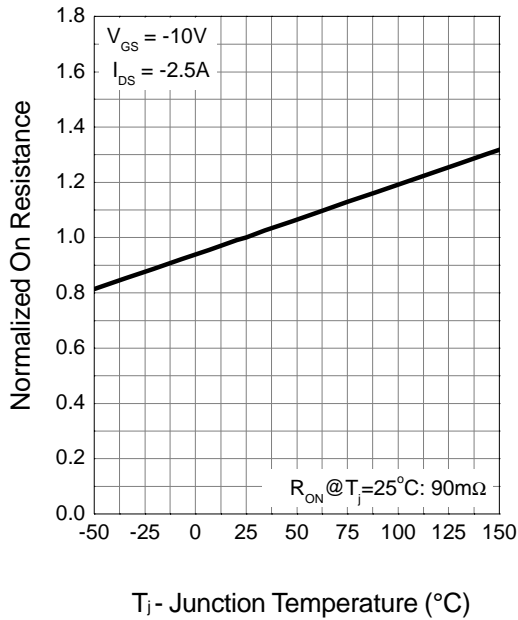


Gate Threshold Voltage

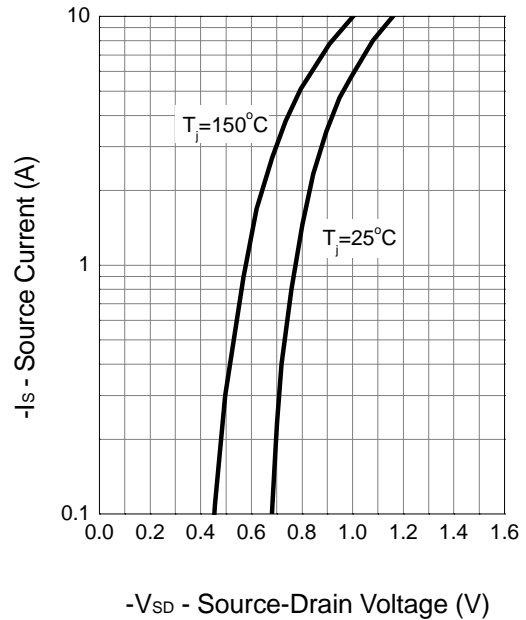


Typical Characteristics (Cont.)

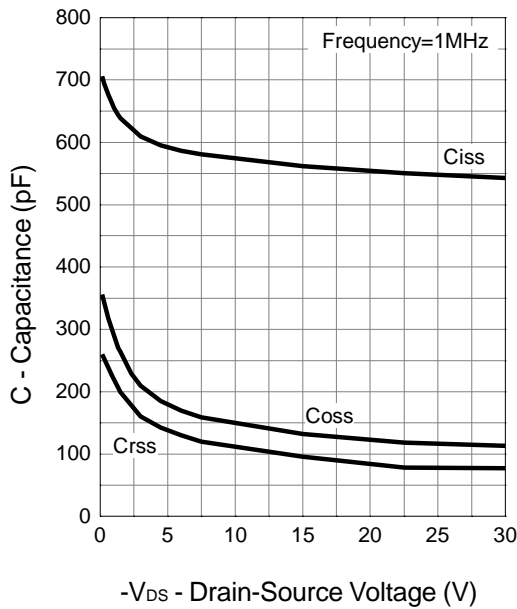
Drain-Source On Resistance



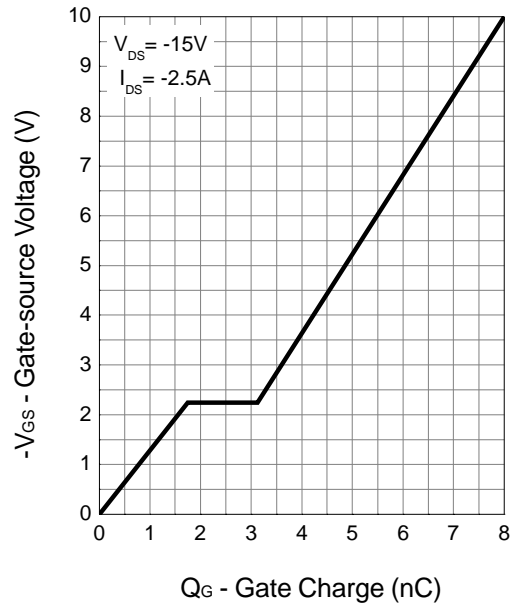
Source-Drain Diode Forward



Capacitance



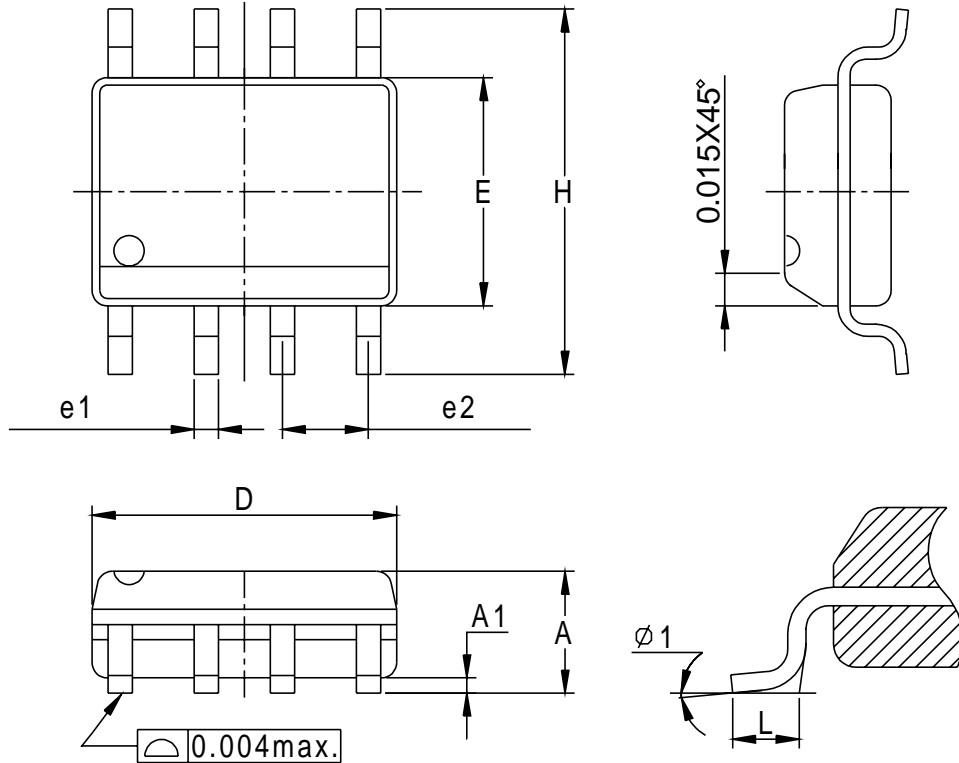
Gate Charge



Packaging Information

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

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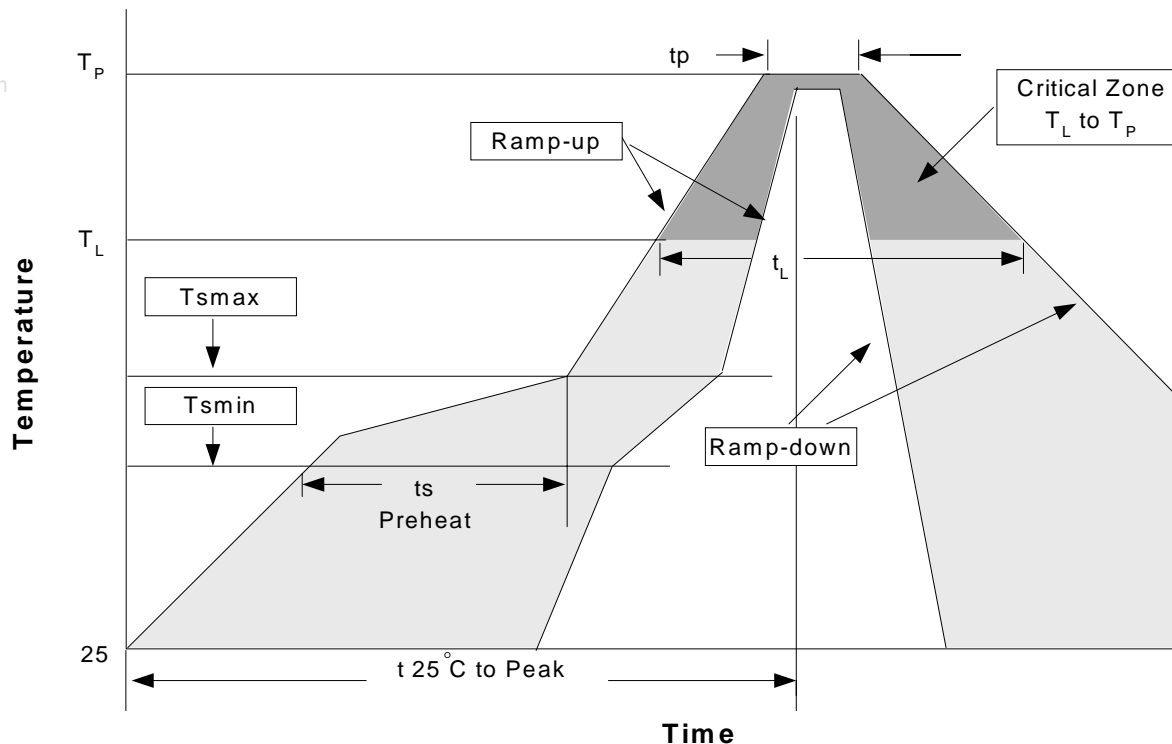


Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
D	4.80	5.00	0.189	0.197
E	3.80	4.00	0.150	0.157
H	5.80	6.20	0.228	0.244
L	0.40	1.27	0.016	0.050
e1	0.33	0.51	0.013	0.020
e2	1.27BSC		0.50BSC	
φ 1	8°		8°	

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 <ul style="list-style-type: none"> - Temperature Min (T_{smin}) - Temperature Max (T_{smax}) - Time (min to max) (t_s) 	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: <ul style="list-style-type: none"> - Temperature (T_L) - Time (t_L) 	183°C 60-150 seconds	217°C 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

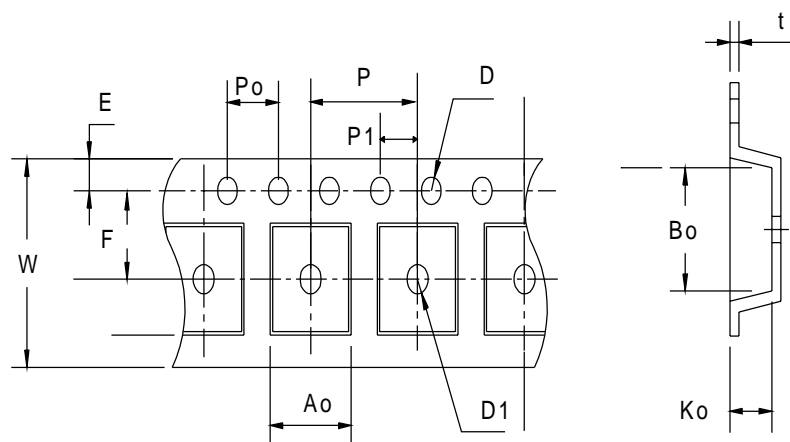
Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >2000
<1.6 mm	260 +0°C*	260 +0°C*	260 +0°C*
1.6 mm – 2.5 mm	260 +0°C*	250 +0°C*	245 +0°C*
≥2.5 mm	250 +0°C*	245 +0°C*	245 +0°C*

*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.

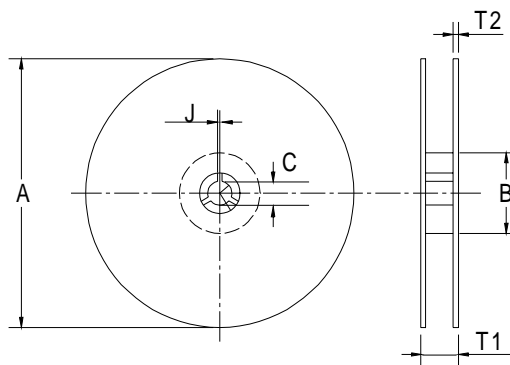
Reliability Test Program

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.)



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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 - 0.1	8± 0.1	1.75± 0.1
	F	D	D1	Po	P1	Ao	Bo	Ko	t
	5.5 ± 0.1	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

(mm)

Cover Tape Dimensions

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

Customer Service

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