

APM9945K

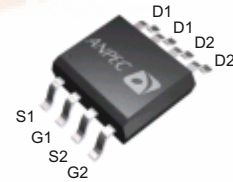


Dual N-Channel Enhancement Mode MOSFET

Features

- 60V/3A,
 $R_{DS(ON)} = 100m\Omega (typ.) @ V_{GS} = 10V$
 $R_{DS(ON)} = 120m\Omega (typ.) @ V_{GS} = 4.5V$
- Super High Dense Cell Design
- Reliable and Rugged
- Lead Free Available (RoHS Compliant)

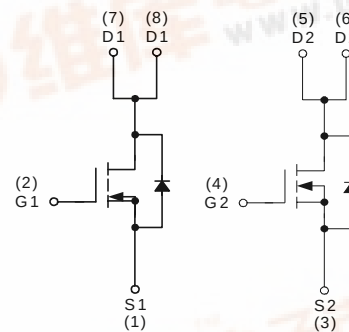
Pin Description



SOP – 8

Applications

- Power Management in Desktop or DC/DC Converters



N-Channel MOSFET

Ordering and Marking Information

APM9945 □□-□□□ Lead Free Code Handling Code Temp. Range Package Code	Package Code K : SOP-8 Operating Junction Temp. Range C : -55 to 150°C Handling Code TU : Tube TR : Tape & Reel Lead Free Code L : Lead Free Device Blank : Original Device
APM9945 K : APM9945 XXXXX	XXXXX - Date Code

Note: ANPEC lead-free products contain molding compounds/die attach materials and 100% matte in 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 ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Rating	Unit
V_{DSS}	Drain-Source Voltage	60	V
V_{GSS}	Gate-Source Voltage	± 20	
I_D^*	Continuous Drain Current	$V_{GS}=10V$	A
I_{DM}^*	Pulsed Drain Current		
I_S^*	Diode Continuous Forward Current	3	A
T_J	Maximum Junction Temperature	150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	
P_D^*	Power Dissipation for Single Operation	$T_A=25^\circ\text{C}$	W
		$T_A=100^\circ\text{C}$	
$R_{\theta JA}^*$	Thermal Resistance-Junction to Ambient	62.5	$^\circ\text{C/W}$

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	APM9945K			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	60			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =48V, V _{GS} =0V			1	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1	2	3	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA
R _{DS(ON)} ^a	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =3A		100	135	mΩ
		V _{GS} =4.5V, I _{DS} =2A		120	160	
V _{SD} ^a	Diode Forward Voltage	I _{SD} =3A, V _{GS} =0V		0.8	1.3	V
Dynamic Characteristics ^b						
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V,F=1MHz		3.4		Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V, Frequency=1.0MHz		390		pF
C _{oss}	Output Capacitance			75		
C _{rss}	Reverse Transfer Capacitance			20		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =15V, R _L =10Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω		8	18	ns
T _r	Turn-on Rise Time			9	20	
t _{d(OFF)}	Turn-off Delay Time			20	40	
T _f	Turn-off Fall Time			8	20	

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

Symbol	Parameter	Test Condition	APM9945K			Unit
			Min.	Typ.	Max.	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =10V, I _{DS} =3A		20	26	nC
Q _{gs}	Gate-Source Charge			5		
Q _{gd}	Gate-Drain Charge			5		

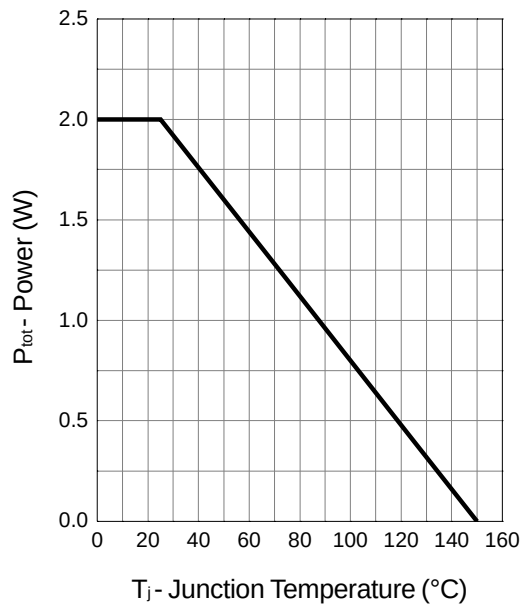
Notes:

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

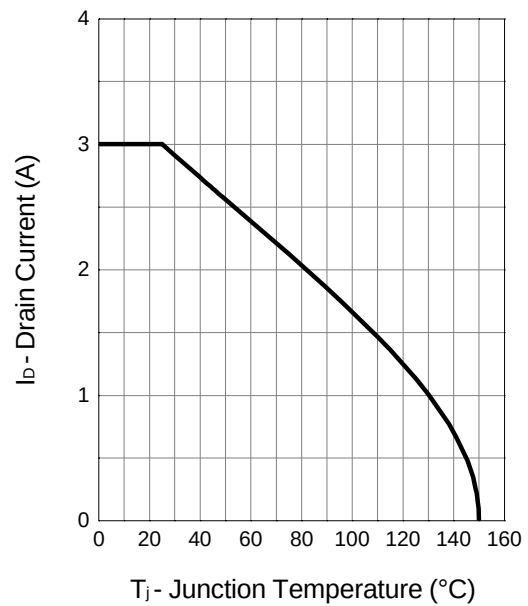
b : Guaranteed by design, not subject to production testing.

Typical Characteristics

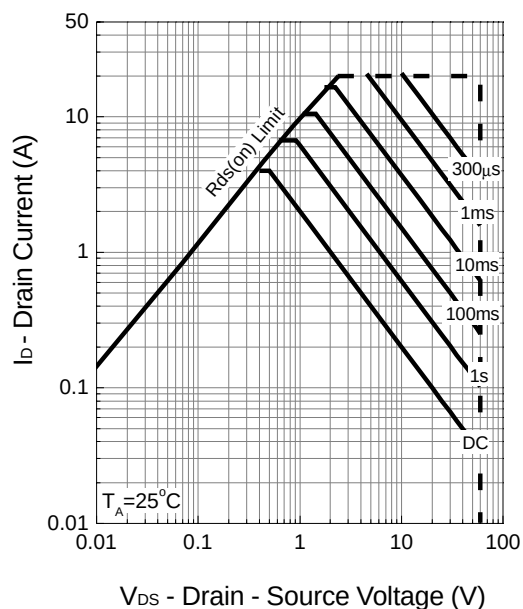
Power Dissipation



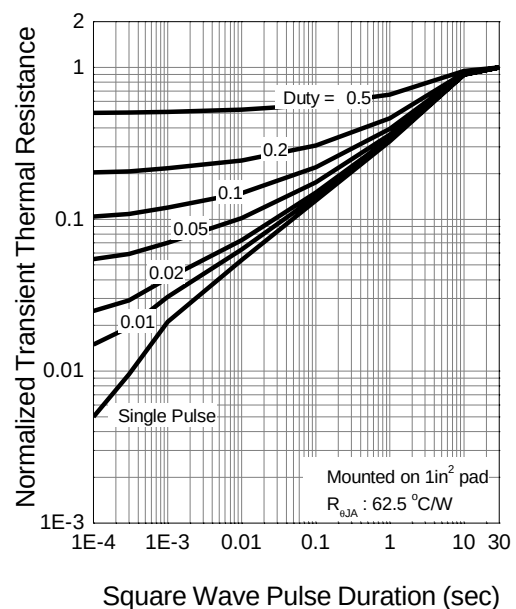
Drain Current



Safe Operation Area

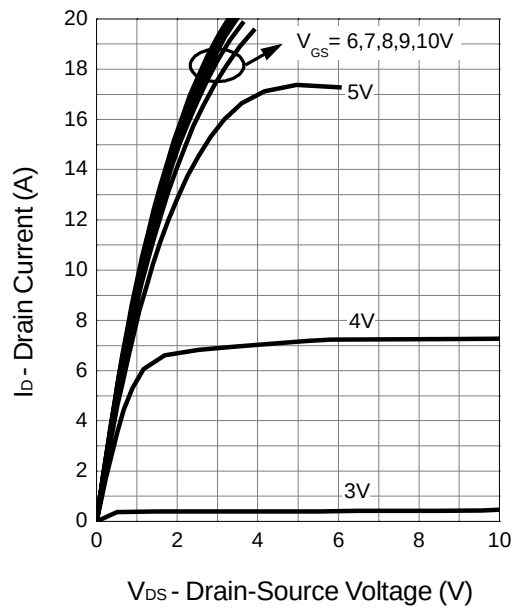


Thermal Transient Impedance

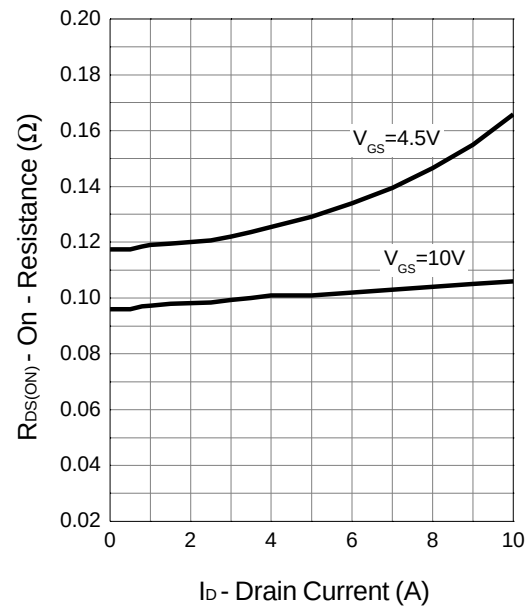


Typical Characteristics (Cont.)

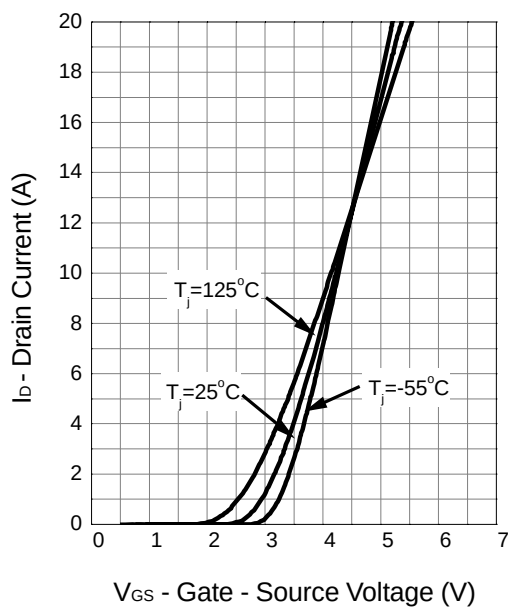
Output Characteristics



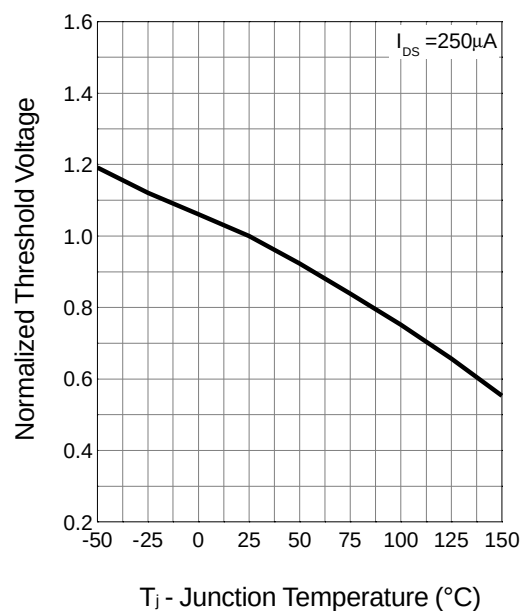
Drain-Source On Resistance



Transfer Characteristics

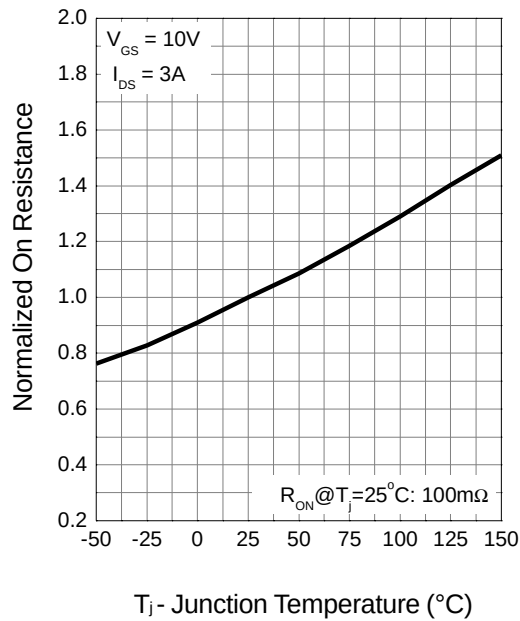


Gate Threshold Voltage

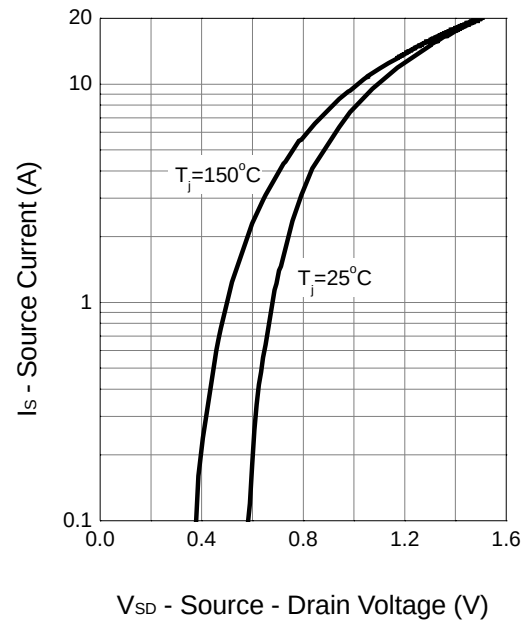


Typical Characteristics (Cont.)

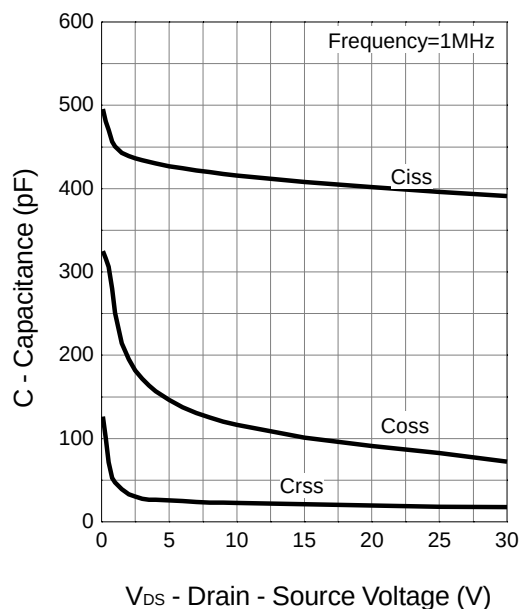
Drain-Source On Resistance



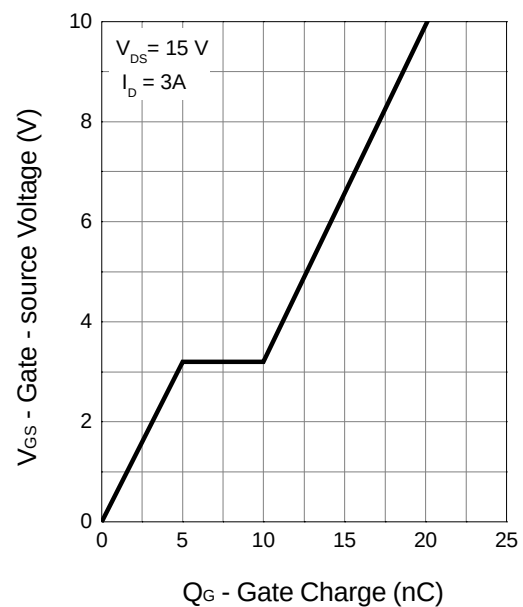
Source-Drain Diode Forward



Capacitance

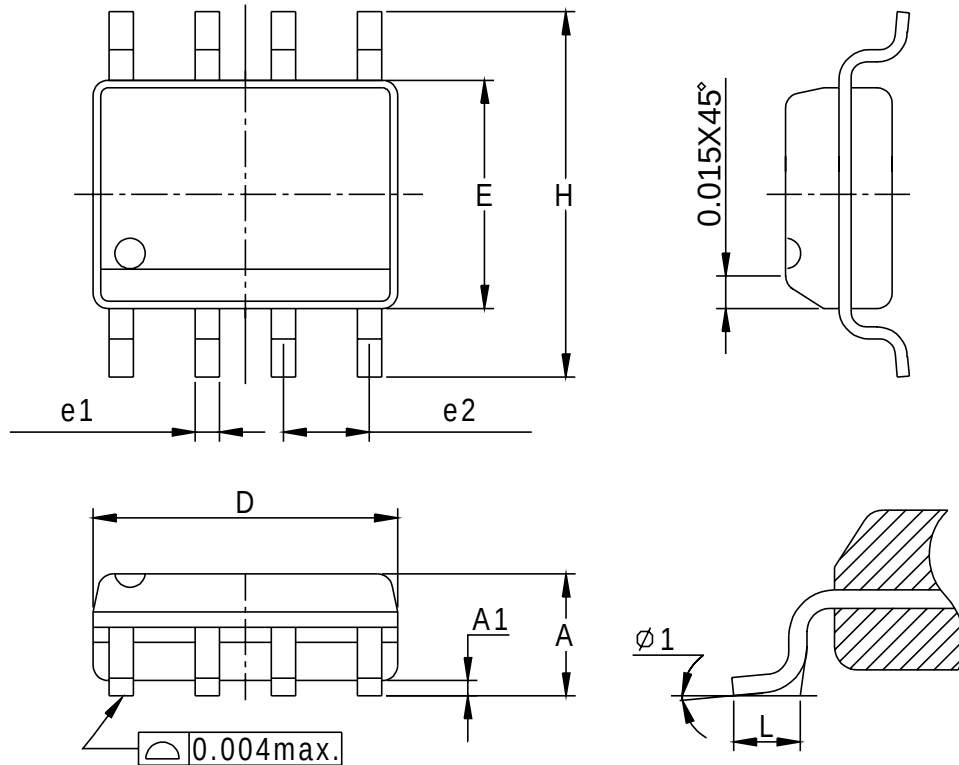


Gate Charge



Packaging Information

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

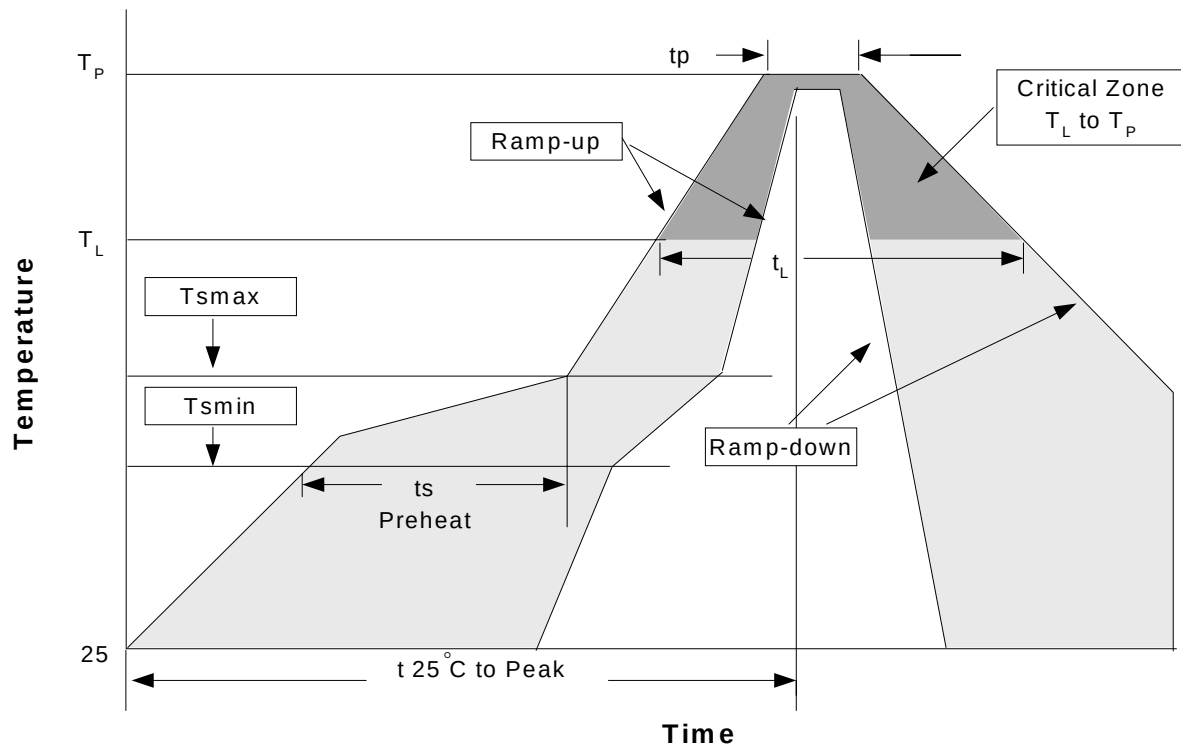


Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
D	4.80	5.00	0.189	0.197
E	3.80	4.00	0.150	0.157
H	5.80	6.20	0.228	0.244
L	0.40	1.27	0.016	0.050
e1	0.33	0.51	0.013	0.020
e2	1.27BSC		0.50BSC	
Ø 1	8°		8°	

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

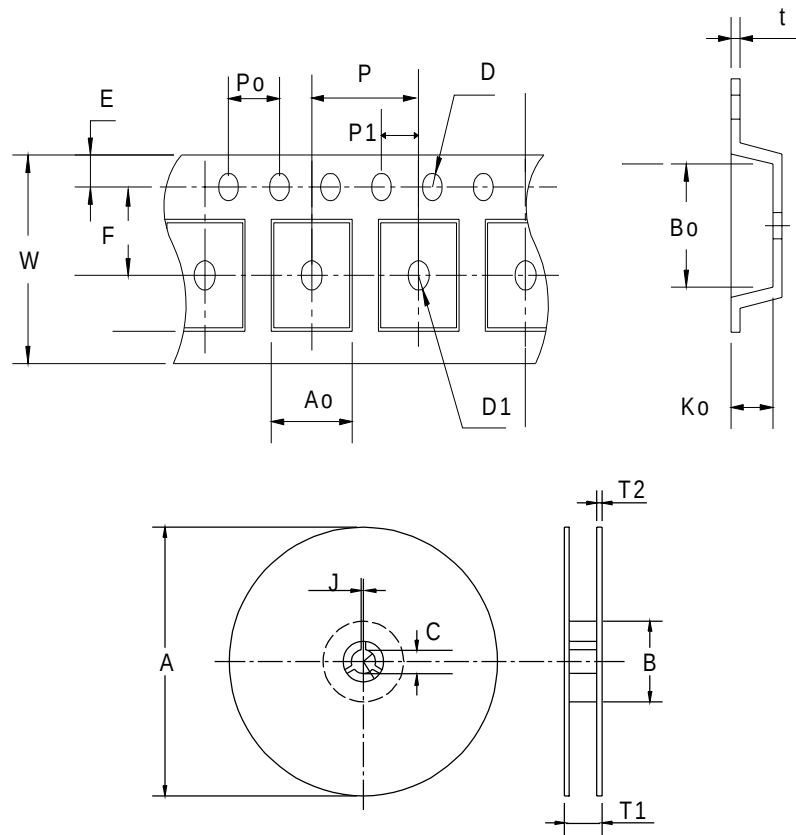
Profile Feature	Sn-Pb Eutectic Assembly		Pb-Free Assembly	
	Large Body	Small Body	Large Body	Small Body
Average ramp-up rate (T _L to T _P)	3°C/second max.		3°C/second max.	
Preheat				
- Temperature Min (Tsm)	100°C		150°C	
- Temperature Mix (Tsm)	150°C		200°C	
- Time (min to max)(ts)	60-120 seconds		60-180 seconds	
Tsm to T _L			3°C/second max	
- Ramp-up Rate				
Tsm to T _L				
- Temperature(T _L)	183°C		217°C	
- Time (t _L)	60-150 seconds		60-150 seconds	
Peak Temperature(Tp)	225 +0/-5°C	240 +0/-5°C	245 +0/-5°C	250 +0/-5°C
Time within 5°C of actual Peak Temperature(tp)	10-30 seconds	10-30 seconds	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.	

Note: All temperatures refer to topside of the package. Measured on the body surface.

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	$12 + 0.3 - 0.1$	8 ± 0.1	1.75 ± 0.1
	F	D	D_1	P_0	P_1	A_0	B_0	K_0	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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