

## Dual N-Channel Enhancement Mode MOSFET

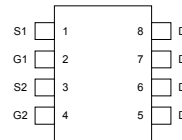
### Features

- 20V/6A,  $R_{DS(ON)} = 28m\Omega(\text{typ.}) @ V_{GS} = 4.5V$   
 $R_{DS(ON)} = 38m\Omega(\text{typ.}) @ V_{GS} = 2.5V$
- Super High Dense Cell Design for Extremely Low  $R_{DS(ON)}$
- Reliable and Rugged
- SO-8 and TSSOP-8 Packages

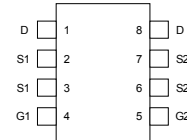
### Applications

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

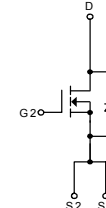
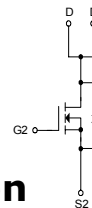
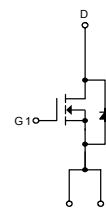
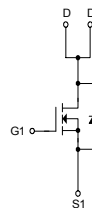
### Pin Description



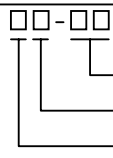
SO-8



TSSOP-8



### Ordering and Marking Information

<p>APM9926A</p>  <p>Handling Code Temp. Range Package Code</p>	<p>Package Code K : SO-8                      O : TSSOP-8 Operation Junction Temp. Range C : -55 to 150°C Handling Code TR : Tape &amp; Reel</p>
<p>APM9926A K/O : <span style="border: 1px solid black; padding: 2px;">APM9926A XXXXX</span></p>	<p>XXXXX - Date Code</p>

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

Symbol	Parameter	Rating	Unit
$V_{DSS}$	Drain-Source Voltage	20	V
$V_{GSS}$	Gate-Source Voltage	$\pm 10$	
$I_D^*$	Maximum Drain Current – Continuous	6	A
$I_{DM}$	Maximum Drain Current – Pulsed	20	

\* 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.

## Absolute Maximum Ratings (Cont.) (T<sub>A</sub> = 25°C unless otherwise noted)

Symbol	Parameter	Rating	Unit		
P <sub>D</sub>	Maximum Power Dissipation	T <sub>A</sub> =25°C	SO-8	1.6	W
			TSSOP-8	1.0	
		T <sub>A</sub> =100°C	SO-8	0.625	
			TSSOP-8	0.4	
T <sub>J</sub>	Maximum Junction Temperature	150	°C		
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C		
R <sub>θJA</sub>	Thermal Resistance – Junction to Ambient	80	°C/W		

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

## Electrical Characteristics (T<sub>A</sub> = 25°C unless otherwise noted)

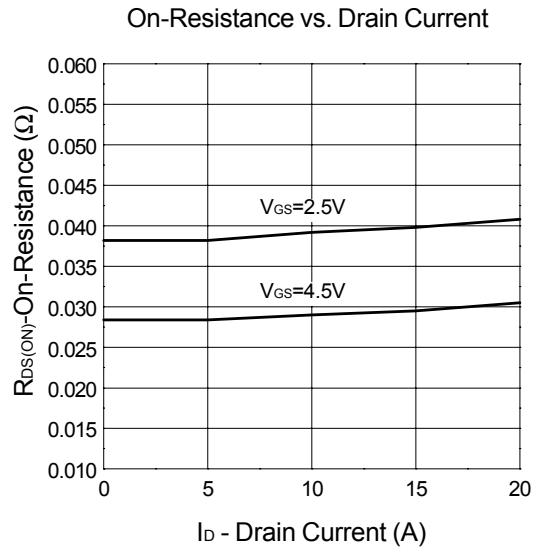
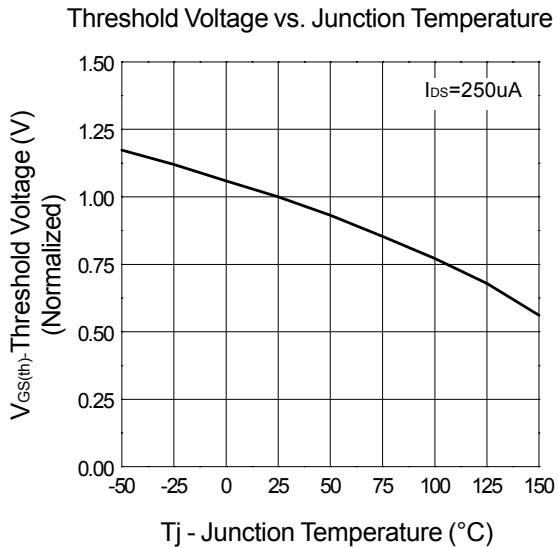
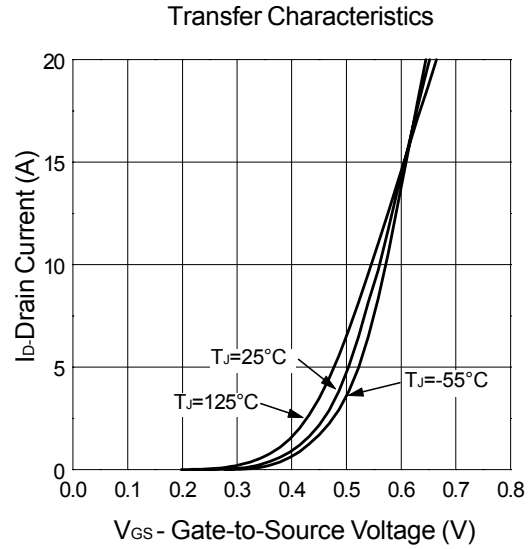
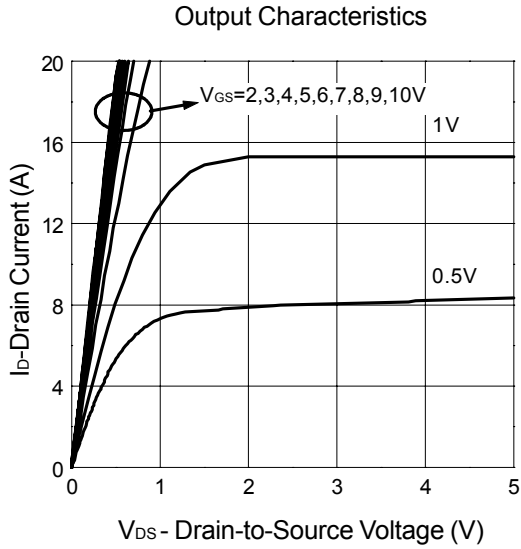
Symbol	Parameter	Test Condition	APM9926A			Unit
			Min.	Typ.	Max.	
<b>Static</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>DS</sub> =250μA	20			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =16V, V <sub>GS</sub> =0V			1	μA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250μA	0.5	0.7	1.5	V
I <sub>GSS</sub>	Gate Leakage Current	V <sub>GS</sub> =±10V, V <sub>DS</sub> =0V			±100	nA
R <sub>DS(ON)</sub> <sup>a</sup>	Drain-Source On-state Resistance	V <sub>GS</sub> =4.5V, I <sub>DS</sub> =6A		28	32	mΩ
		V <sub>GS</sub> =2.5V, I <sub>DS</sub> =5.2A		38	45	
V <sub>SD</sub> <sup>a</sup>	Diode Forward Voltage	I <sub>SD</sub> =1.7A, V <sub>GS</sub> =0V		0.7	1.3	V
<b>Dynamic<sup>b</sup></b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =10V, I <sub>DS</sub> =6A		10	12	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>GS</sub> =4.5V,		3.6		
Q <sub>gd</sub>	Gate-Drain Charge			2		
t <sub>d(ON)</sub>	Turn-on Delay Time	V <sub>DD</sub> =10V, I <sub>DS</sub> =1A, V <sub>GEN</sub> =4.5V, R <sub>G</sub> =0.2Ω		17		ns
T <sub>r</sub>	Turn-on Rise Time			15		
t <sub>d(OFF)</sub>	Turn-off Delay Time			45		
T <sub>f</sub>	Turn-off Fall Time			25		
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V		520		pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =15V		110		
C <sub>rss</sub>	Reverse Transfer Capacitance	Frequency=1.0MHz		70		

### Notes

<sup>a</sup> : Pulse test ; pulse width ≤300μs, duty cycle ≤ 2%

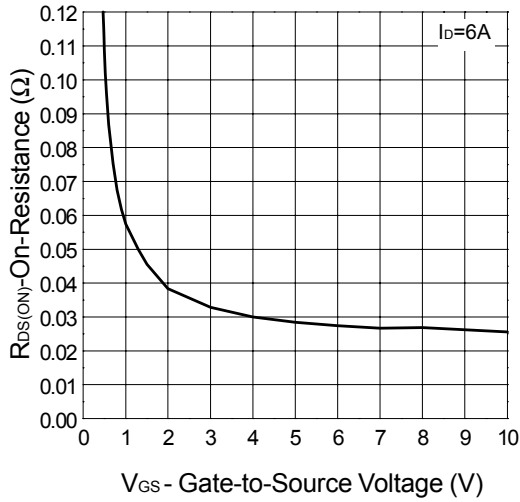
<sup>b</sup> : Guaranteed by design, not subject to production testing

Typical Characteristics

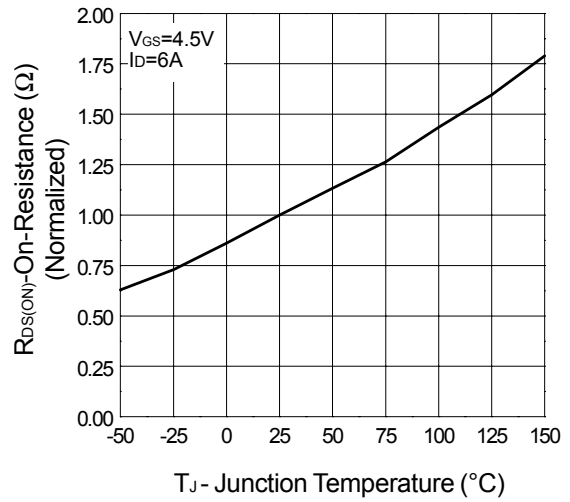


Typical Characteristics (Cont.)

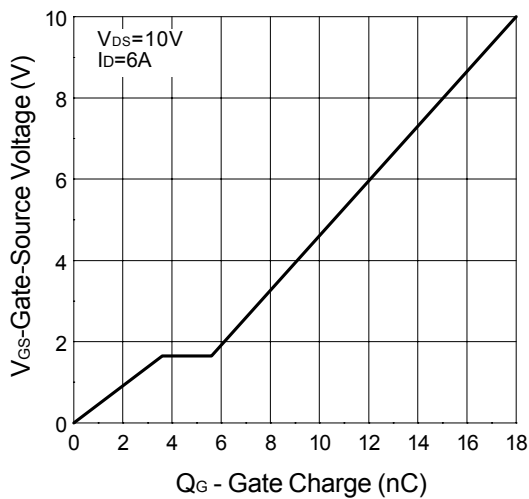
On-Resistance vs. Gate-to-Source Voltage



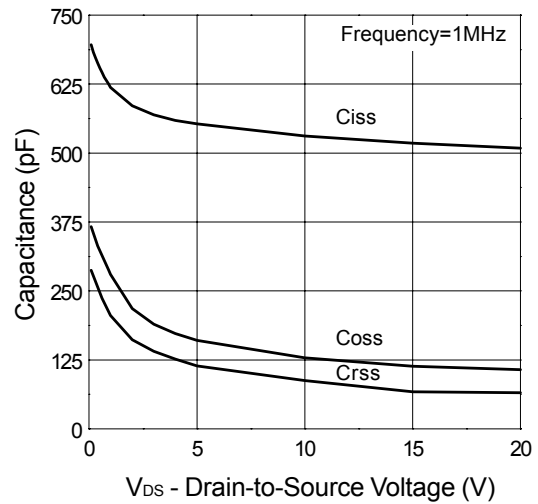
On-Resistance vs. Junction Temperature



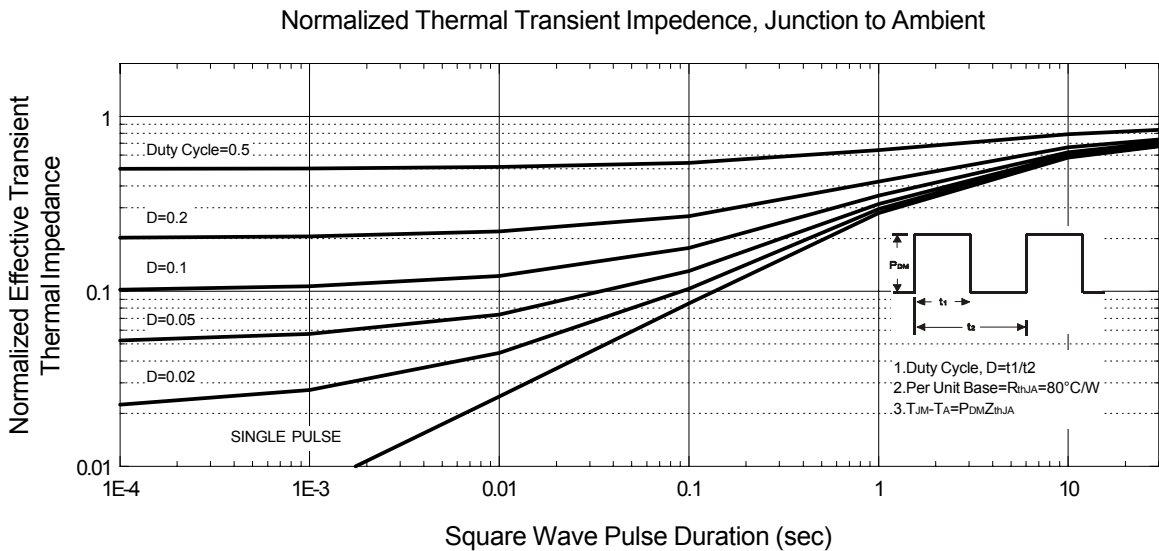
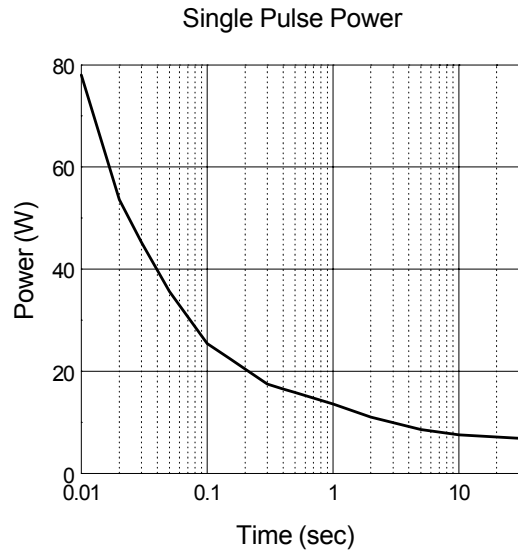
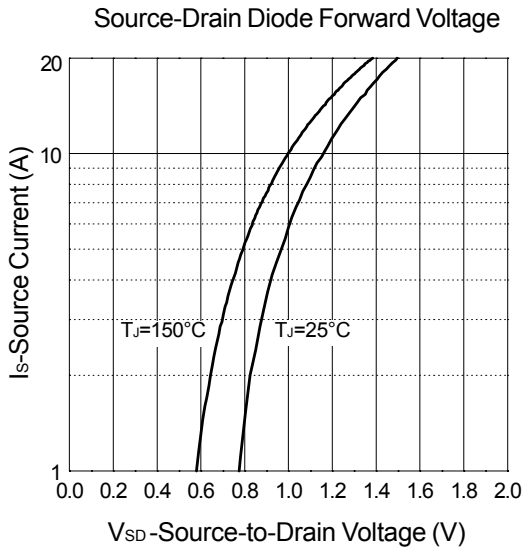
Gate Charge



Capacitance

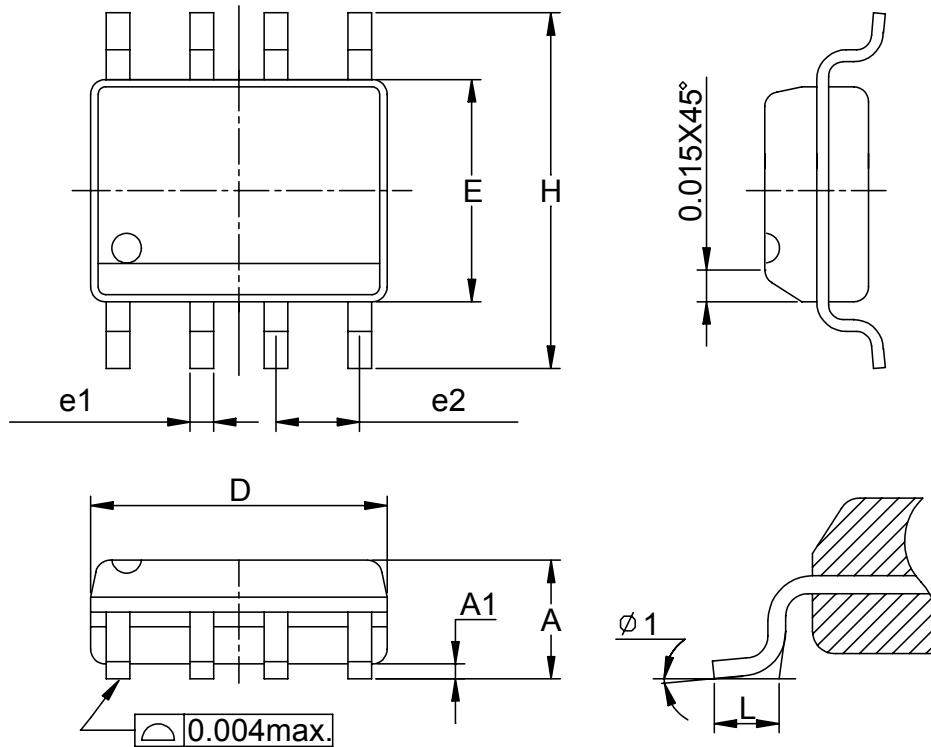


Typical Characteristics (Cont.)



## Packaging Information

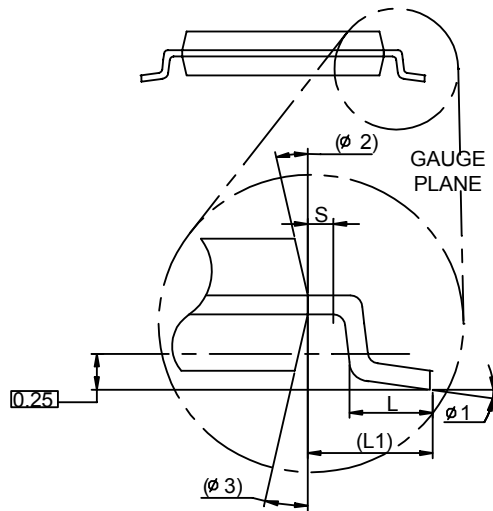
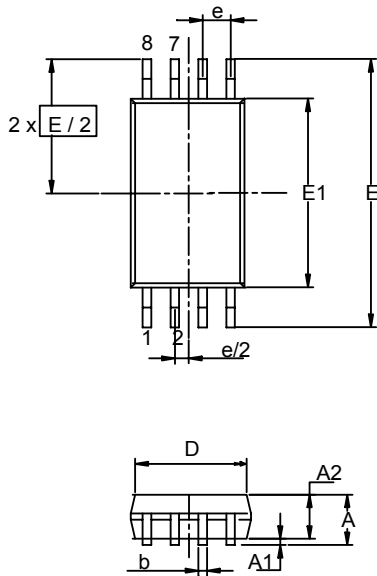
SOP-8 pin ( Reference JEDEC Registration MS-012)



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°	

Packaging Information (Cont.)

TSSOP-8

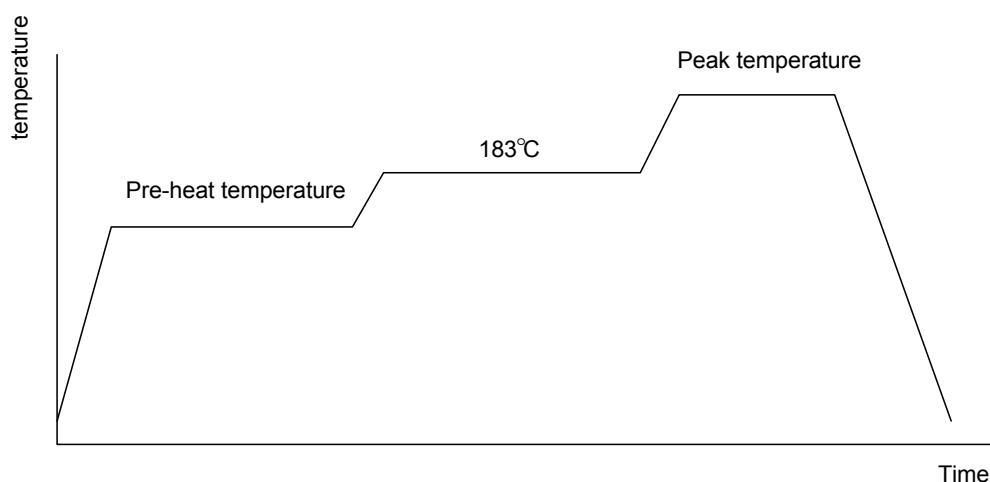


Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A		1.2		0.047
A1	0.00	0.15	0.000	0.006
A2	0.80	1.05	0.031	0.041
b	0.19	0.30	0.007	0.012
D	2.9	3.1	0.114	0.122
e	0.65 BSC		0.026 BSC	
E	6.40 BSC		0.252 BSC	
E1	4.30	4.50	0.169	0.177
L	0.45	0.75	0.018	0.030
L1	1.0 REF		0.039 REF	
R	0.09		0.004	
R1	0.09		0.004	
S	0.2		0.008	
phi 1	0°	8°	0°	8°
phi 2	12° REF		12° REF	
phi 3	12° REF		12° REF	

## 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

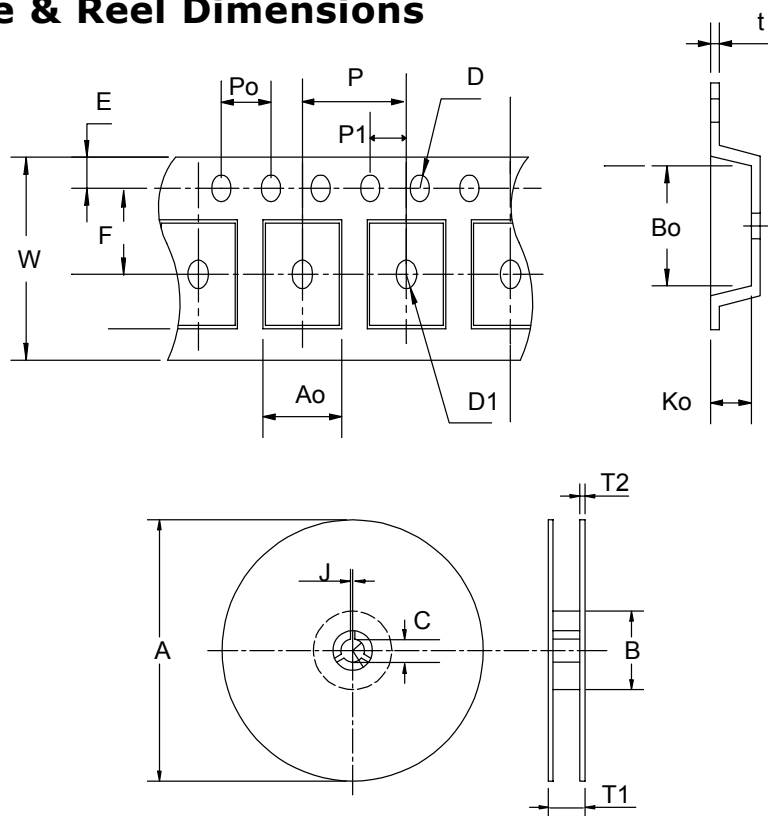
pkg. thickness ≥ 2.5mm and all bgas	pkg. thickness < 2.5mm and pkg. volume ≥ 350 mm <sup>3</sup>	pkg. thickness < 2.5mm and pkg. volume < 350mm <sup>3</sup>
Convection 220 +5/-0 °C		Convection 235 +5/-0 °C
VPR 215-219 °C		VPR 235 +5/-0 °C
IR/Convection 220 +5/-0 °C		IR/Convection 235 +5/-0 °C



## 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 <sup>+</sup> <sub>0.15</sub>	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
Application	A	B	C	J	T1	T2	W	P	E
TSSOP-8	330 ± 1	62 + 1.5	12.75 <sup>+</sup> <sub>0.15</sub>	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 ± 0.1	1.5 + 0.1	1.5 + 0.1	4.0 ± 0.1	2.0 ± 0.1	7.0 ± 0.1	3.6 ± 0.3	1.6 ± 0.1	0.3 ± 0.013

## Cover Tape Dimensions

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

## Customer Service

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