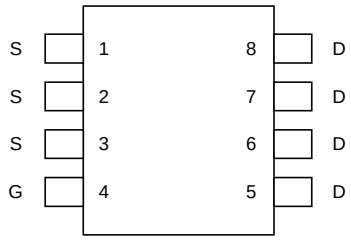
N-Channel Enhancement Mode MOSFET

Features

- 30V/12.5A, $R_{DS(ON)}$=6mΩ(typ.) @ V_{GS}=10V
  $R_{DS(ON)}$=10mΩ(typ.) @ V_{GS}=4.5V
- Super High Dense Cell Design for Extremely Low $R_{DS(ON)}$
- Reliable and Rugged
- SO-8 Package

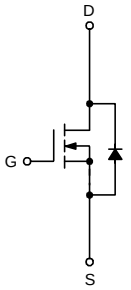
Pin Description



SO – 8

Applications

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



N-Channel MOSFET

Ordering and Marking Information

APM4420 □□-□□

- Handling Code
- Temp. Range
- Package Code

Package Code
K : SO-8
Operating Junction Temp. Range
C : -55 to 125°C
Handling Code
TU : Tube
TR : Tape & Reel

APM4420 K : APM4420 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	±20	
I_D	Maximum Drain Current – Continuous	12.5	A
I_{DM}	Maximum Drain Current – Pulsed	50	

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	°C
$R_{\theta jA}$	Thermal Resistance – Junction to Ambient		50	°C/W

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

Symbol	Parameter	Test Condition	APM4420			Unit
			Min.	Typ.	Max.	
Static						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	30			V
I_{DSS}	Zero Gate Voltage Drain	V_{DS}=24V , V_{GS}=0V			1	μA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	1		3	V
I_{GSS}	Gate Leakage Current	V_{GS}=±16V, V_{DS}=0V			±100	nA
$R_{DS(ON)}$ [a]	Drain-Source On-state Resistance	V_{GS}=10V, I_D=12.5A		6	9	mΩ
		V_{GS}=4.5V, I_D=7A		10	13	
V_{SD} [a]	Diode Forward Voltage	I_{SD}=2.3A, V_{GS}=0V	0.6		1.3	V
Dynamic[b]						
Q_g	Total Gate Charge	V_{DS}=15V, I_D=12.5A		28	36	nC
Q_{gs}	Gate-Source Charge	V_{GS}=5V,		8		
Q_{gd}	Gate-Drain Charge			5		
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=15V, I_D=1A, V_{GEN}=10V, R_G=6Ω, RL=15Ω		13	20	ns
T_r	Turn-on Rise Time			9	15	
$t_{d(OFF)}$	Turn-off Delay Time			43	66	
T_f	Turn-off Fall Time			14	28	
C_{iss}	Input Capacitance	V_{GS}=0V		3200		pF
C_{oss}	Output Capacitance	V_{DS}=15V		680		
C_{rss}	Reverse Transfer Capacitance	Frequency=1.0MHz		275		

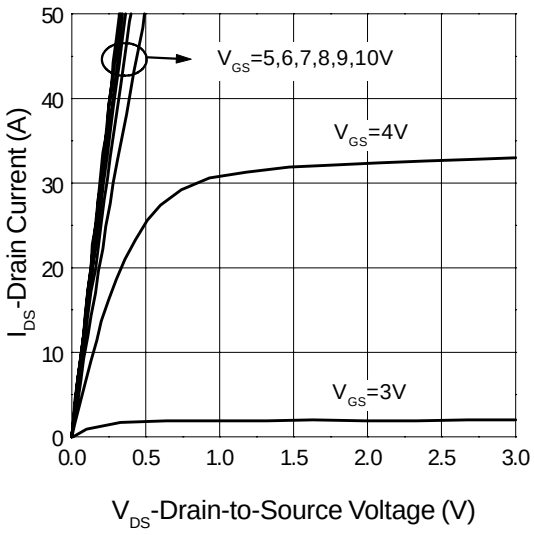
Notes

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

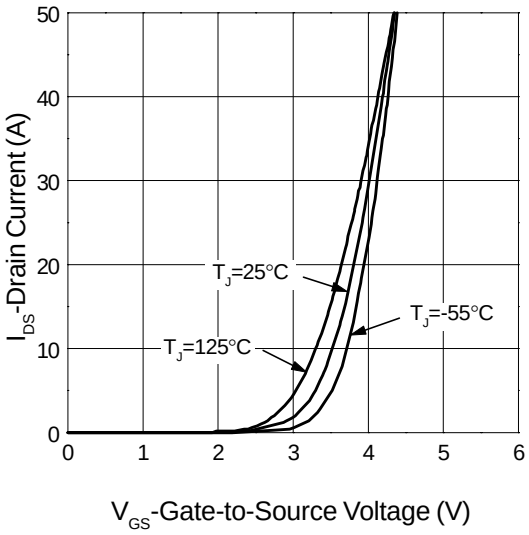
[b] : Pulse test ; pulse width ≤300μs, duty cycle ≤ 2%

Typical Characteristics

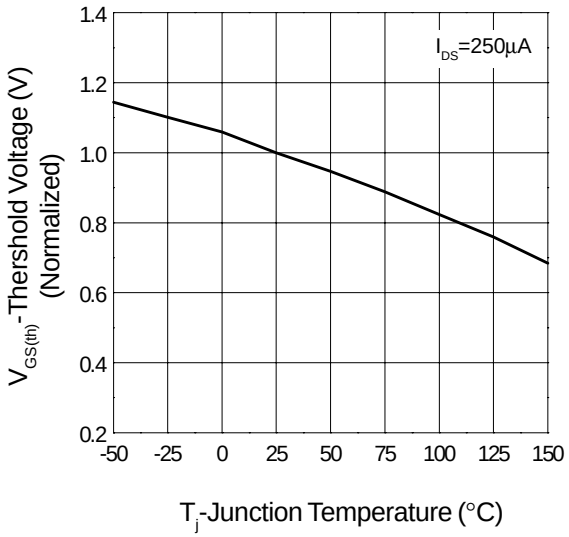
Output Characteristics



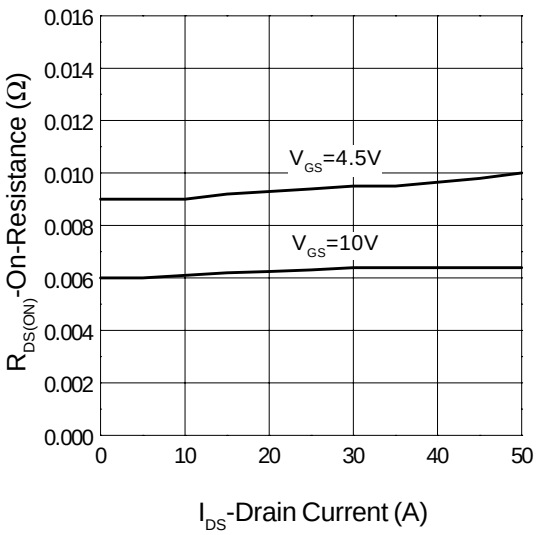
Transfer Characteristics



Threshold Voltage vs. Junction Temperature

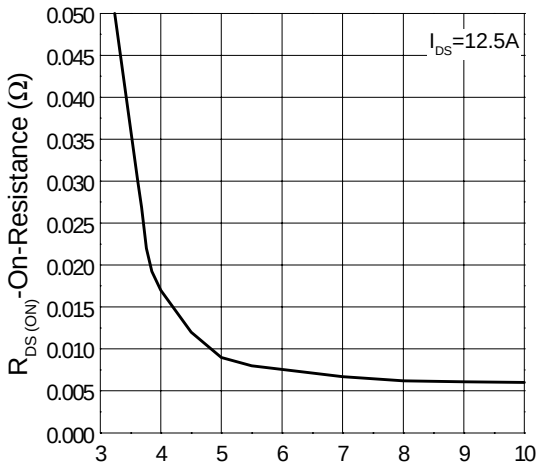


On-Resistance vs. Drain Current

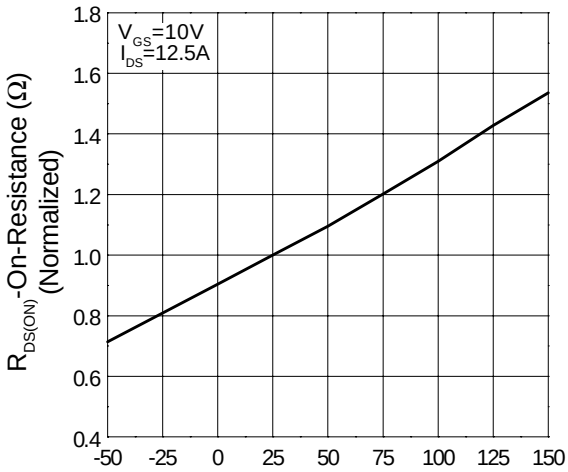


Typical Characteristics Cont.

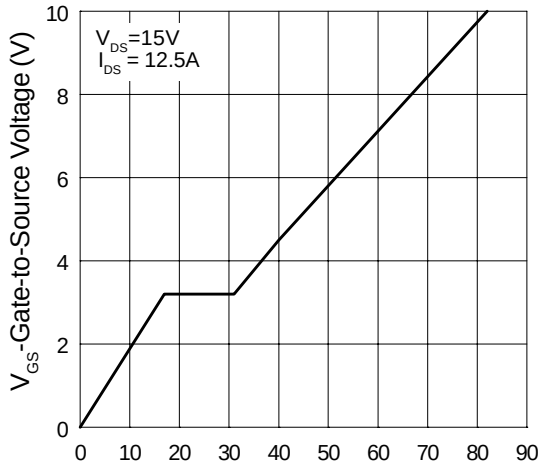
On-Resistance vs. Gate-to-Source Voltage



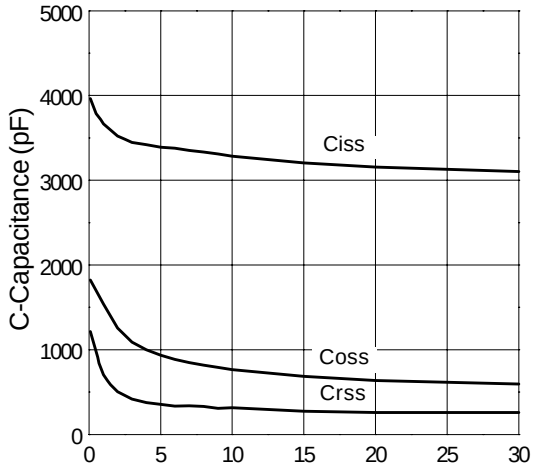
On-Resistaence vs. Junction Temperature



Gate Charge

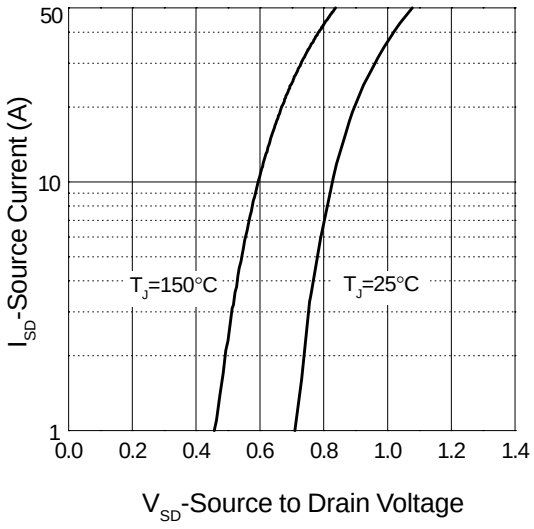


Capacitance Characteristics

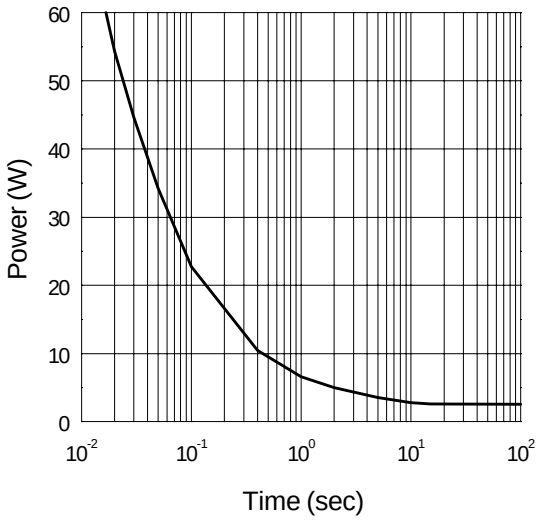


Typical Characteristics Cont.

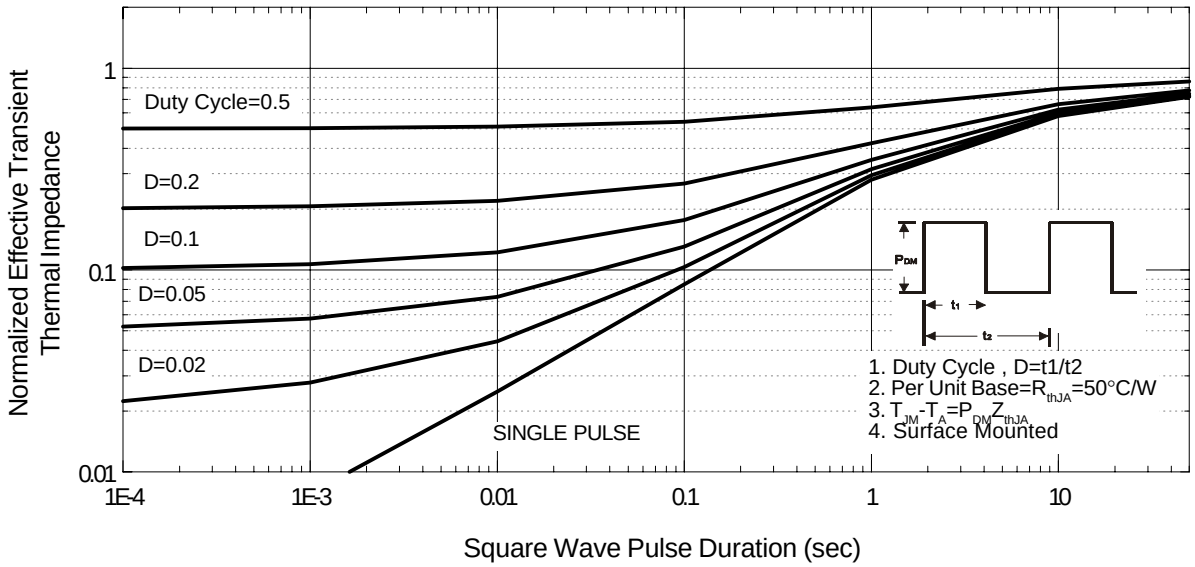
Source-Drain Diode Forward Voltage



Single Pulse Power

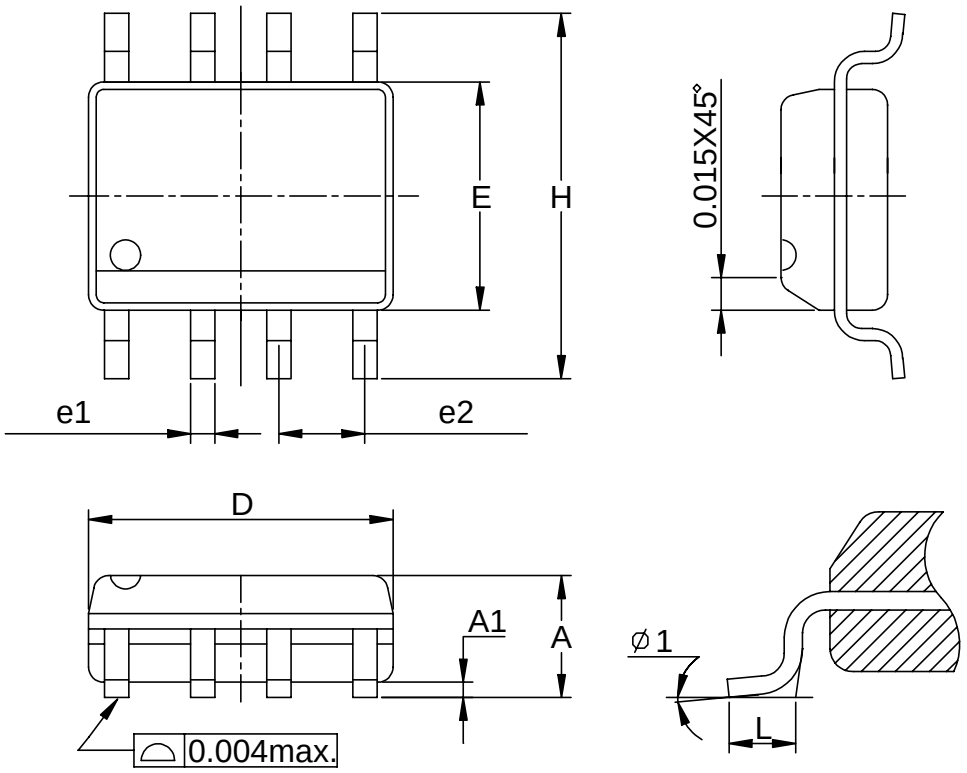


Normalized Transient Thermal Transient Impedence, Junction to Ambient



Packaging Information

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



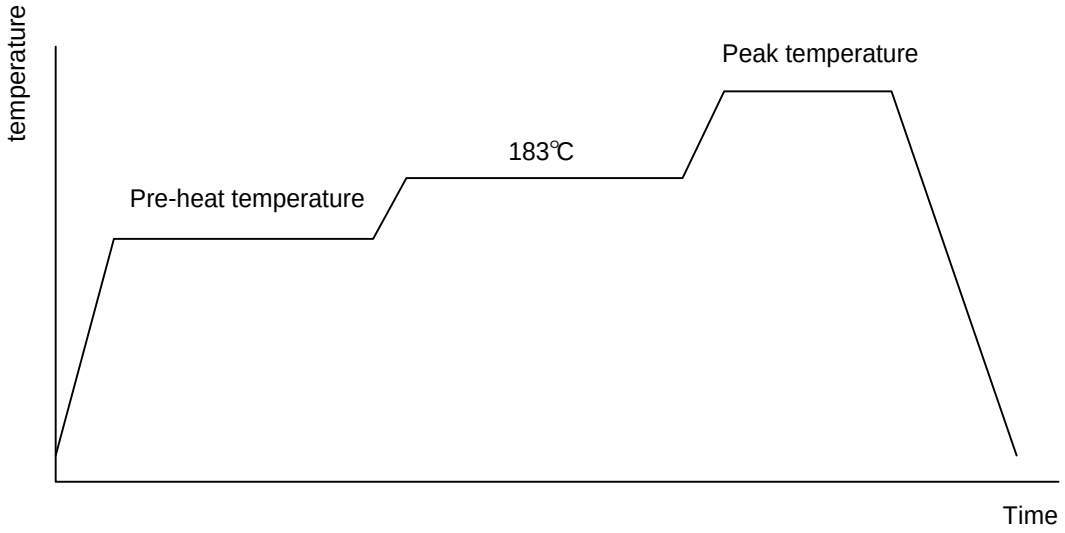
Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
D	4.80	5.00	0.189	0.197
E	3.80	4.00	0.150	0.157
H	5.80	6.20	0.228	0.244
L	0.40	1.27	0.016	0.050
e1	0.33	0.51	0.013	0.020
e2	1.27BSC		0.50BSC	
ϕ 1	8°		8°	

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.	

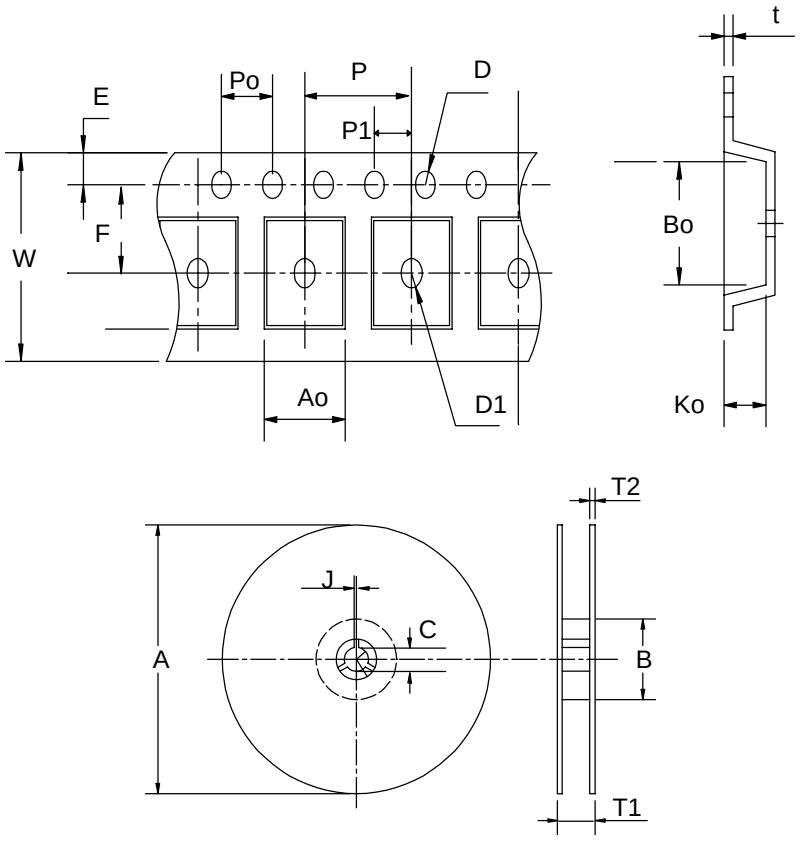
Package Reflow Conditions

pkg. thickness ≥ 2.5mm and all 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

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 + 0.1 5	2 + 0.5	12.4 +0.2	2± 0.2	12 + 0.3 - 0.1	8± 0.1	1.75± 0.1
Application	F	D	D1	Po	P1	Ao	Bo	Ko	t
SOP-8	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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