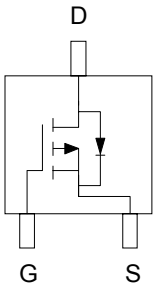
P-Channel Enhancement Mode MOSFET

Features

- -30V/-3A , $R_{DS(ON)}$=100mΩ(typ.) @ V_{GS}=-10V
  $R_{DS(ON)}$=140mΩ(typ.) @ V_{GS}=-4.5V
- Super High Dense Cell Design for Extremely Low $R_{DS(ON)}$
- Reliable and Rugged
- SOT-23 Package

Pin Description



Top View of SOT-23

Applications

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

Ordering and Marking Information

APM2307 □□-□□

- Handling Code
- Temp. Range
- Package Code

Package Code
A : SOT-23
Operation Junction Temp. Range
C : -55 to 150°C
Handling Code
TR : Tape & Reel

APM2307 A : M07X

X - 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	-3	A
I_{DM}	Maximum Drain Current – Pulsed	-12	

* 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.

Rev. A.3 - Jun., 2003

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

Symbol	Parameter		Rating	Unit
P_D	Maximum Power Dissipation	T_A=25°C	1.25	W
		T_A=100°C	0.5	
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	°C
$R_{\theta jA}$	Thermal Resistance – Junction to Ambient		100	°C/W

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

Symbol	Parameter	Test Condition	APM2307			Unit
			Min.	Typ.	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		-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	120	mΩ
		V_{GS}=-4.5V , I_{DS}=-2.5A		140	170	
V_{SD}[a]	Diode Forward Voltage	I_{SD}=-1.25A , V_{GS}=0V	0.6		1.3	V
Dynamic[b]						
Q_g	Total Gate Charge	V_{DS}=-15V , I_{DS}=-3A		8	13	nC
Q_{gs}	Gate-Source Charge	V_{GS}=-10V		1.9		
Q_{gd}	Gate-Drain Charge			1.1		
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=-15V , I_{DS}=-1A , V_{GEN}=-10V , R_G=6Ω R_L=15Ω		10	20	ns
T_r	Turn-on Rise Time			8	20	
$t_{d(OFF)}$	Turn-off Delay Time			25	50	
T_f	Turn-off Fall Time			5	15	
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			75		

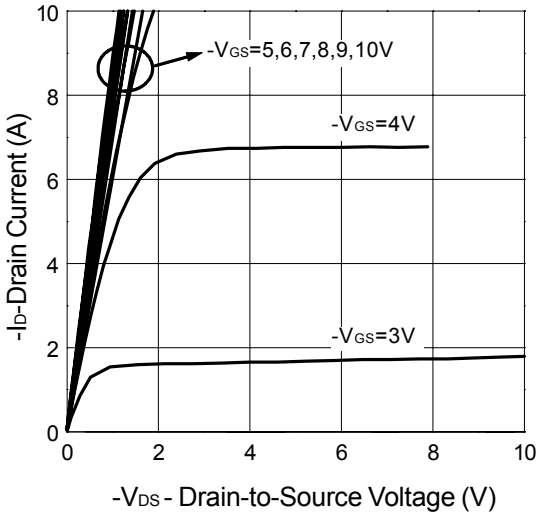
Notes

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

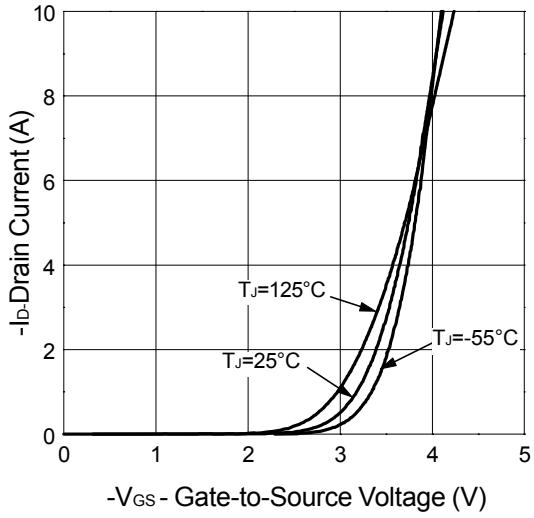
[b] : Guaranteed by design, not subject to production testing

Typical Characteristics

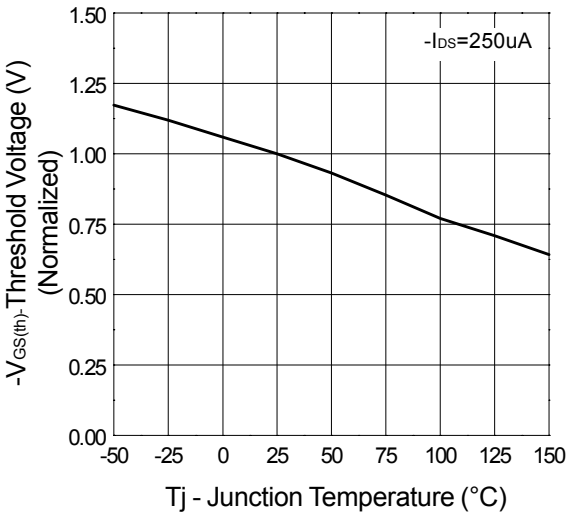
Output Characteristics



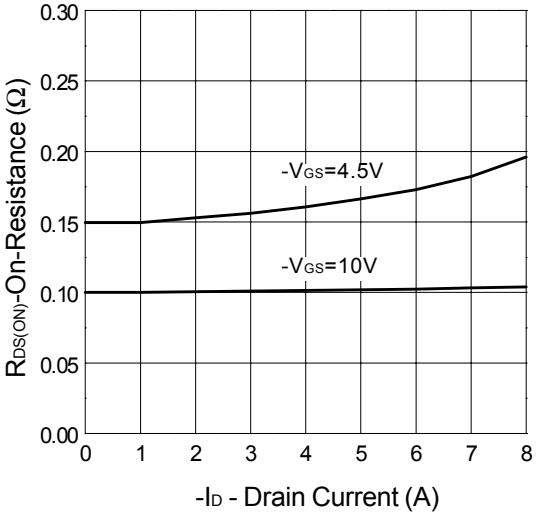
Transfer Characteristics



Threshold Voltage vs. Junction Temperature

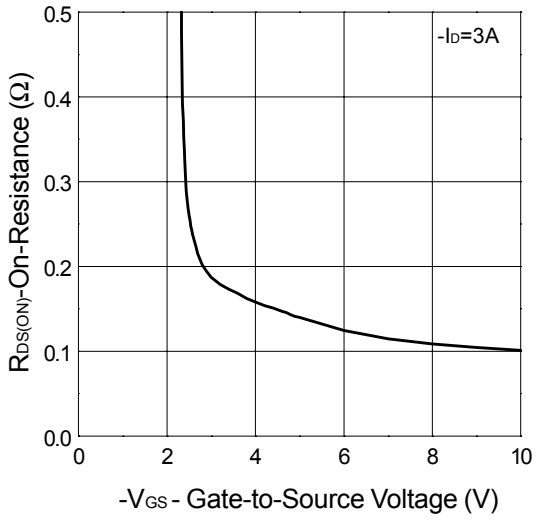


On-Resistance vs. Drain Current

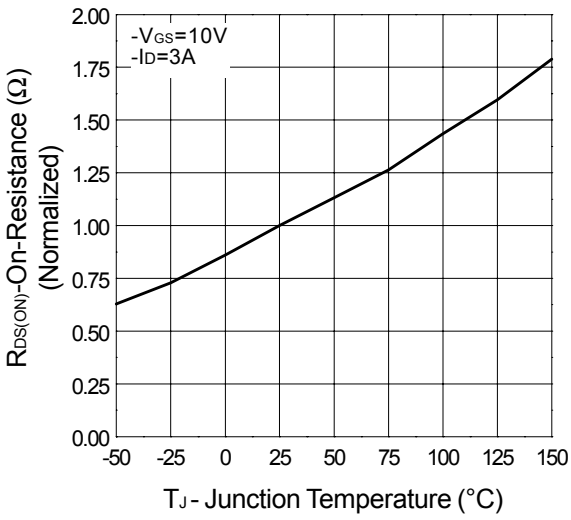


Typical Characteristics

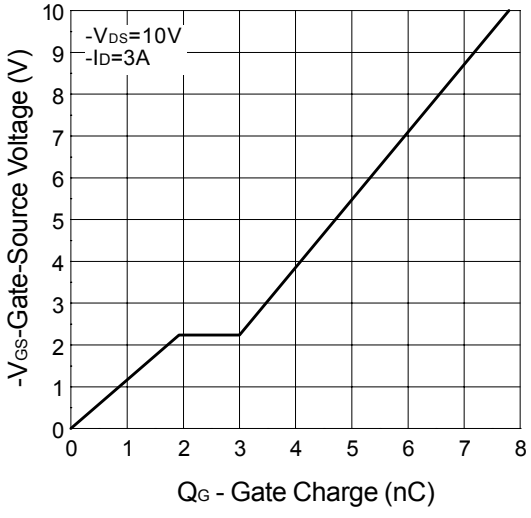
On-Resistance vs. Gate-to-Source Voltage



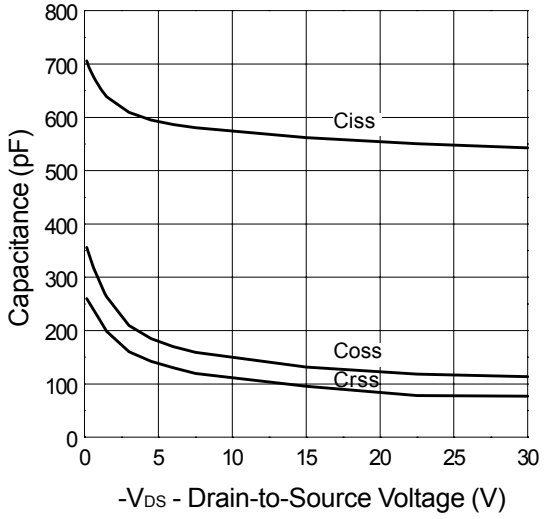
On-Resistance vs. Junction Temperature



Gate Charge

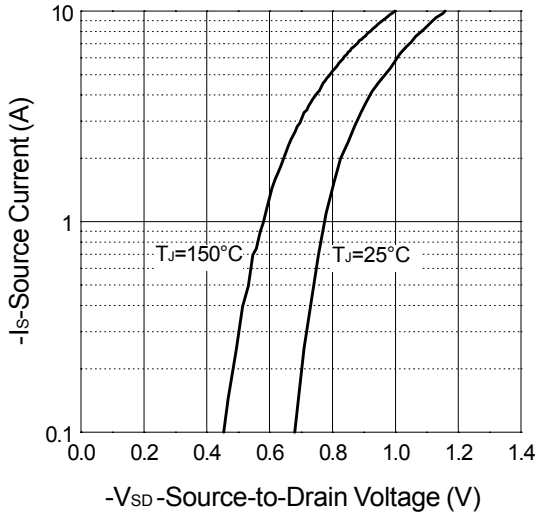


Capacitance

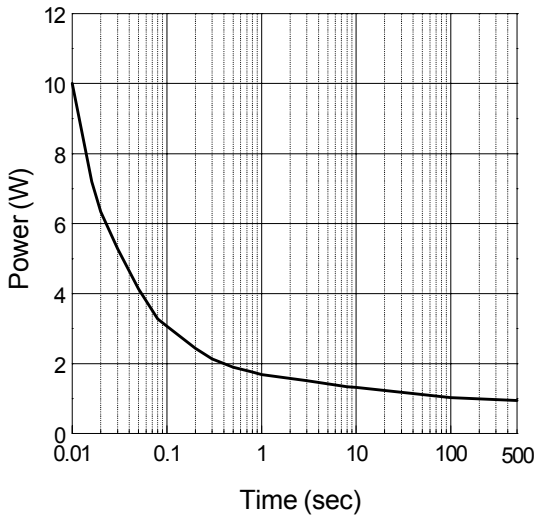


Typical Characteristics

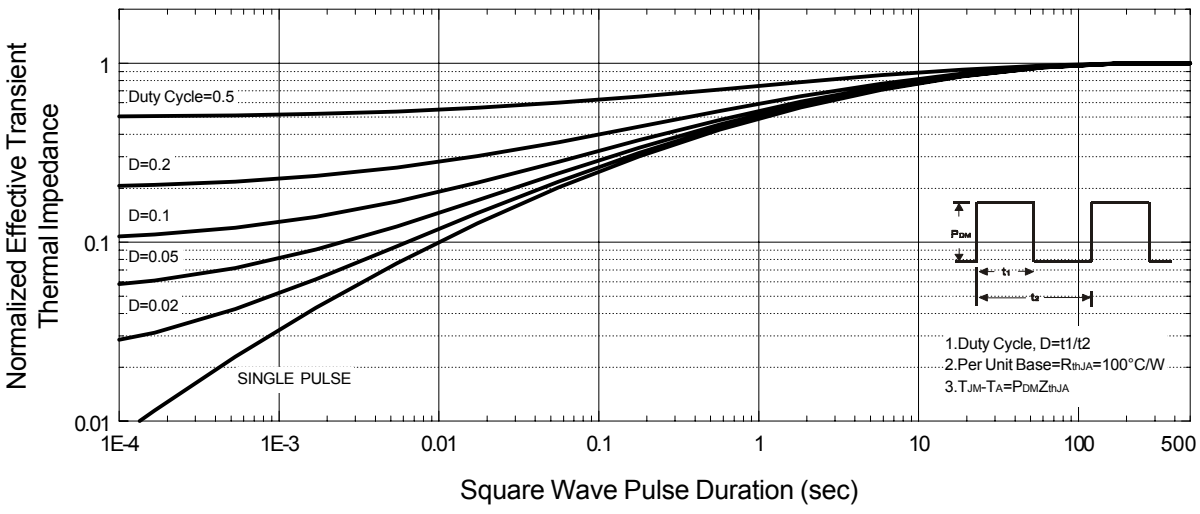
Source-Drain Diode Forward Voltage



Single Pulse Power

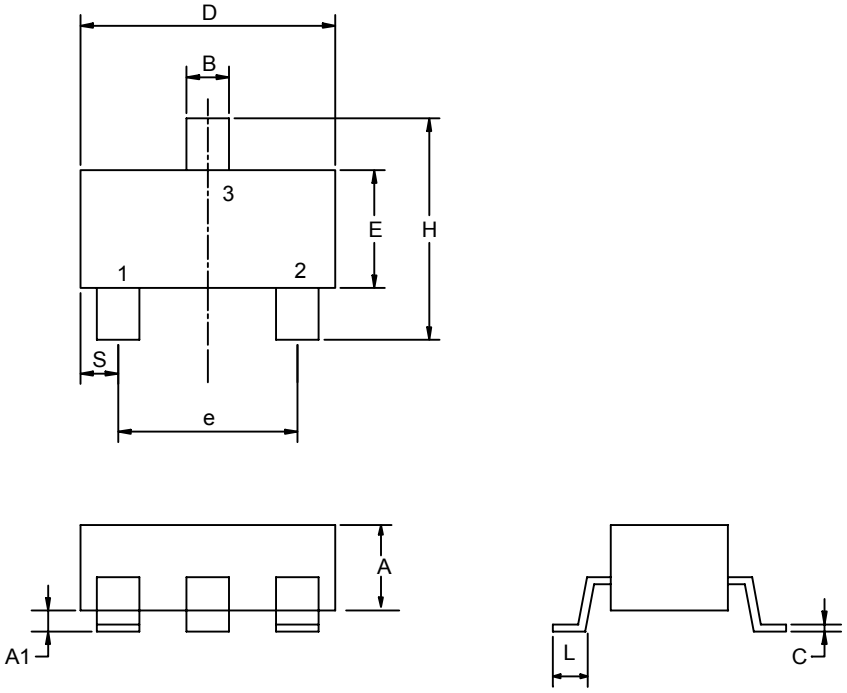


Normalized Thermal Transient Impedence, Junction to Ambient



Packaging Information

SOT-23



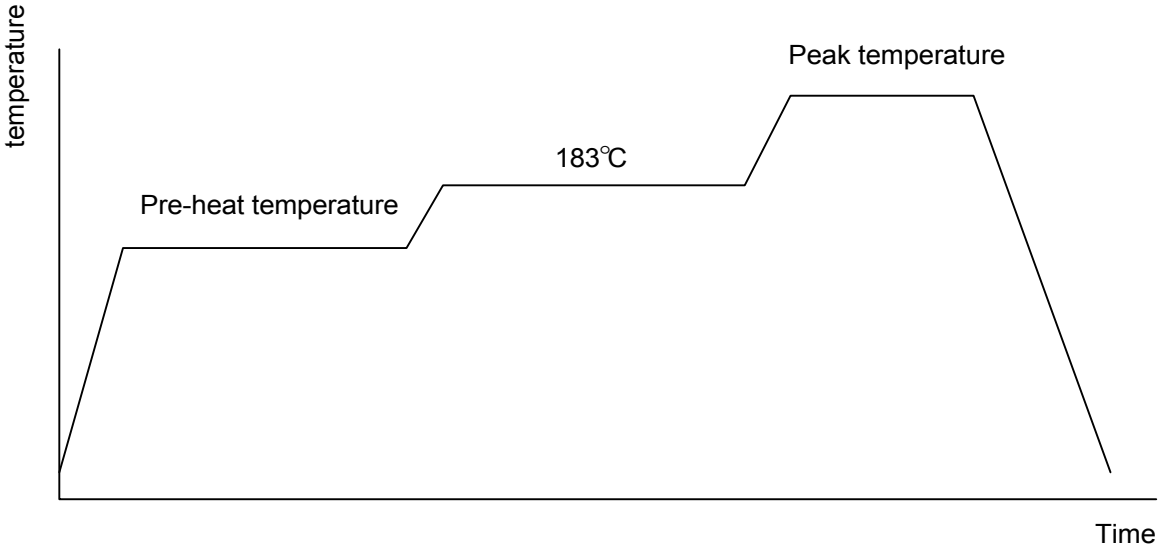
Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.00	1.30	0.039	0.051
A1	0.00	0.10	0.000	0.004
B	0.35	0.51	0.014	0.020
C	0.10	0.25	0.004	0.010
D	2.70	3.10	0.106	0.122
E	1.40	1.80	0.055	0.071
e	1.90 BSC		0.075 BSC	
H	2.40	3.00	0.094	0.118
L	0.37		0.0015	

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.	

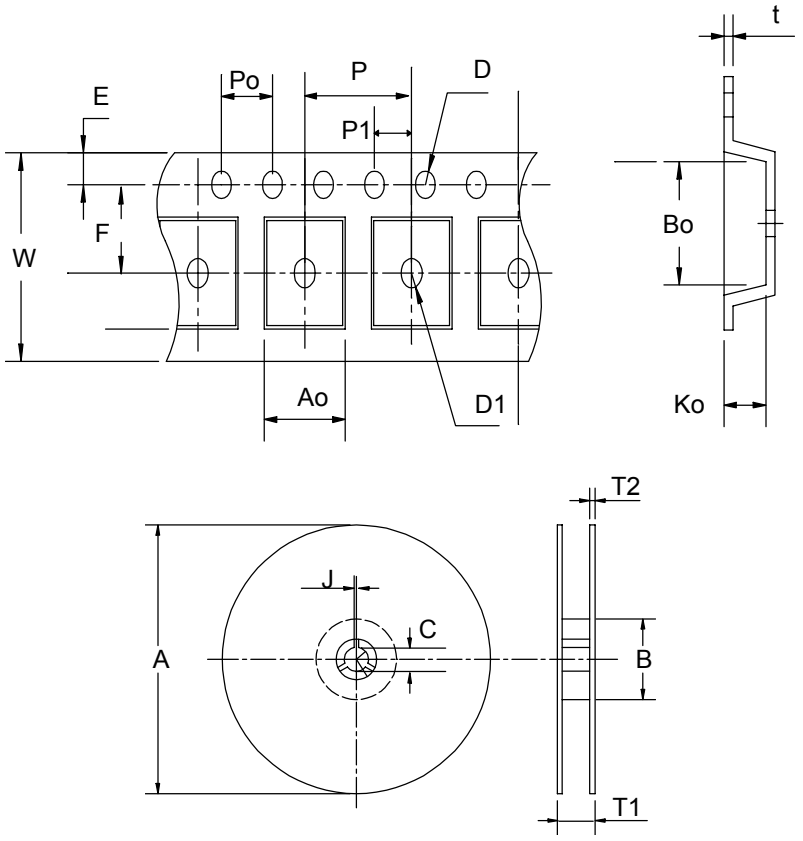
Package Reflow Conditions

pkg. thickness ≥ 2.5mm and all bags	**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
SOT-23	178±1	72 ± 1.0	13.0 + 0.2	2.5 ± 0.15	8.4 ± 2	1.5± 0.3	8.0+ 0.3 - 0.3	4 ± 0.1	1.75± 0.1
	F	D	D1	Po	P1	Ao	Bo	Ko	t
	3.5 ± 0.05	1.5 +0.1	1.5 +0.1	4.0 ± 0.1	2.0 ± 0.1	3.15 ± 0.1	3.2± 0.1	1.4± 0.1	0.2±0.03

Cover Tape Dimensions

Application	Carrier Width	Cover Tape Width	Devices Per Reel
SOT- 23	8	5.3	3000

Customer Service

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