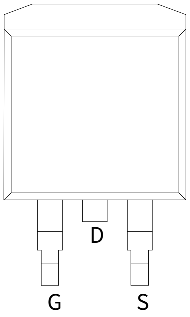
APM3055NG

N-Channel Enhancement Mode MOSFET

Features

- 30V/12A,
  $R_{DS(ON)}$=75mΩ (typ.) @ V_{GS}=10V
  $R_{DS(ON)}$=100mΩ (typ.) @ V_{GS}=4.5V
- Super High Dense Cell Design
- Reliable and Rugged
- Lead Free Available (RoHS Compliant)

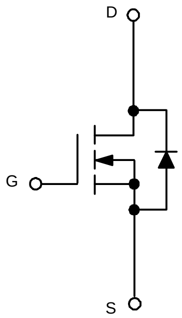
Pin Description



Top View of TO-263

Applications

- Power Management in Desktop Computer or DC/DC Converters



N-Channel MOSFET

Ordering and Marking Information

APM3055N □□-□□ □ Lead Free Code Handling Code Temp. Range Package Code	Package Code G : TO-263 Operating Junction Temp. Range C : -55 to 150° C Handling Code TU : Tube TR : Tape & Reel Lead Free Code L : Lead Free Device
APM3055N G: APM3055N XXXXX	XXXXX - Date Code

Note: ANPEC lead-free products contain molding compounds and 100% matte tin plate termination finish; which are fully compliant with RoHS and compatible with both SnPb and lead-free soldiering 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.

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T_A=25°C Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		30	V
V_{GSS}	Gate-Source Voltage		±20	
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	
I_S	Diode Continuous Forward Current	T_C=25°C	8	A
Mounted on Large Heat Sink				
I_{DP}	300µs Pulse Drain Current Tested	T_C=25°C	48	A
		T_C=100°C	48	
I_D	Continuous Drain Current	T_C=25°C	12*	
		T_C=100°C	12	
P_D	Maximum Power Dissipation	T_C=25°C	62.5	W
		T_C=100°C	25	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		2	°C/W
Mounted on PCB of 1in^2 pad area				
I_{DP}	300µs Pulse Drain Current Tested	T_A=25°C	16	A
		T_A=100°C	10	
I_D	Continuous Drain Current	T_A=25°C	4.3	
		T_A=100°C	3.1	
P_D	Maximum Power Dissipation	T_A=25°C	2.8	W
		T_A=100°C	1.1	
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		45	°C/W
Mounted on PCB of Minimum Footprint				
I_{DP}	300µs Pulse Drain Current Tested	T_A=25°C	14	A
		T_A=100°C	8	
I_D	Continuous Drain Current	T_A=25°C	3.5	
		T_A=100°C	2	
P_D	Maximum Power Dissipation	T_A=25°C	2	W
		T_A=100°C	0.8	
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		62.5	°C/W

Notes:

* Current limited by bond wire.

Electrical Characteristics (T$_A$ = 25°C unless otherwise noted)

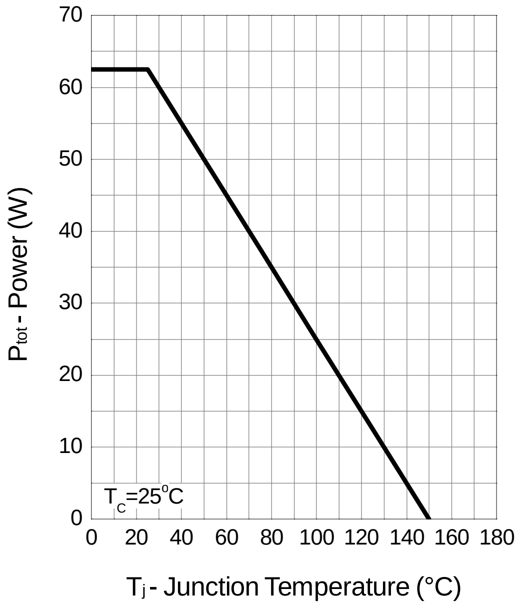
Symbol	Parameter	Test Condition	APM3055NG			Unit
			Min.	**Typ.**	**Max.**	
Static						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250µA	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=24V, V_{GS}=0V			1	µA
		T_J=85°C			30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250µA	1	1.5	2	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}=12A		75	100	mΩ
		V_{GS}=4.5V, I_{DS}=6A		100	200	
Diode						
V_{SD} [a]	Diode Forward Voltage	I_{SD}=3A, V_{GS}=0V		0.8	1.3	V
t_{rr}	Reverse Recovery Time	I_{DS}=12A, dI_{SD}/dt=100A/µs		20		ns
Q_{rr}	Reverse Recovery Charge			11		nC
Dynamic [b]						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz		2.2		Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, Frequency=1.0MHz		390		pF
C_{oss}	Output Capacitance			65		
C_{rss}	Reverse Transfer Capacitance			35		
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=15V, R_L=15Ω, I_{DS}=1A, V_{GEN}=10V, R_G=6Ω		3	6	ns
T_r	Turn-on Rise Time			10	19	
$t_{d(OFF)}$	Turn-off Delay Time			15	28	
T_f	Turn-off Fall Time			2	5	
Gate Charge [b]						
Q_g	Total Gate Charge	V_{DS}=15V, V_{GS}=10V, I_{DS}=12A		7.7	11	nC
Q_{gs}	Gate-Source Charge			1.7		
Q_{gd}	Gate-Drain Charge			1.1		

Notes:

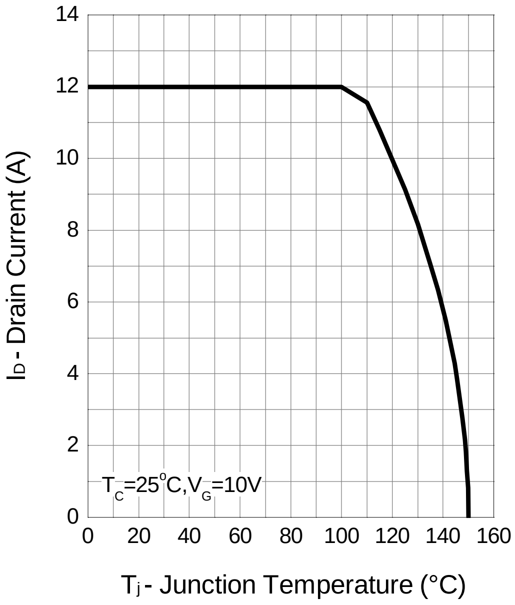
a : Pulse test ; pulse width≤300µs, duty cycle≤2%.
b : Guaranteed by design, not subject to production testing.

Typical Characteristics

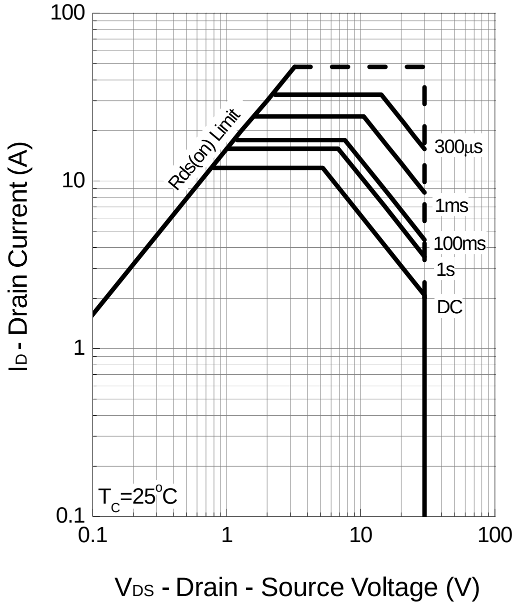
Power Dissipation



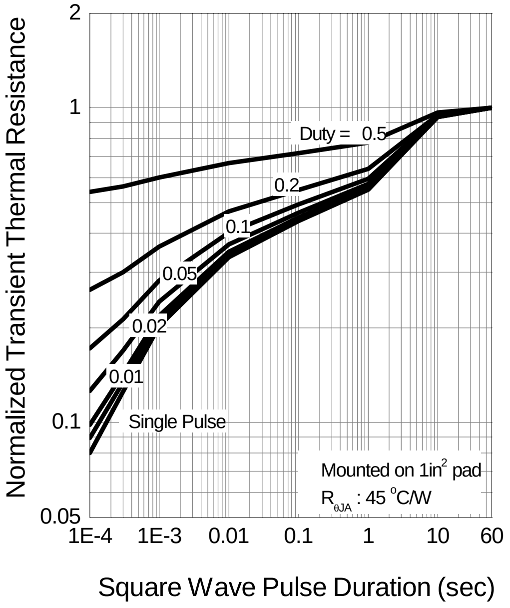
Drain Current



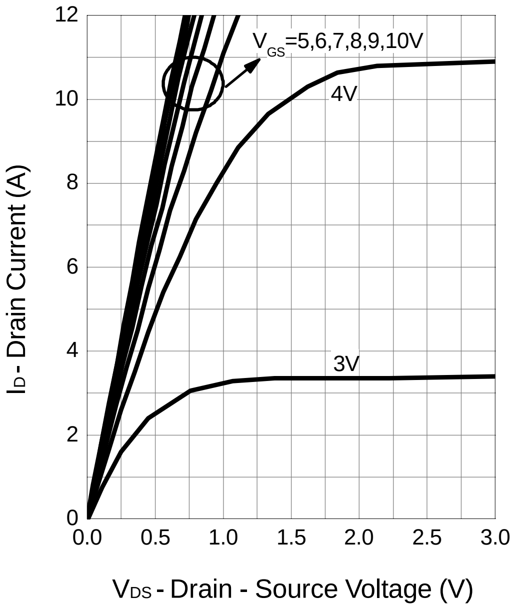
Safe Operation Area



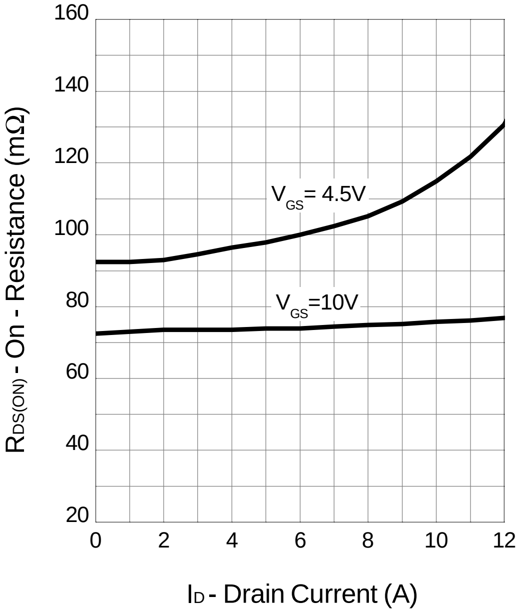
Thermal Transient Impedance



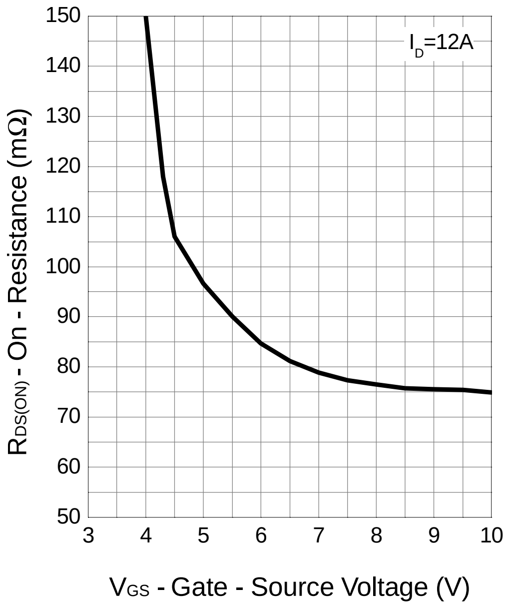
Typical Characteristics (Cont.)



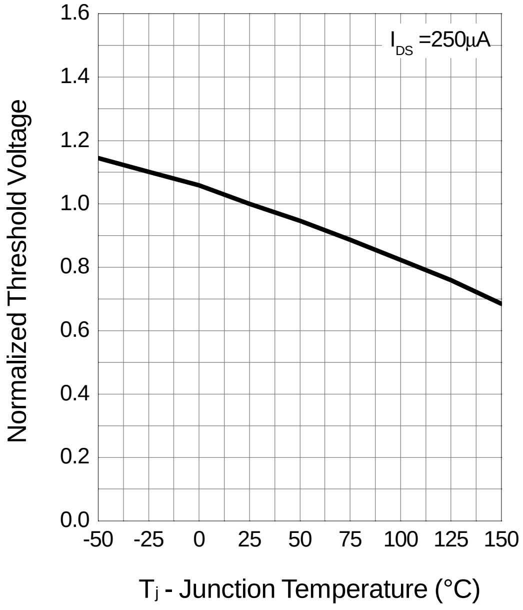
Output Characteristics



Drain-Source On Resistance

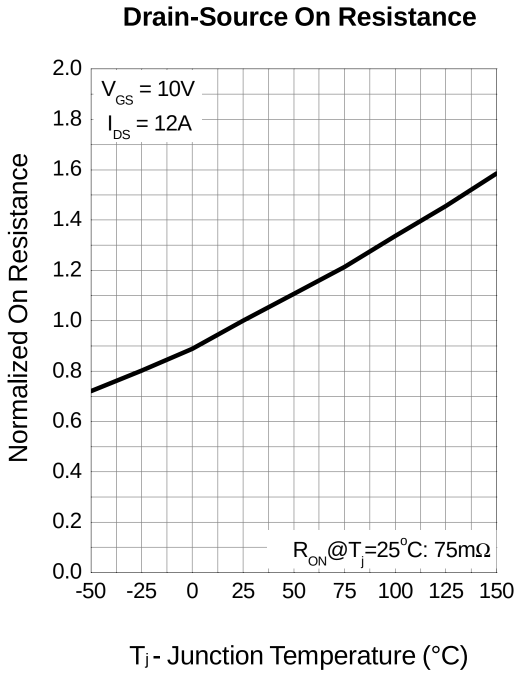


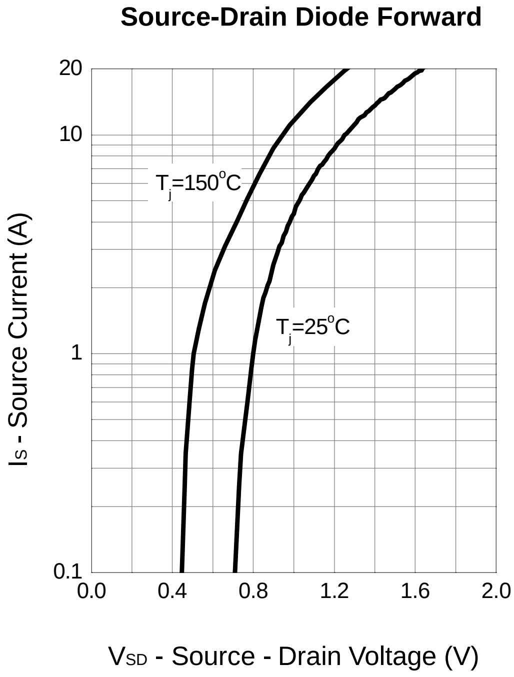
Drain-Source On Resistance

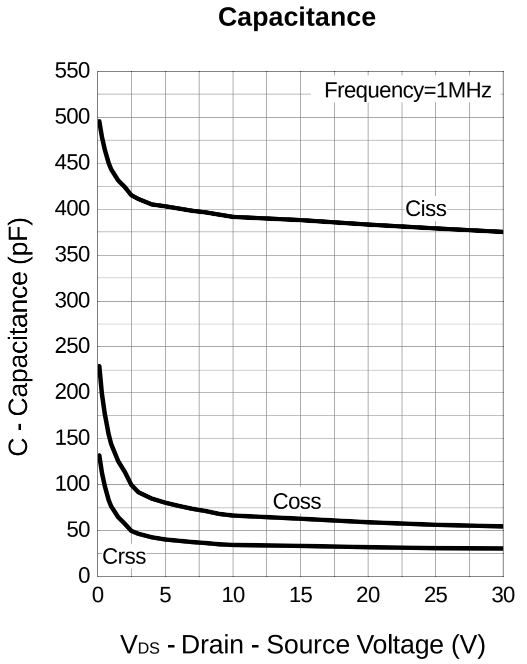


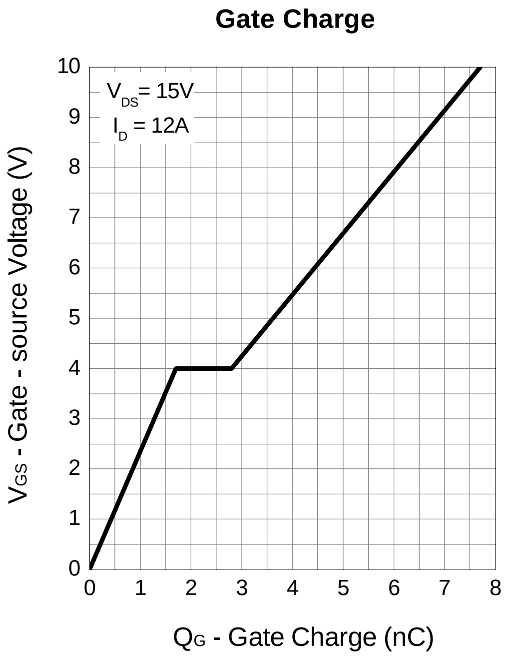
Gate Threshold Voltage

Typical Characteristics (Cont.)



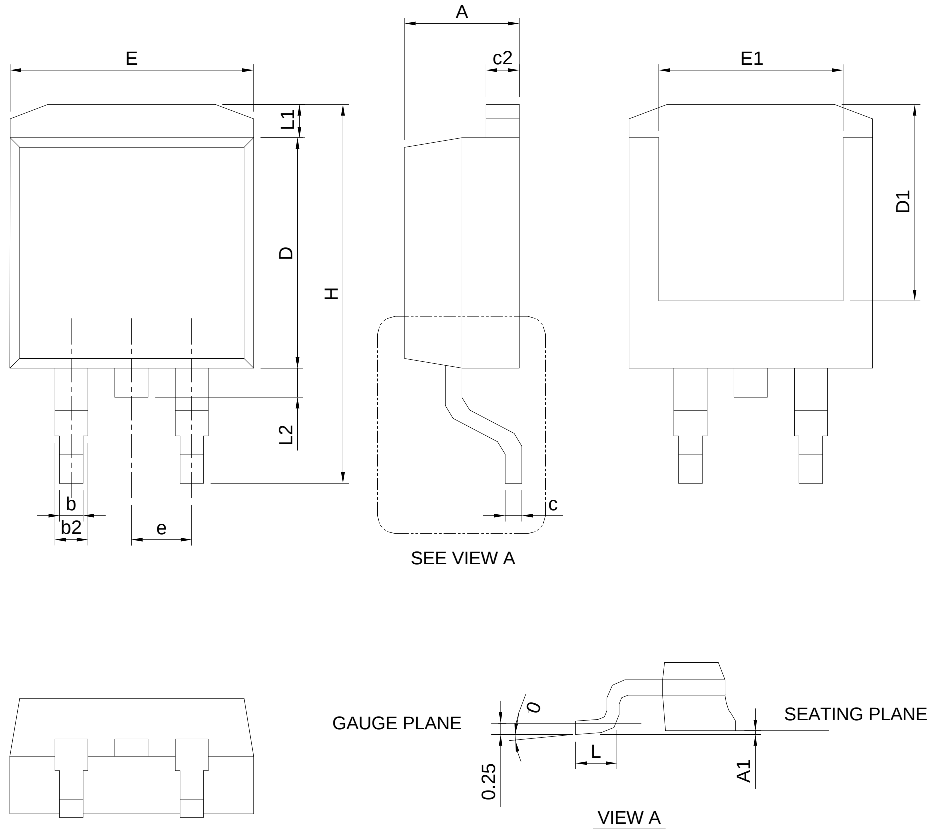






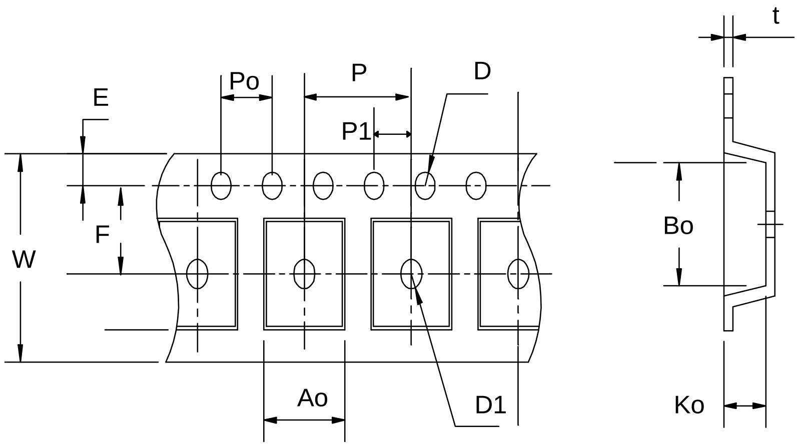
Packaging Information

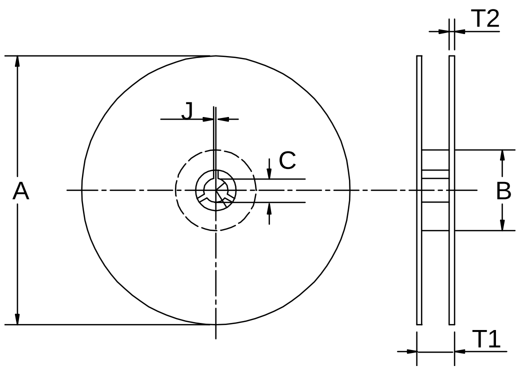
TO-263 (Reference JEDEC Registration TO-263)



Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.06	4.83	0.160	0.190
A1	0.00	0.25	0.000	0.010
b	0.51	0.99	0.020	0.039
b2	1.14	1.78	0.045	0.070
c	0.38	0.74	0.015	0.029
c2	1.14	1.65	0.045	0.065
D	8.38	9.65	0.330	0.380
D1	6.86	-	0.270	-
E	9.65	11.43	0.380	0.450
E1	6.22	-	0.245	-
e	2.54 BSC		0.100 BSC	
L	1.78	2.79	0.070	0.110
L1	-	1.68	-	0.066
L2	-	1.78	-	0.070
θ	0°	8°	0°	8°

Carrier Tape & Reel Dimensions





Application	A	B	C	J	T1	T2	W	P	E
TO-263	380±3	80 ± 2	13 ± 0. 5	2 ± 0.5	24 ± 4	2± 0.3	24 + 0.3 - 0.1	16 ± 0.1	1.75± 0.1
	F	D	D1	Po	P1	Ao	Bo	Ko	t
	11.5 ± 0.1	1.5 +0.1	1.5± 0.25	4.0 ± 0.1	2.0 ± 0.1	10.8 ± 0.1	16.1± 0.1	5.2± 0.1	0.35±0.013

(mm)

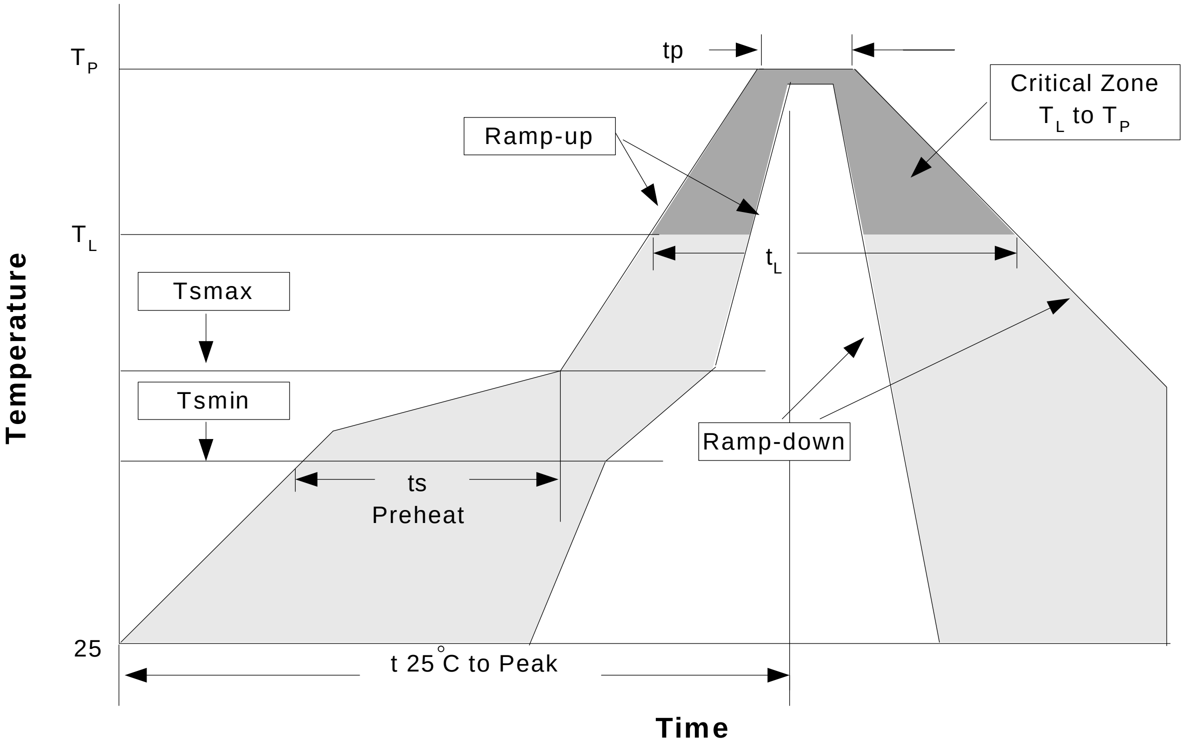
Cover Tape Dimensions

Application	Carrier Width	Cover Tape Width	Devices Per Reel
TO- 263	24	21.3	800

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)



Classificatin 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 - Temperature Min (Tsmin) - Temperature Max (Tsmax) - Time (min to max) (ts)	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: - Temperature (T$_L$) - Time (t$_L$)	183°C 60-150 seconds	217°C 60-150 seconds
Peak/Classificatioon Temperature (Tp)	See table 1	See table 2
Time within 5°C of actual Peak Temperature (tp)	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.

Classificatin Reflow Profiles(Cont.)

Table 1. SnPb Entectic Process – Package Peak Reflow Temperatures

Package Thickness	Volume mm^3 <350	Volume mm^3 ^{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

Customer Service

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