

General Description

The ETM3001 is a GaAs MMIC SPDT switch in a SOT - 363 6 lead plastic package. The TM3001 features low insertion loss and positive voltage operation with low DC power consumption. Typical applications are for the variety of analog and digital wireless communication systems.

Features

- Insertion Loss: 0.4dB @ 2.5GHz
- P –1dB: +30dBm Typical @ +3V
- IIP3: 55dBm @ Input Power up to 20dBm
- Good Reliability Performance
- SOT-363 6 Lead Plastic Package
- T/R Switches in 802.11b, g WLAN Systems

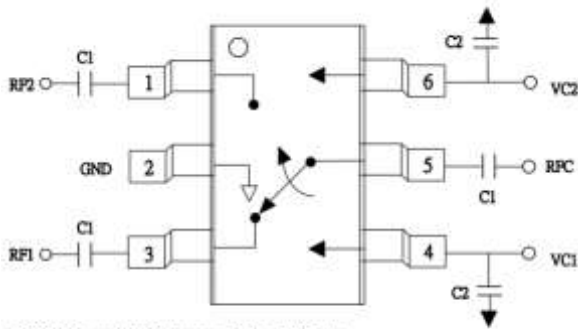
Applications

- WLAN
- Mobile Phone
- Bluetooth
- DECT
- PHS
- GPS
-

Ordering Information

ETM3001 □ GR
|
BG = SOT363

Functional Block Diagram



DC blocking capacitors C1 are required on all RF ports.
C1=56pF, C2=1000pF for operation >500MHz

Absolute Maximum Ratings

Parameter	Value	Unit
Switch Control VC1, VC2	-6.0 to +6.0 <small>Note</small>	V
RF input Power (>500MHz)	33	dBm
Operating Temperature	-40 to +85	°C
Storage Temperature	-65 to +150	°C

Note | VC1-VC2 | ≤ 6.0V

Notes:

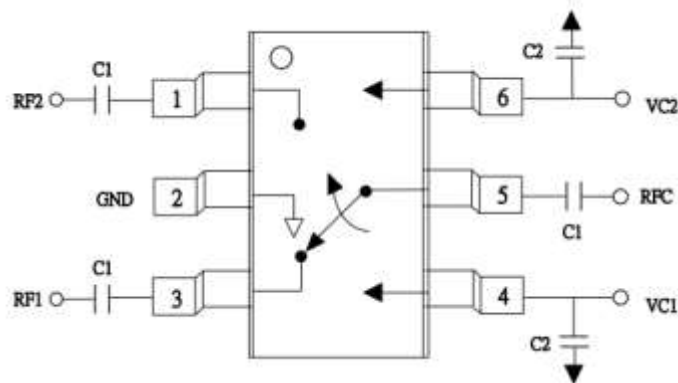
1. Operation of this device in excess of any maximum rating as specified above may cause permanent damage to the device.
2. Caution ! ESD Sensitive Device.

Electrical Specifications at 25°C with 0, +3V Control Voltages

Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Insertion Loss	Input Power +25dBm				
	DC-1.0GHz	-	0.3	0.4	dB
	1.0 -2.0GHz		0.4	0.5	dB
Isolation	Input Power +25dBm				
	DC-1.0GHz	24	26	-	dB
	1.0 -2.0GHz	22	24	-	dB
VSWR	DC-1.0GHz	-	1.2	1.4	-
	1.0 -2.0GHz		1.2	1.4	
	2.0 -3.0GHz		1.5	1.6	
Input Power for 1 dB compression	2.5GHz	-	30	-	dBm
Second Harmonics	f=2.5GHz, P _{in} =25dBm	-	-75	-	dBc
Third Harmonics	f=2.5GHz, P _{in} =25dBm	-	-80	-	dBc
Intermodulation Intercept Point (IIP3)	For two tones (f=2.5GHz, 2.501GHz) @ Input power +20dBm	-	55	-	dBm
Switch Time		-	50	-	ns
Control Current	Input Power +25dBm	-	4	100	µA

Notes: All measurements made in 50Ω system, unless otherwise specified.
DC=500MHz

Pin Connections and Internal Block



DC blocking capacitors C1 are required on all RF ports.
 C1=56pF , C2=1000pF for operation >500MHz

Pin Assignment

Pin No.	Pin Name
1	RF2
2	GND
3	RF1
4	VC1
5	RFC
6	VC2

SW Truth Table

VC1	VC2	RFC-RF1	RFC-RF2
High	Low	Isolation	Insertion Loss
Low	High	Insertion Loss	Isolation

High: 3V to 5V, Low: -0.2V to 0.2V

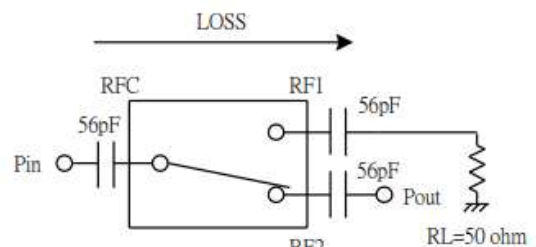
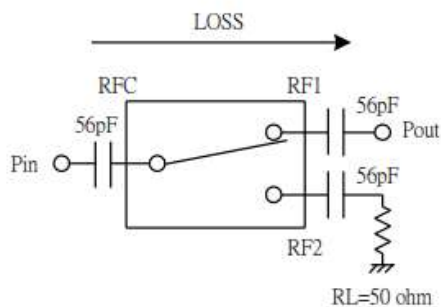
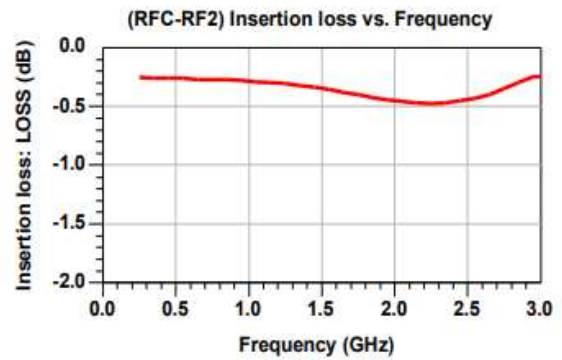
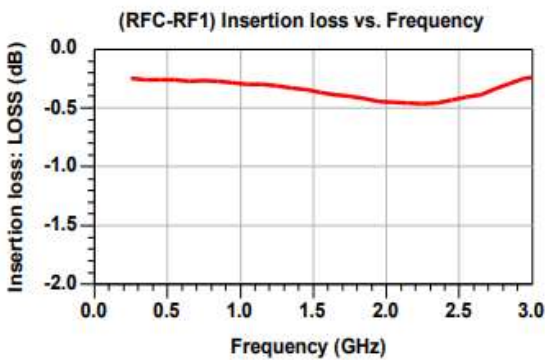
Reliability Testing Items and Specification

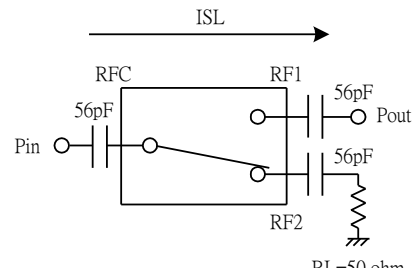
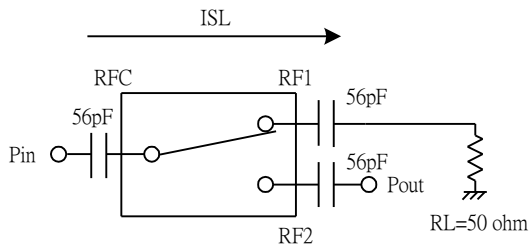
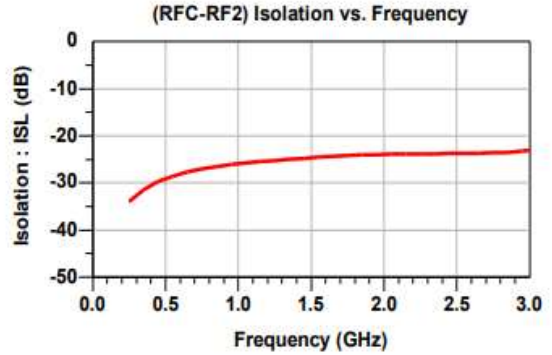
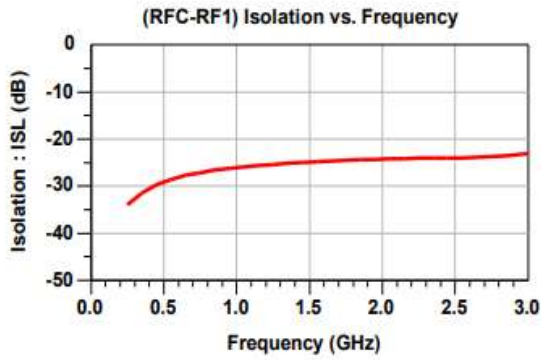
No.	Testing Items
1	Temperature Cycling Testing + IR Reflow
2	Pressure Cooker Testing + IR Reflow
3	Thermal Humidity Testing
4	Working Life
5	Electro-Static Discharge
6	Over Voltage
7	Over Power

All sample passed reliability testing

Typical Characteristics

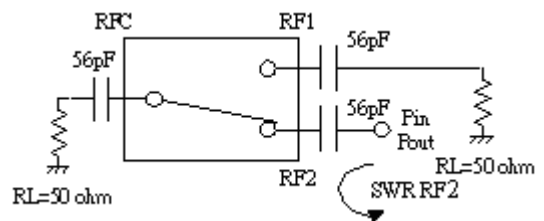
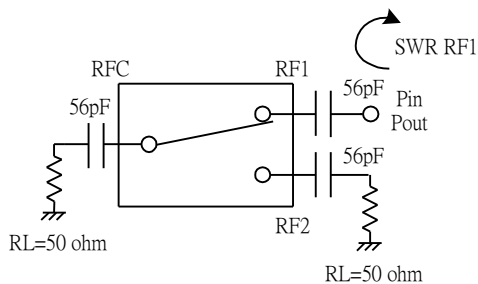
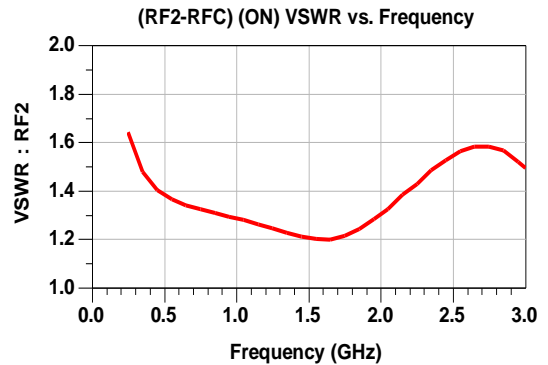
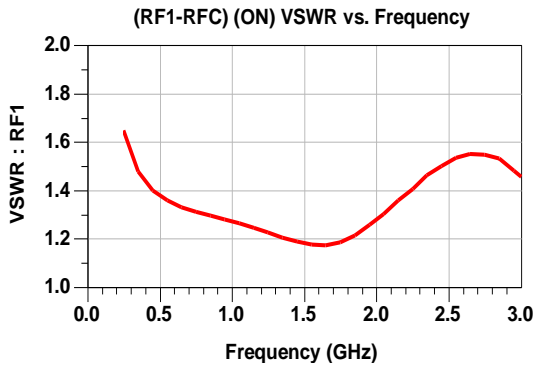
($V_{cc}=0V/3.0V$, $P_{in}=0dBm$)

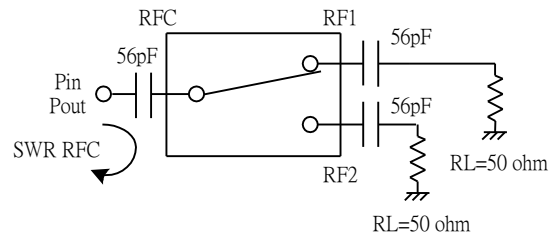
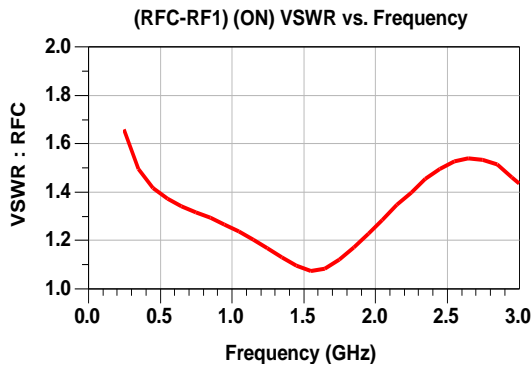




Typical Characteristics (continued)

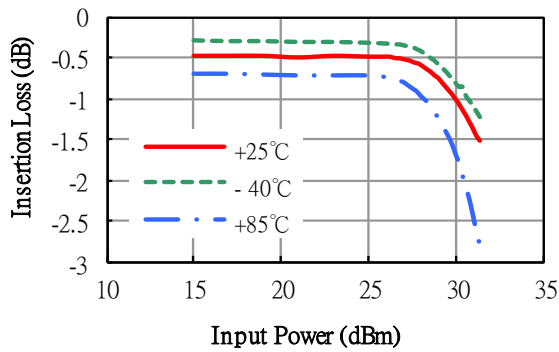
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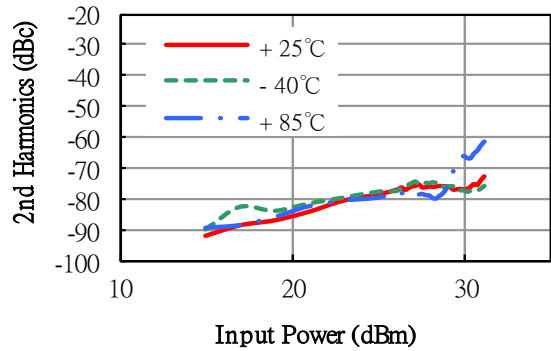


Typical Characteristics (continued)

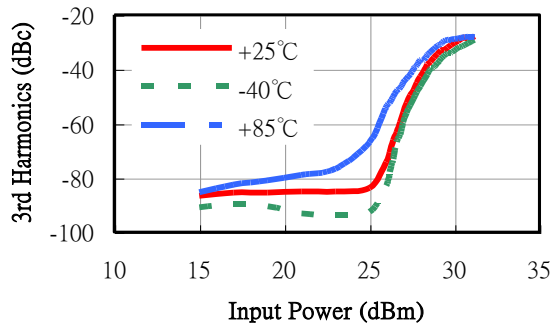
Insertion Loss vs. Input Power
($V_{cc}=0V/3.0V$, $2.5GHz@-40^{\circ}C,+25^{\circ}C,+80^{\circ}C$)



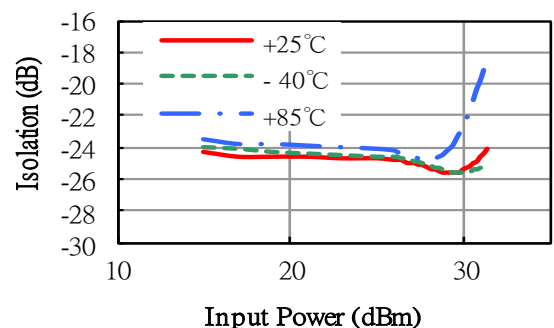
2nd Harmonics vs. Ambient Temperature
($V_{cc}=0V/3.0V$, $2.5GHz@-40^{\circ}C,+25^{\circ}C,+80^{\circ}C$)



3rd Harmonics vs. Ambient Temperature
($V_{cc}=0V/3.0V$, $2.5GHz@-40^{\circ}C,+25^{\circ}C,+80^{\circ}C$)

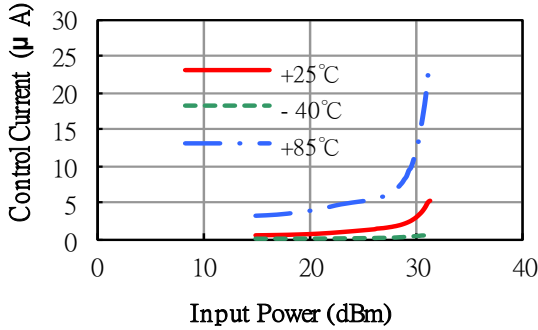


Isolation vs. Input Power
($V_{cc}=0V/3.0V$, $2.5GHz@-40^{\circ}C,+25^{\circ}C,+80^{\circ}C$)

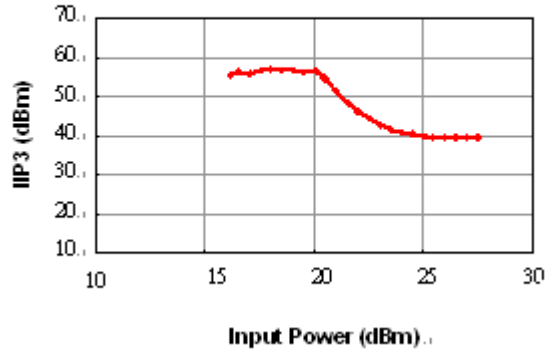


Typical Characteristics (continued)

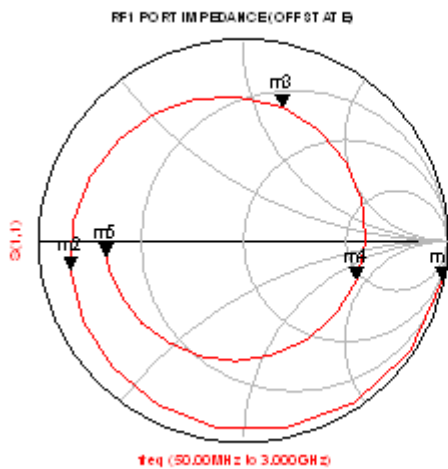
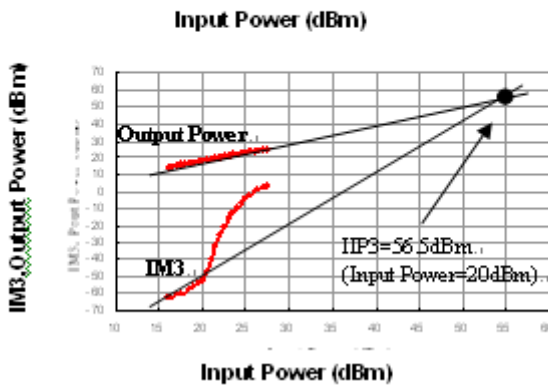
Control Current vs. Input Power
($V_{cc}=0V/3.0V$, 2.5GHz@-40°C,+25°C,+80°C)



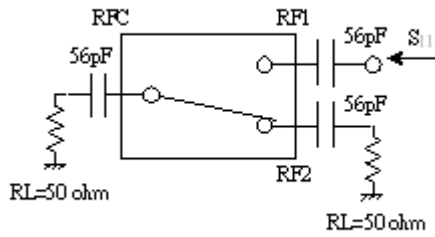
IP3 vs. Input Power
($V_{cc}=0V/3.0V$, 2.5 GHz)



Output Power,IM3 vs. Input Power
($V_{cc}=0V/3.0V$, 2.5 GHz@ Input Power 20dBm)

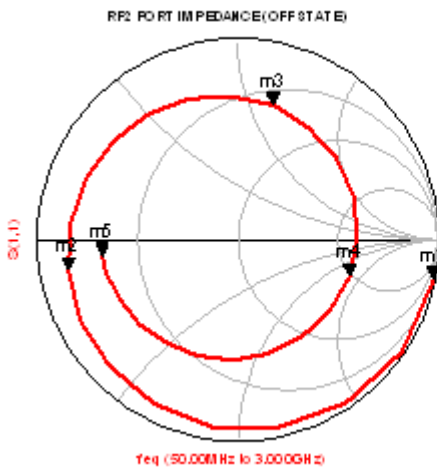


m1	freq=50.00MHz S(1,1)=0.993 / -11.534 impedance = 16.343 - j494.544
m2	freq=850.0MHz S(1,1)=0.855 / -170.156 impedance = 3.928 - j4.279
m3	freq=1.550GHz S(1,1)=0.689 / 73.823 impedance = 24.044 + j60.682
m4	freq=2.050GHz S(1,1)=0.589 / -19.399 impedance = 138.526 - j83.073
m5	freq=3.000GHz S(1,1)=0.675 / -173.303 impedance = 9.741 - j2.815

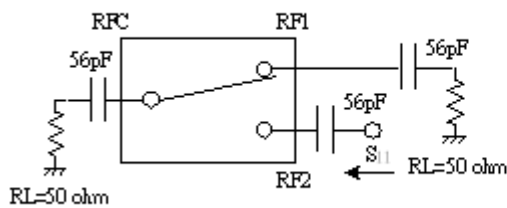


Marker	f (MHz)	Mag	Ang(\angle°)
1	50	0.933	-11.53
2	850	0.855	-170.15
3	1550	0.689	73.82
4	2050	0.589	-19.39
5	3000	0.675	-173.30

RF2 Port Impedance (Off State)



m1	freq=50.00MHz S(1,1)=0.993 / -11.569 impedance = 16.503 - j493.024
m2	freq=850.0MHz S(1,1)=0.857 / -169.629 impedance = 3.881 - j4.510
m3	freq=1.550GHz S(1,1)=0.690 / 75.377 impedance = 23.262 + j59.187
m4	freq=2.050GHz S(1,1)=0.586 / -18.391 impedance = 141.916 - j79.852
m5	freq=3.000GHz S(1,1)=0.680 / -172.789 impedance = 9.575 - j3.035



Marker	f (MHz)	Mag	Ang(\angle°)
1	50	0.933	-11.53
2	850	0.855	-170.15
3	1550	0.689	73.82
4	2050	0.589	-19.39
5	3000	0.675	-173.30



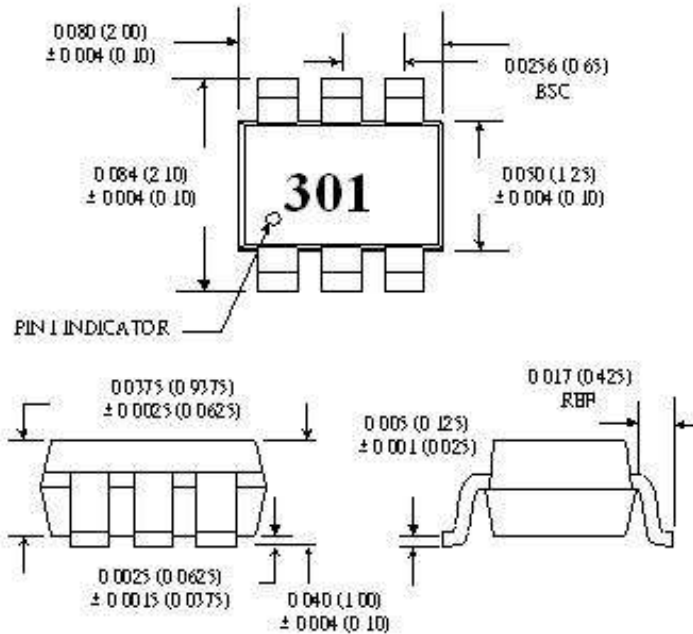
Typical Characteristics (continued)

Scattering Parameters: S11 (Off State)

(V_{cc}=0/3.0V, 50Ω System)

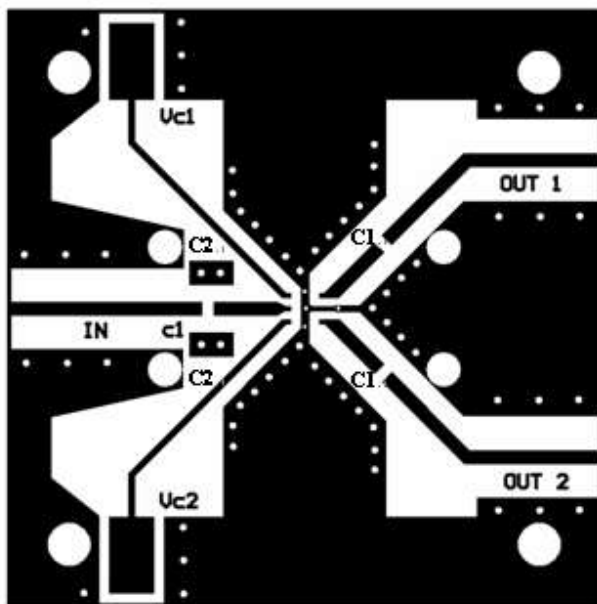
f(MHz)	RF1 Port		RF2 Port	
	Mag.	Ang.(\angle°)	Mag.	Ang.(\angle°)
50	0.933	-11.53	0.993	-11.56
100	0.990	-22.83	0.989	-22.91
200	0.978	-46.15	0.978	-46.27
300	0.963	-67.13	0.963	-67.27
400	0.946	-87.31	0.946	-87.42
500	0.925	-108.04	0.925	-108.06
600	0.905	-126.24	0.906	-126.13
700	0.887	-143.95	0.888	-143.69
800	0.865	-162.07	0.866	-161.62
900	0.845	-178.31	0.847	-177.68
1000	0.823	165.44	0.826	166.26
1100	0.800	148.60	0.803	149.59
1200	0.778	132.60	0.780	133.77
1300	0.751	115.52	0.753	116.87
1400	0.727	99.50	0.729	100.95
1500	0.701	82.79	0.702	84.33
1600	0.674	64.82	0.674	66.37
1700	0.652	47.04	0.650	48.57
1800	0.627	29.32	0.625	30.77
1900	0.608	9.55	0.606	10.83
2000	0.592	-9.46	0.589	-8.35
2100	0.583	-29.42	0.580	-28.56
2200	0.581	-48.34	0.578	-47.72
2300	0.583	-66.31	0.580	-65.85
2400	0.593	-84.95	0.592	-84.64
2500	0.603	-101.82	0.602	-101.59
2600	0.618	-118.17	0.619	-117.96
2700	0.633	-133.18	0.635	-133.02
2800	0.647	-147.75	0.650	-147.48
2900	0.664	-160.75	0.668	-160.39
3000	0.675	-173.30	0.680	-172.78

SOT-363 Package Dimensions (Unit: inch (mm))



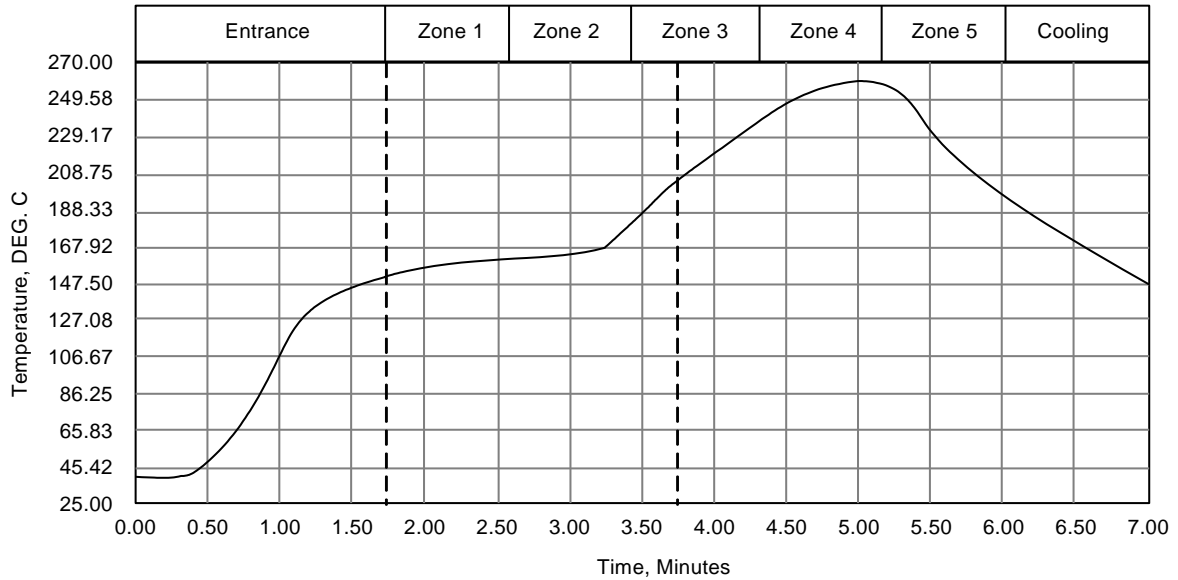
Recommended PCB Design

(TOP VIEW)



PCB SIZE : 1350mil x 1350mil
 PCB : FR-4 , Thickness=0.4mm
 Capacitor: size 0402
 Microstrip Line Width = 30mil ($Z_0=50\Omega$)
 $C1=56\text{pF}$
 $C2=1000\text{pF}$

SMT Reflow Profile



SAFETY INFORMATION ON THIS PRODUCT

<p>Cautions on using this product</p>	<p>The product contains Gallium-Arsenide (GaAs). GaAs vapor and power are hazardous to human health if inhaled or ingested.</p> <ul style="list-style-type: none"> • Do not destroy or burn the product. • Do not cut or cleave off any part of the product. • Do not crush or chemically dissolve the product. <p>Follow related laws and ordinances for disposal. The product should be excluded from general industrial waste or household garbage.</p>
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