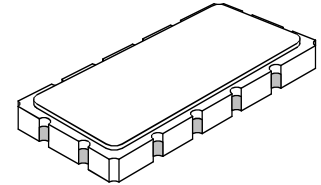




SF1091A

211 MHz SAW Filter



SM13365-12

- **Designed for GSM BTS Transmitter Applications**
- **Low Insertion Loss**
- **Excellent Size-to-Performance Ratio**
- **Hermetic 13.3 X 6.5 mm Surface-Mount Case**
- **Unbalanced Input and Output**
- **Complies with Directive 2002/95/EC (RoHS)**



Absolute Maximum Ratings

Rating	Value	Units
Maximum Incident Power in Passband	+10	dBm
Max. DC voltage between any 2 terminals	30	VDC
Storage Temperature Range	-40 to +85	°C
Suitable for lead-free soldering - Max Soldering Profile	260°C for 30 s	

Electrical Characteristics

Characteristic	Sym	Notes	Min	Typ	Max	Units
Nominal Center Frequency	f_c	1	211.000			MHz
Passband Insertion Loss at f_c 3 dB Passband Group Delay Variation over $f_c \pm 150$ kHz	IL	1, 2		7	8.0	dB
	BW_3		± 450	± 500		kHz
	GDV			200	250	ns _{p-p}
Rejection $f_c - 2.0$ to $f_c - 1.05$ and $f_c + 1.05$ to $f_c + 2.0$ MHz $f_c - 80$ to $f_c - 2.0$ and $f_c + 2.0$ to $f_c + 80$ MHz $n \times f_c$ over 291 to 2000 MHz		1, 2, 3	10	21		dB
			30	33		
			40	60		
Operating Temperature Range	T_A	1	-10		+85	°C
Frequency Temperature Coefficient	FTC	1		0.32		ppm/°C ²

Impedance Matching to 50 Ω unbalanced	External L-C
Case Style	SM13365-12 13.3 x 6.5 mm Nominal Footprint
Lid Symbolization (XX = 2 character date code)	RFM SF1091A XX

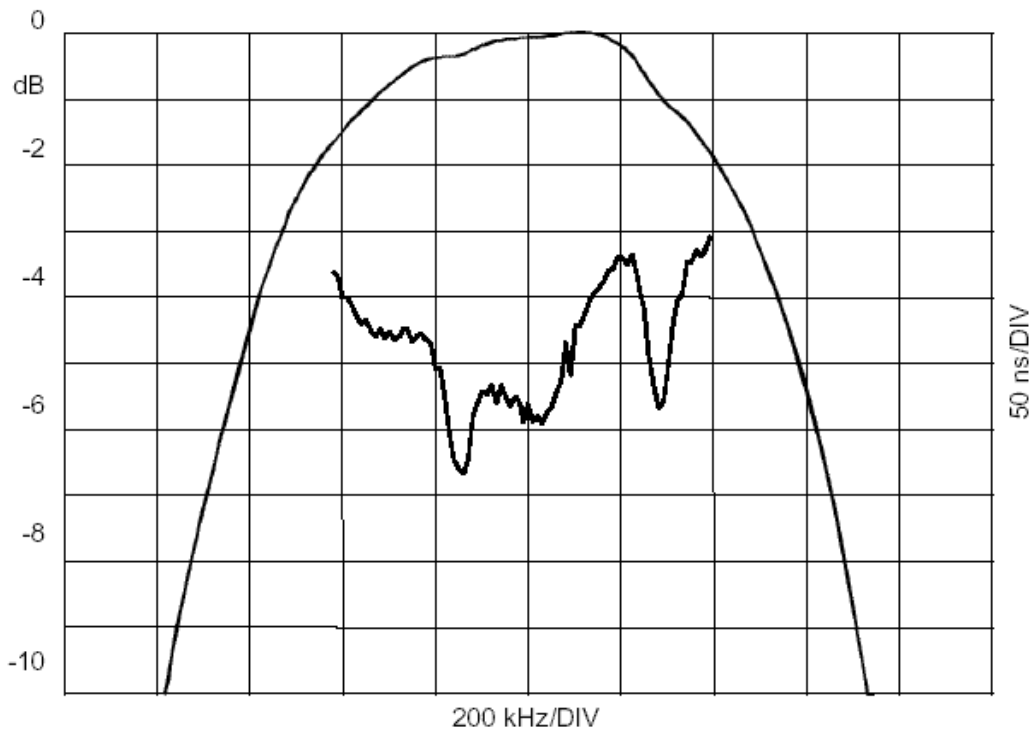
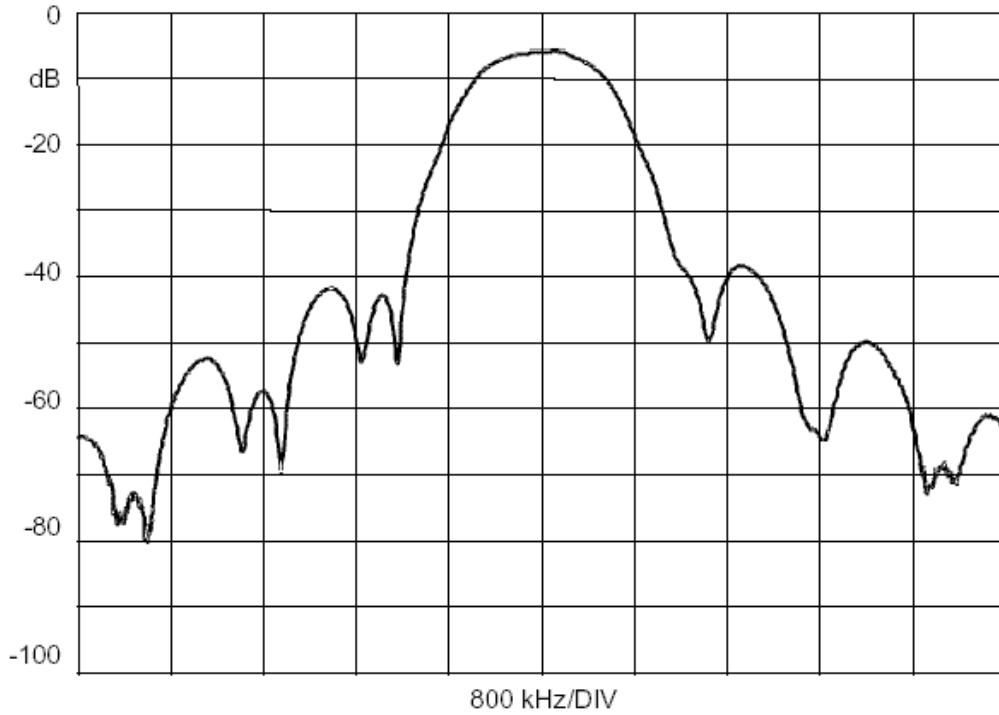
Electrical Connections

Connection	Terminals
Port 1 Hot	11
Port 1 Gnd Return	12
Port 2 Hot	5
Port 2 Gnd Return	6
Case Ground	All others

Notes:

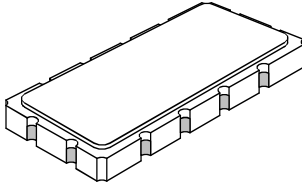
1. Unless noted otherwise, all specification apply over the operating temperature range with filter soldered to the specified demonstration board with impedanced matching to 50 Ω network analyzer.
2. Unless noted otherwise, all frequency specifications are referenced to the nominal center frequency, f_c .
3. Rejection is measured as attenuation below the minimum IL point in the passband. Rejection in final user application is dependent on PCB layout and external impedance matching design. See Application Note No. 42 for details.
4. The turnover temperature, T_o , is the temperature of maximum (or turnover) frequency, f_o . The nominal frequency at any case temperature, T_c , may be calculated from: $f = f_o [1 - FTC(T_o - T_c)^2]$.
5. The design, manufacturing process, and specifications of this filter are subject to change.
6. Either Port 1 or Port 2 may be used for either input or output in the design. However, impedances and impedance matching may vary between Port 1 and Port 2, so that the filter must always be installed in one direction per the circuit design.
7. US and international patents may apply.
8. Electrostatic Sensitive Device. Observe precautions for handling.





SM13365-12 Case

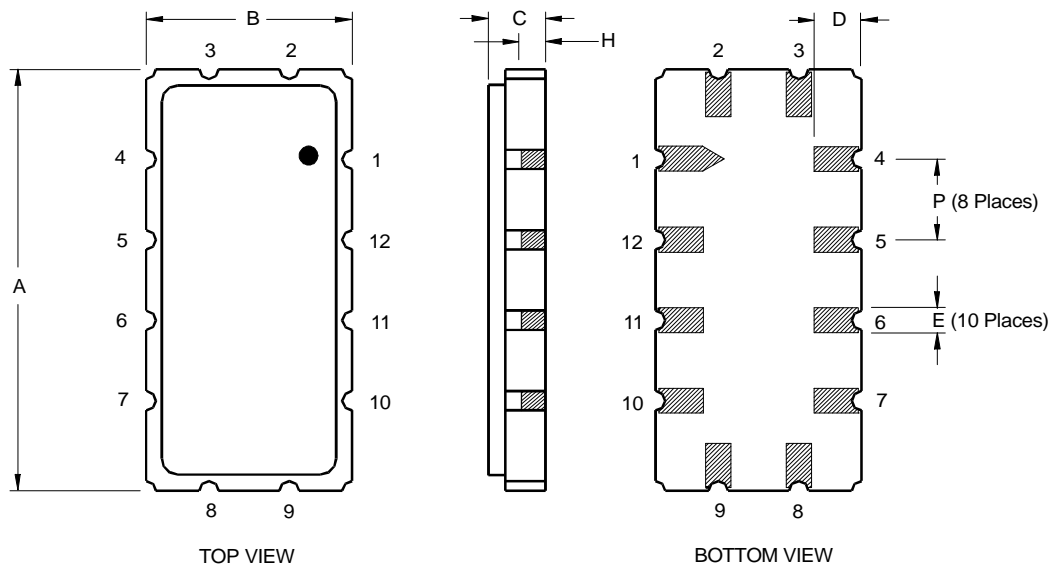
12-Terminal Ceramic Surface-Mount Case
13.3 x 6.5 mm Nominal Footprint



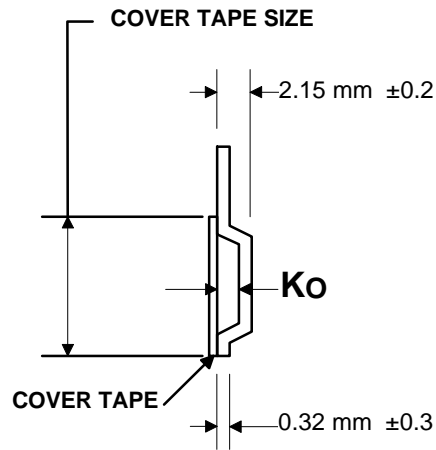
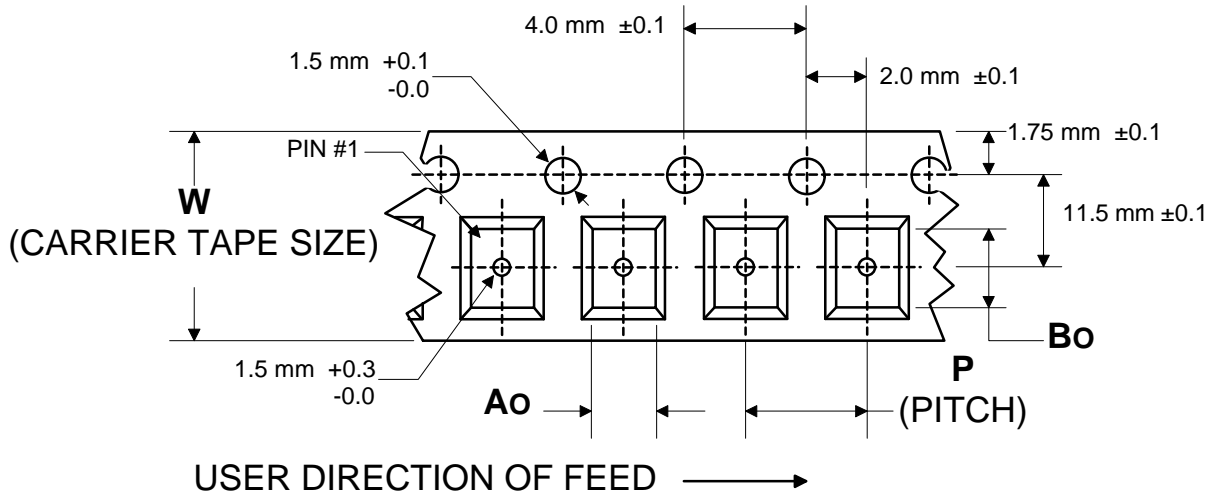
Case Dimensions						
Dimension	mm			Inches		
	Min	Nom	Max	Min	Nom	Max
A	13.08	13.31	13.60	0.515	0.524	0.535
B	6.27	6.50	6.80	0.247	0.256	0.268
C		1.91	2.00		0.075	0.079
D		1.50			0.059	
E		0.79			0.031	
H		1.0			0.039	
P		2.54			0.100	

Materials	
Solder Pad Termination	Au plating 30 - 60 ulnches (76.2-152 uM) over 80-200 ulnches (203-508 uM) Ni.
Lid	Fe-Ni-Co Alloy Electroless Nickel Plate (8-11% Phosphorus) 100-200 ulnches Thick
Body	Al ₂ O ₃ Ceramic
Pb Free	

Electrical Connections		
Connection		Terminals
Port 1	Input or Return	2
	Return or Input	3
Port 2	Output or Return	8
	Return or Output	9
Ground		All others
Single Ended Operation		Return is ground
Differential Operation		Return is hot

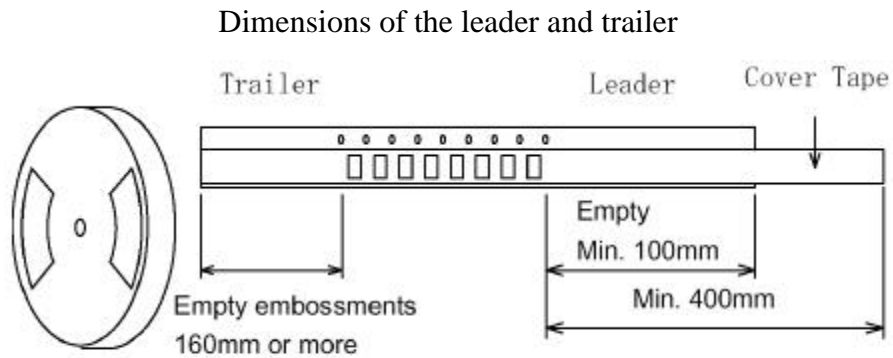


COMPONENT ORIENTATION and DIMENSIONS



Carrier Tape Dimensions		
Ao	7.0 mm	±0.1
Bo	13.8 mm	±0.1
Ko	2.2 mm	±0.1
Pitch	12.0 mm	±0.1
W	24.0 mm	±0.3

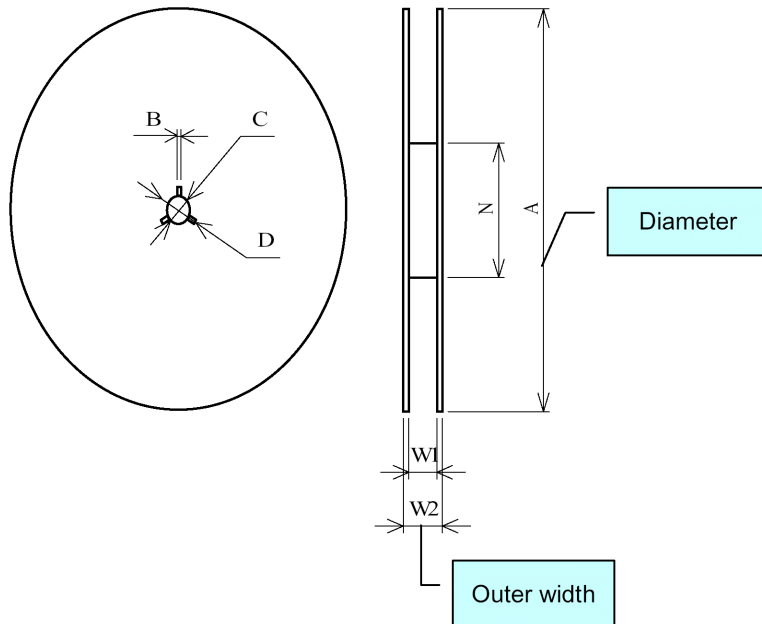
Leader and Trailer specifications (Based upon EIA-481)



7 Inch Reel Quantity 500														
Symbol	A		N		C		D		B		W ₁		W ₂	
Dimension	178	+0 -4	60	±1	13	+0.5 -0.2	20.2	+1.5 -0	2	±0.5	24.4	+2 -0	30.4	MAX

13 Inch Reel Quantity 2000														
Symbol	A		N		C		D		B		W ₁		W ₂	
Dimension	330	+0 -4	100	±2	13	+0.5 -0.2	20.2	+1.5 -0	2	±0.5	24.4	+2 -0	30.4	MAX

Dimensional drawing of the reel



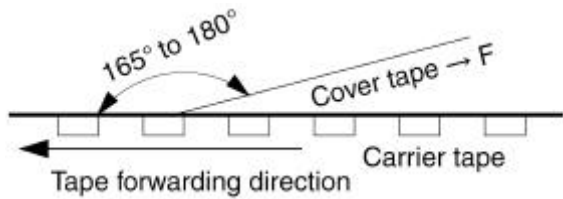
Additional items

(1) Cover tape peeling strength

The cover tape shall be adhered evenly to the carrier tape along both sides in the pulling direction.

The cover tape peeling strength shall be as follows for an angle between the cover tape and the pulling direction of 165° to 180° (see the figure) and a peeling speed of 300mm/min. ± 10 mm/min.

[EIA-481] 0.1N to 1.3N for a tape width of 12 to 56mm



Fixing method

1. Insert the tip of the carrier tape into the groove.
2. Fix the tip of the cover tape with adhesive tape.

Tape material

(1) Carrier tape [anti-charging treatment: carbon used] Surface resistivity: 1×10^8 or less
Material: Polystyrene or Polycarbonate

(2) Cover tape material: Polyester (anti-charging treated) Surface resistivity: 1×10^{12} or less
 $t = 50$ to $100\mu\text{m}$ width = 13.3mm

Warranty periods

Cover tape peeling strength and mounting performance of stored components.

2-1. Cover tape peeling strength: One year after delivery (Peeling strength: 0.1N to 1.3N)

Number of missing components

There shall not be two or more consecutive missing components. Also, the maximum number of missing components shall be the larger of one piece or 0.1%.

Storage environment

Keep the product on which taping has been performed to a temperature below 40°C and a humidity within 80% RH. Do not subject in the direct sun.

Labeling

The following items are labeled on the surface of a reel.
 Product Part Number, Date Code, Quantity

Reel labels shall follow the format shown below. The long side of the label must measure between 2.75 and 4.0 inches (68 to 100 mm). The short side of the label must measure between 1.5 and 2 inches (38 to 80 mm). Bar codes must conform to AIAG standard B10.

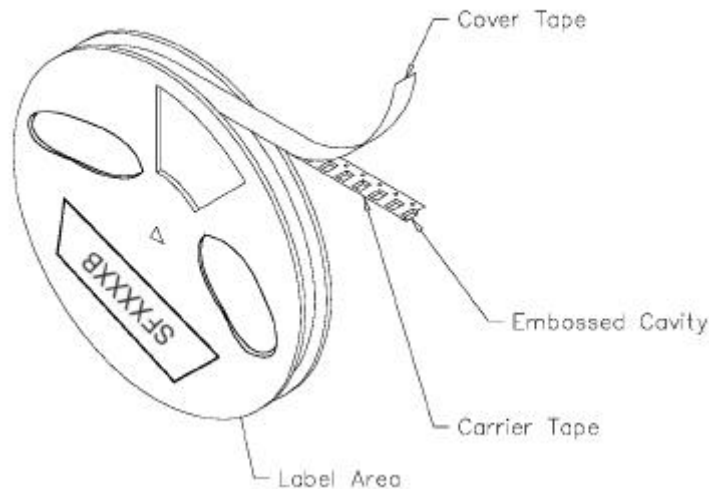
Information that is on the label:

- Device Type: RFM part number
- Code: RFM designated part ID or part date code
- Reel ID: Manufacturing reel identification
- Reel Qty: Quantity of parts on the reel
- Work Order: Manufacturing work order number
- Date: Date product was loaded on tape and reel.
- Company Identification: R. F. Monolithics, Inc.
- *Q. C.: Area for QA stamps, other information is required
- Country of assembly



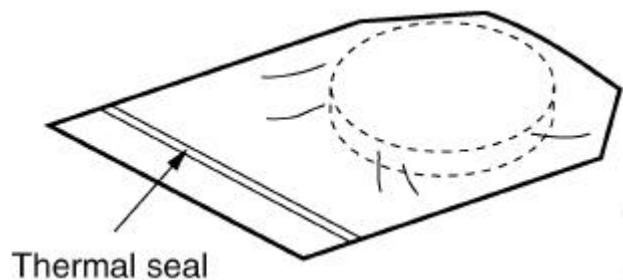
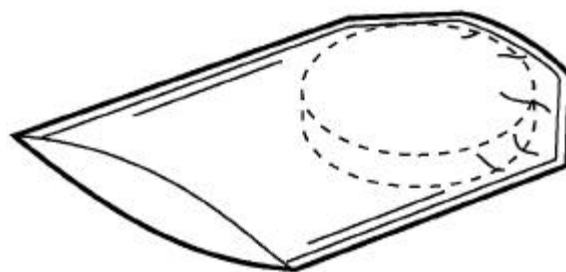
Examples of acceptable reel labels

Location of label on reel is shown below. Reel labels must be placed entirely on plastic, without covering open sections of the reel. Design of reel must satisfy this requirement. Pin #1 must be located on the side opposite the reel label.

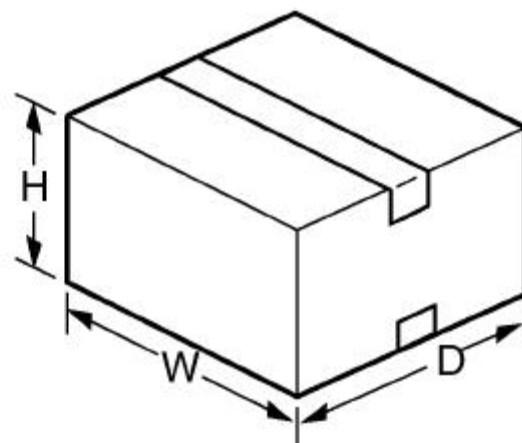


Package for Shipment

	Quantity Per Reel	Number Reels Per Carton	External Carton Dimensions	Reel Weight	Shipping Carton Weight	Total Weight
13 Inch Reel	2000	2	356 x 356 x 102 mm 14 x 14 x 4 inches	1288 g	448 g	1736 g
	2000	4	356 x 356 x 178 mm 14 x 14 x 7 inches	2576 g	448 g	3024 g
	2000	8	356 x 356 x 356 mm 14 x 14 x 14 inches	5152 g	448 g	5600 g



Thermal seal



Shipment package

Sealing tape

RFM Qualification and Reliability Test				
Test		Standard	Test Parameters	Pass / Fail Criteria
1	Life at Elevated Temperature	MIL-STD-202 Method 108 Condition C	1,000 Hours 125°C Unbiased	Within Electrical & Hermetic Spec. (Note 1)
2	Temperature Cycling	JESD22 Method JA-104 Air-to-Air	-55 xC to +125 xC 20 min. Dwell 1,000 cycles	
3	Vibration, Variable Frequency	MIL-STD-883 Method 2007 Condition B	50g Max. 4 Cycles, 3 Axis 20 Hz to 2 kHz to 20 Hz	
4	Mechanical Shock	MIL-STD-883 Method 2002 Condition B	1,500g Max. 5 Shocks ±3 Axis	
5	Destructive Bond Strength	MIL-STD-883 Method 2011 Condition C	Wire Bond Pull Strength	2.0 grams (After Seal)
6	Die Shear Strength	MIL-STD-883 Method 2019	Shear Strength	0.6 kg (Strength/area limit in development)
7	Solderability (Note 2)	J-STD-002 Method B	8 hr. steam age 245 x C solder temperature 5 second dwell	>95% wetted surface
8	Physical Dimensions	JESD22 Method JB-100	Critical Dimensions	Within specifications
9	Temperature Characteristics	RFM Procedure	Frequency over Temperature	Within specifications
10	Terminal Strength (Note 2)	MIL-STD-833 Method 2004 Condition A & D	Cond. A-Lead Tension Cond. B -Pad Adhesion 24	8 oz. - 30 sec. Visual Requirements & meets Hermetic Spec.
11	Resistance to Solvents	MIL-STD-883 Method 2015	Solvents a, b, d	Visual Requirements
12	Steady State Life	MIL-STD-883 Method 1005	1,000 Hours Max. Operating Temperature Rated Voltage	Within Electrical & Hermetic Spec. (Note 1)
13	Internal Water-Vapor Content	MIL-STD-883 Method 1018		< 5,001 PPM
14	Constant Acceleration	MIL-STD-883 Method 2001 Y1 Direction	30,000g	Within Electrical & Hermetic Spec. (Note 1)
15	Substrate Attach Strength	MIL-STD-883 Method 2027	Tensile Strength of Die Attachment	Custom per Device