

FM4001-L-Q1 THRU FM4007-L-Q1

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FM4001-L-Q1 THRU FM4007-L-Q1

1.0A Surface Mount General Purpose Rectifiers 50V-1000V

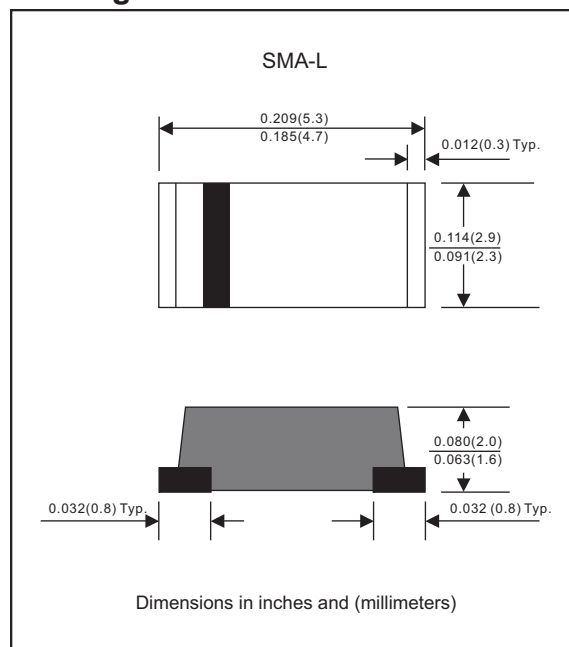
Features

- Batch process design, excellent power dissipation offers better reverse leakage current and thermal resistance
- Low profile surface mounted application in order to optimize board space
- High current capability
- High surge capability
- Glass passivated chip junction
- Lead-free parts meet RoHS requirements
- Qualified to AEC-Q101 standards for high reliability
- Suffix "-H" indicates Halogen-free parts, ex. FM4001-L-Q1-H

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SMA-L
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.05 gram

Package outline



Maximum ratings (AT $T_A=25^{\circ}\text{C}$ unless otherwise noted)

PARAMETER	SYMBOLS	FM4001-L-Q1	FM4002-L-Q1	FM4003-L-Q1	FM4004-L-Q1	FM4005-L-Q1	FM4006-L-Q1	FM4007-L-Q1	UNIT
Maximum repetitive peak reverse voltage	V_{RRM}	50	100	200	400	600	800	1000	V
Maximum RMS voltage	V_{RMS}	35	70	140	280	420	560	700	V
Maximum continuous reverse voltage	V_R	50	100	200	400	600	800	1000	V
Maximum average forward rectified current	I_o	1.0							A
Non-repetitive peak forward surge current 8.3ms single half sine-wave	I_{FSM}	30							A
Typical junction capacitance (Note1)	C_J	15							pF
Operating junction temperature range	T_J	-55 to +150							$^{\circ}\text{C}$
Storage temperature range	T_{STG}	-65 to +175							$^{\circ}\text{C}$

Electrical characteristics (AT $T_A=25^{\circ}\text{C}$ unless otherwise noted)

PARAMETER	SYMBOLS	FM4001-L-Q1	FM4002-L-Q1	FM4003-L-Q1	FM4004-L-Q1	FM4005-L-Q1	FM4006-L-Q1	FM4007-L-Q1	UNIT
Maximum instantaneous forward voltage at $I_F=1.0\text{A}$	V_F	1.1							V
Maximum reverse leakage current at rated V_R	I_R	5.0 50							μA μA

Thermal characteristics

PARAMETER	SYMBOLS	FM4001-L-Q1	FM4002-L-Q1	FM4003-L-Q1	FM4004-L-Q1	FM4005-L-Q1	FM4006-L-Q1	FM4007-L-Q1	UNIT
Typical thermal resistance junction to ambient (Note2)	$R_{\theta JA}$	64							$^{\circ}\text{C/W}$
Typical thermal resistance junction to case (Note2)	$R_{\theta JC}$	34							$^{\circ}\text{C/W}$

Notes 1: Measured at 1MHz and applied reverse voltage of 4.0V D.C

2: Mounted on FR-4 PCB copper, minimum recommended pad layout

Rating and characteristic curves (FM4001-L-Q1 THRU FM4007-L-Q1)

FIG.1-TYPICAL FORWARD
CHARACTERISTICS

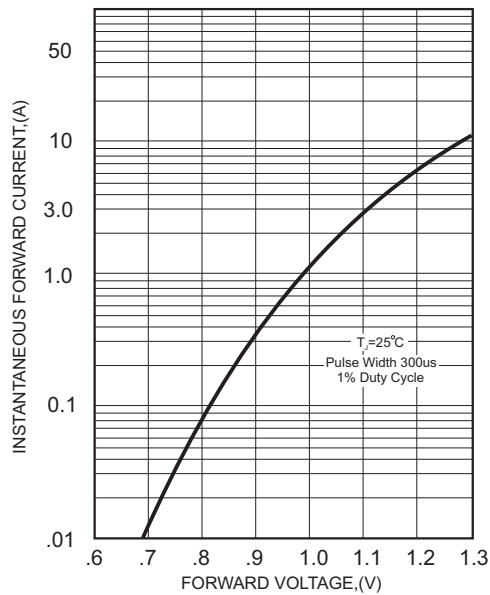


FIG.2-TYPICAL FORWARD CURRENT DERATING CURVE

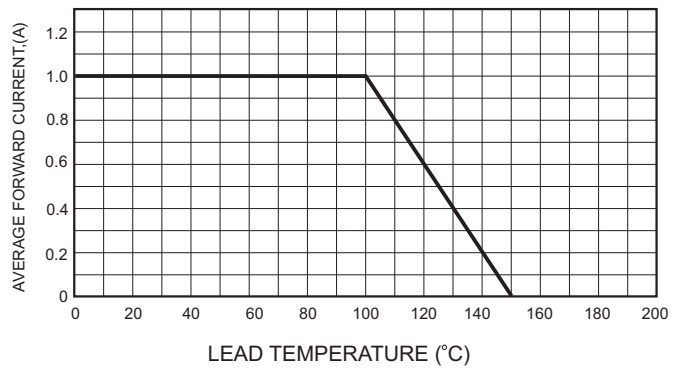


FIG.4-MAXIMUM NON-REPETITIVE FORWARD
SURGE CURRENT

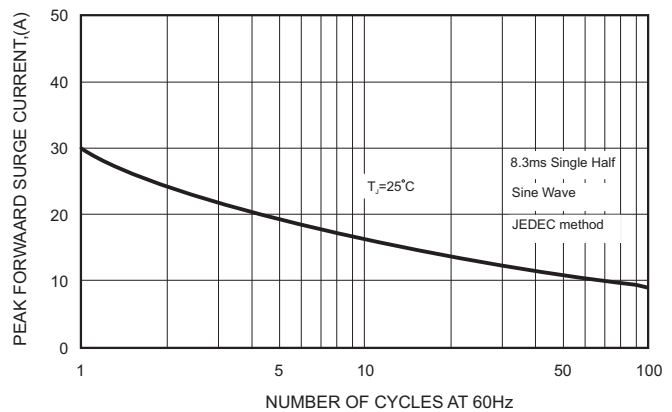


FIG.3 - TYPICAL REVERSE
CHARACTERISTICS

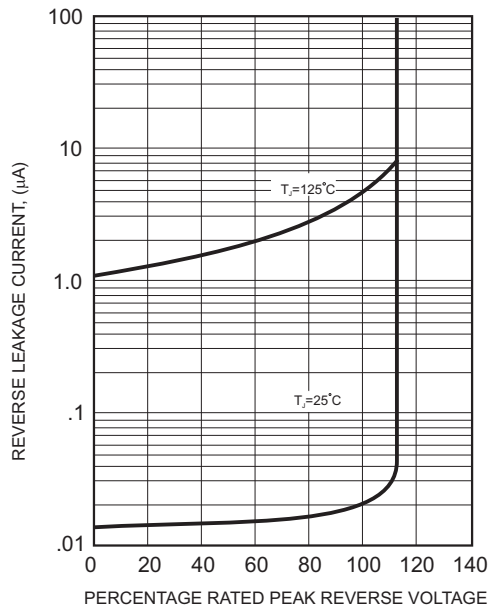
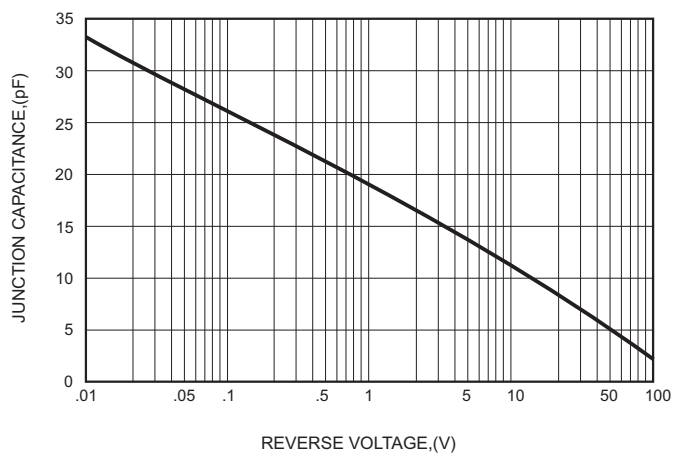


FIG.5-TYPICAL JUNCTION CAPACITANCE



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Pinning information

Pin	Simplified outline	Symbol
Pin1 cathode Pin2 anode		

Marking

Type number	Marking code
FM4001-L-Q1	A1
FM4002-L-Q1	A2
FM4003-L-Q1	A3
FM4004-L-Q1	A4
FM4005-L-Q1	A5
FM4006-L-Q1	A6
FM4007-L-Q1	A7

Suggested solder pad layout



Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SMA-L	0.110 (2.80)	0.059 (1.50)	0.110 (2.80)

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Packing information



unit:mm

Item	Symbol	Tolerance	SMA-L
Carrier width	A	0.1	2.90
Carrier length	B	0.1	5.50
Carrier depth	C	0.1	2.10
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	330.00
13" Reel inner diameter	D1	min	50.00
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D1	min	62.00
Feed hole diameter	D2	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	5.50
Punch hole pitch	P	0.1	4.00
Sprocket hole pitch	P0	0.1	4.00
Embossment center	P1	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	12.00
Reel width	W1	1.0	18.00

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

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Reel packing

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA, (m/m)	CARTON SIZE (m/m)	CARTON (pcs)	APPROX. GROSS WEIGHT (kg)
SMA-L	7"	2,000	4.0	20,000	183*155*183	178	382*356*392	160,000	15.5
	7"	2,000	4.0	10,000	180*180*80	178	440*410*220	100,000	13.0

Suggested thermal profiles for soldering processes

- 1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
- 2.Reflow soldering of surface-mount devices



3.Reflow soldering

Profile Feature	Soldering Condition
Average ramp-up rate(T _L to T _P)	<3°C/sec
Preheat -Temperature Min(T _{smmin}) -Temperature Max(T _{smmax}) -Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{smmax} to T _L -Ramp-upRate	<3°C/sec
Time maintained above: -Temperature(T _L) -Time(t _L)	217°C 60~260sec
Peak Temperature(T _P)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(t _P)	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes

FM4001-L-Q1 THRU FM4007-L-Q1**High reliability test capabilities**

Item Test	Conditions	Reference
1. MSL Preconditioning	24hr bake@125°C+168hrs@85°C /85%RH+3xIR@260°C+1flux immersion+alcohol+DI H2O rinse	JESD22-A113
2. Operation Life	Ta=25°C,Rated Current (Io=Io max.)Test Duration:1000hrs	MIL-STD-750E METHOD 1027.3
3. High Temperature Reverse Bias	80% Rated VR (Tj=Tj max.)Test Duration:1000hrs	JESD22-A108
4. High Temperature Storage Life	Ta=125°C Test Duration:1000hrs	JESD22 A-103
5. Temperature Cycle	-55°C(15min) to 150°C(15min)Test Cycles:1000cycles	JESD22 A-104
6. Autoclave	P=2atm Ta=121°C RH=100% Test Duration:96hrs	JESD22 A-102
7. Intermittent Operational Life	Ta=25°C,On/Io Max. 2min, Off/2min, Test Cycles:15000cycles	MIL-STD-750E METHOD 1037
8. Solderability	245±5°C for 5sec	J-STD-002
9. Moisture Resistance	Ta=85°C/85% Relative humidity Test Duration:1000hrs	MIL-STD-750E METHOD 1021.2
10. Resistance To Solder Heat	260±5°C for 10sec	JESD22 B-106
11. High Temperature High Humidity Reverse Bias	Ta=85°C, 85%RH, with device reverse biased at 80% of rated breakdown voltage up to a maximum of 100V or limit of chamber Test Duration:1000hrs	JESD22-A101