

FM220-SF-Q1 THRU FM2200-SF-Q1

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FM220-SF-Q1 THRU FM2200-SF-Q1

2.0A Surface Mount Schottky Barrier Rectifiers 20V-200V

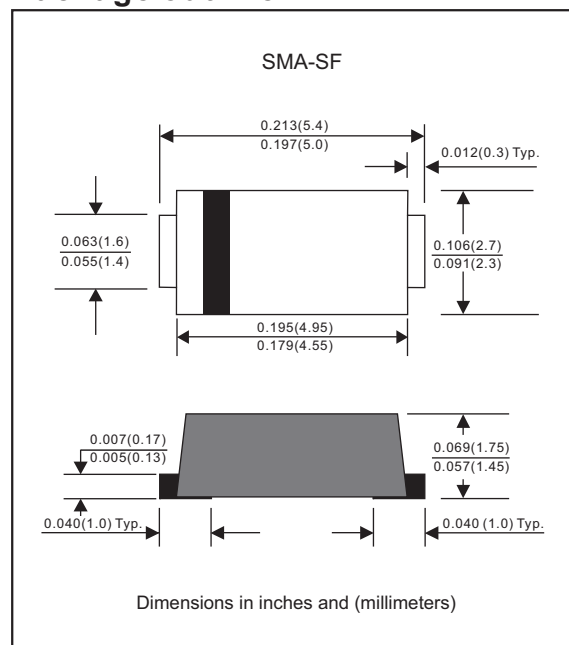
Features

- 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.
- Low power loss, high efficiency
- High current capability, low forward voltage drop
- High surge capability
- Guardring for overvoltage protection
- Ultra high-speed switching
- Silicon epitaxial planar chip, metal silicon junction
- Lead-free parts meet RoHS requirements
- Qualified to AEC-Q101 standards for high reliability
- Suffix "-H" indicates Halogen free parts, ex. FM220-SF-Q1-H

Mechanical data

- Epoxy: UL94-V0 rated flame retardant
- Case : Molded plastic, SMA-SF
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.04 gram

Package outline



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

PARAMETER	SYMBOLS	FM220-SF-Q1	FM230-SF-Q1	FM240-SF-Q1	FM245-SF-Q1	FM250-SF-Q1	FM260-SF-Q1	FM280-SF-Q1	FM2100-SF-Q1	FM2150-SF-Q1	FM2200-SF-Q1	UNIT
Maximum repetitive peak reverse voltage	V _{RRM}	20	30	40	45	50	60	80	100	150	200	V
Maximum RMS voltage	V _{RMS}	14	21	28	31.5	35	42	56	70	105	140	V
Maximum continuous reverse voltage	V _R	20	30	40	45	50	60	80	100	150	200	V
Maximum average forward rectified current	I _O	2.0										A
Non-repetitive peak forward surge current 8.3ms single half sine-wave	I _{FSM}	50										A
Typical junction capacitance (Note 1)	C _J	110				80		60		45	35	pF
Operating junction temperature range	T _J	-55 to +125				-55 to +150						°C
Storage temperature range	T _{STG}	-65 to +175										°C

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

PARAMETER	SYMBOLS	FM220-SF-Q1	FM230-SF-Q1	FM240-SF-Q1	FM245-SF-Q1	FM250-SF-Q1	FM260-SF-Q1	FM280-SF-Q1	FM2100-SF-Q1	FM2150-SF-Q1	FM2200-SF-Q1	UNIT
Maximum instantaneous forward voltage at If=2.0A	V _F	0.50				0.70		0.85		0.90	0.92	v
Maximum reverse leakage current at rated V _R T _J =25°C T _J =100°C	I _R	0.1 10						0.05 5		0.01 5		mA mA

Thermal characteristics

PARAMETER	SYMBOLS	FM220-SF-Q1	FM230-SF-Q1	FM240-SF-Q1	FM245-SF-Q1	FM250-SF-Q1	FM260-SF-Q1	FM280-SF-Q1	FM2100-SF-Q1	FM2150-SF-Q1	FM2200-SF-Q1	UNIT
Typical thermal resistance junction to ambient (Note2)	$R_{\theta JA}$	64										$^{\circ}\text{C/W}$
Typical thermal resistance junction to case (Note 2)	$R_{\theta JC}$	32										$^{\circ}\text{C/W}$

Notes1: 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 (FM220-SF-Q1 THRU FM2200-SF-Q1)

FIG.1-TYPICAL FORWARD CURRENT DERATING CURVE

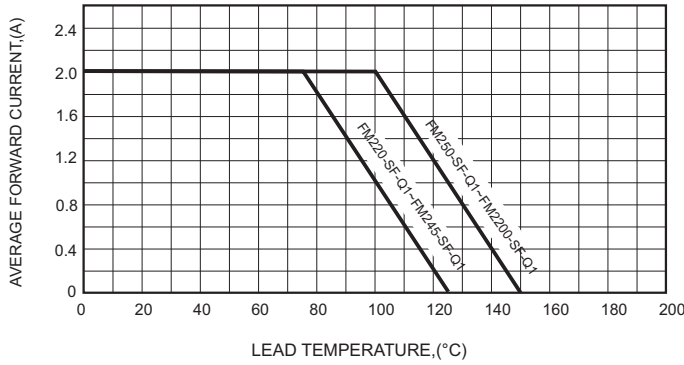


FIG.2-TYPICAL FORWARD CHARACTERISTICS

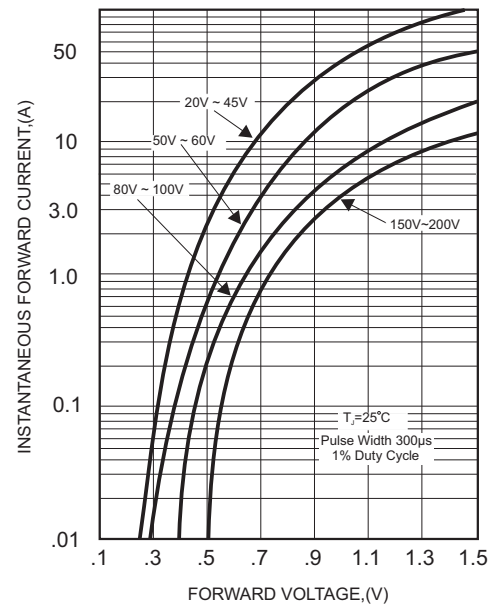


FIG.3-MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT

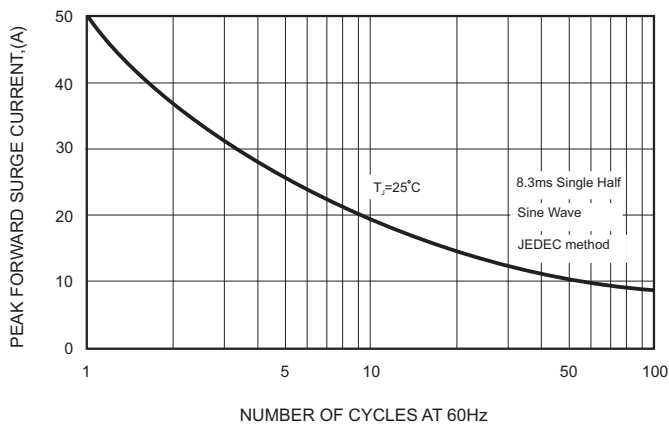


FIG.4-TYPICAL JUNCTION CAPACITANCE

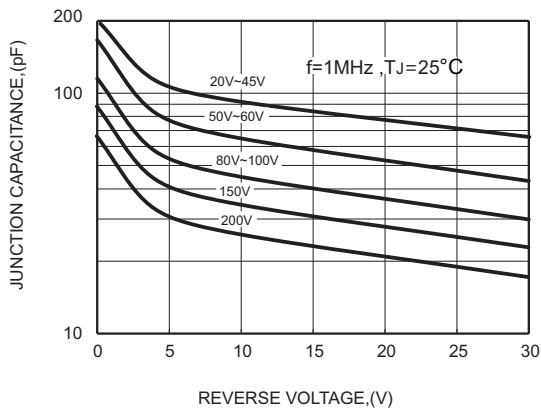
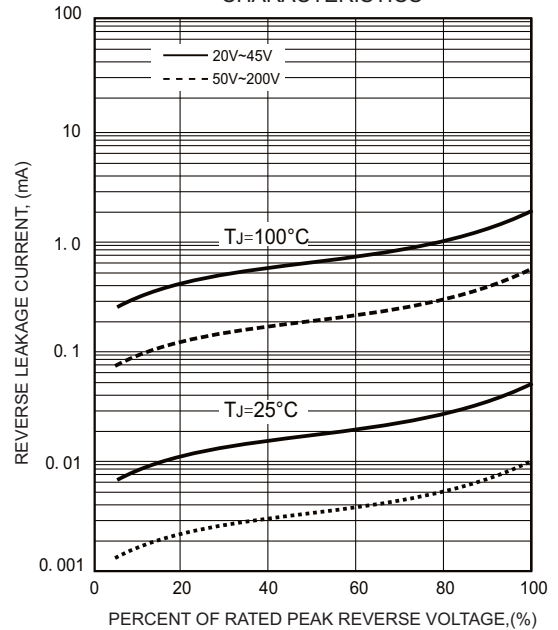


FIG.5 - TYPICAL REVERSE CHARACTERISTICS

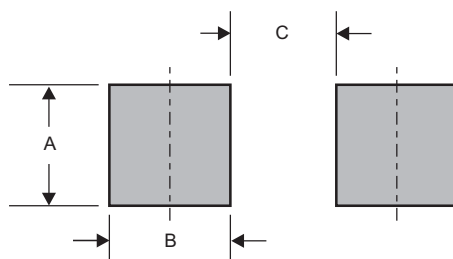


FM220-SF-Q1 THRU FM2200-SF-Q1**Pinning information**

Pin	Simplified outline	Symbol
Pin1 cathode Pin2 anode		

Marking

Type number	Marking code
FM220-SF-Q1	SK22
FM230-SF-Q1	SK23
FM240-SF-Q1	SK24
FM245-SF-Q1	SK24
FM250-SF-Q1	SK25
FM260-SF-Q1	SK26
FM280-SF-Q1	SK28
FM2100-SF-Q1	S210
FM2150-SF-Q1	S215
FM2200-SF-Q1	S220

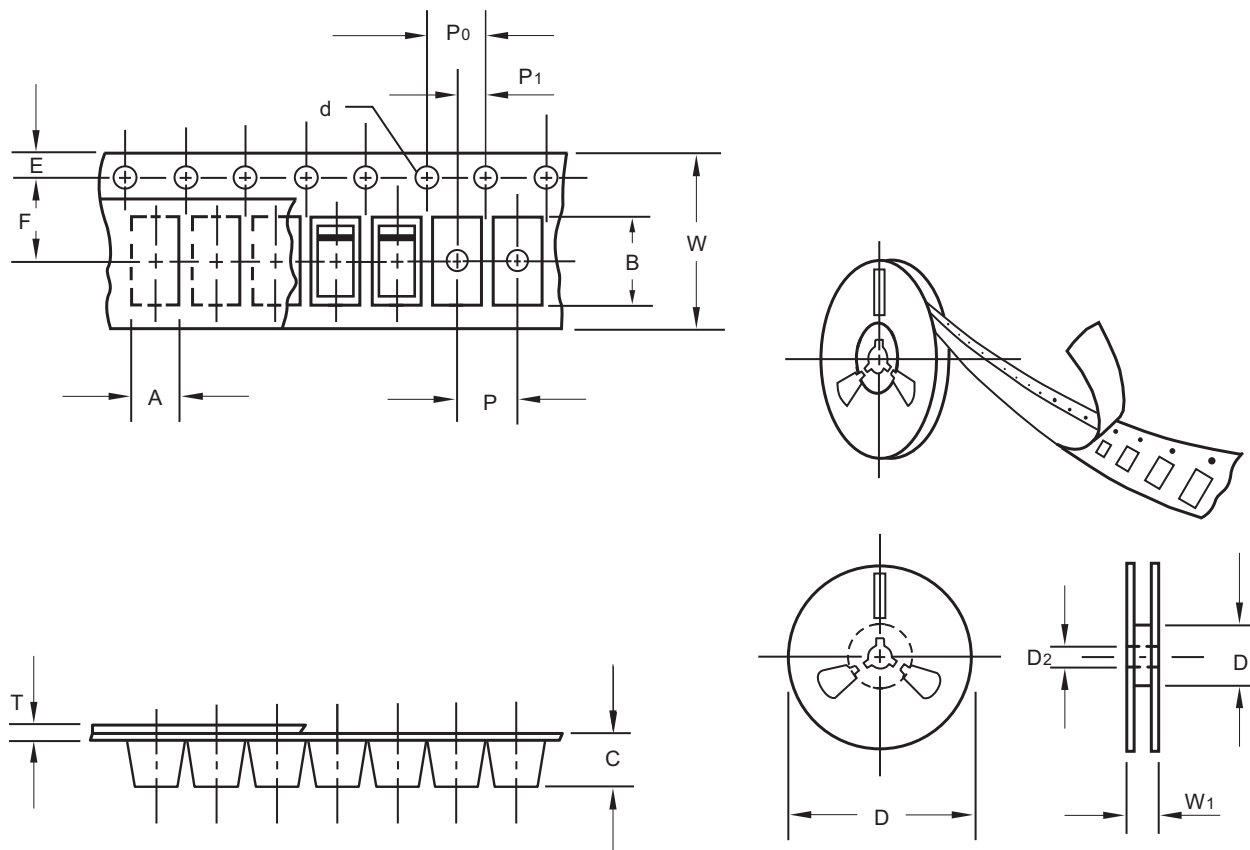
Suggested solder pad layout

Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SMA-SF	0.063 (1.60)	0.059 (1.50)	0.110 (2.80)

FM220-SF-Q1 THRU FM2200-SF-Q1

Packing information



unit:mm

Item	Symbol	Tolerance	SMA-SF
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.

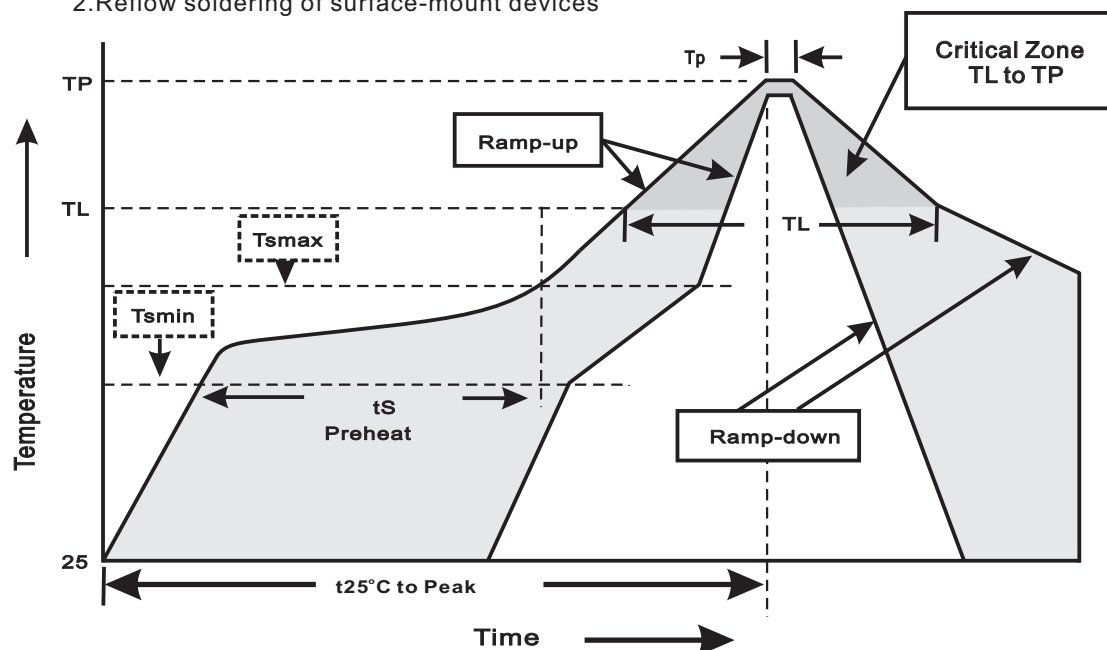
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Reel packing

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-SF	7"	2,000	4.0	20,000	183*155*183	178	382*356*392	160,000	12.0
	13"	7,500	4.0	15,000	335*335*38	330	350*330*360	120,000	11.5

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_{smin}) -Temperature Max(T_{smax}) -Time(min to max)(t_s)	150°C 200°C 60~120sec
T_{smax} 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

FM220-SF-Q1 THRU FM2200-SF-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