

# FM320-AL THRU FM3200-AL

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深圳FMS Kinter 131 6803 0058

# FM320-AL THRU FM3200-AL

## 3.0A Surface Mount Schottky Barrier Rectifiers - 20V-200V

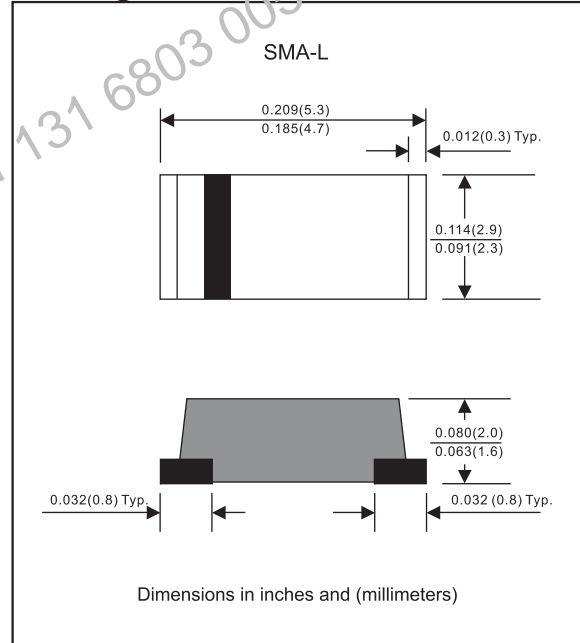
### Features

- 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 environmental standards of MIL-STD-19500 /228
- Suffix "-H" indicates Halogen free parts, ex. FM320-AL-H.

### Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, DO-214AC / 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 and Electrical Characteristics (AT T<sub>A</sub>=25°C unless otherwise noted)

PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
Forward rectified current	See Fig.1	I <sub>O</sub>			3.0	A
Forward surge current	8.3ms single half sine-wave superimposed on rate load (JEDEC method)	I <sub>FSM</sub>			80	A
Reverse current	V <sub>R</sub> = V <sub>RRM</sub> T <sub>J</sub> = 25°C	I <sub>R</sub>			0.5	mA
	V <sub>R</sub> = V <sub>RRM</sub> T <sub>J</sub> = 100°C				20	
Thermal resistance	Junction to ambient	R <sub>B,JA</sub>		52		°C/W
	Junction to case	R <sub>B,JC</sub>		26		°C/W
Diode junction capacitance	f=1MHz and applied 4V DC reverse voltage	C <sub>J</sub>		250		pF
Storage temperature		T <sub>STG</sub>	-65		+175	°C

SYMBOLS	V <sub>RRM</sub> <sup>*1</sup> (V)	V <sub>RMS</sub> <sup>*2</sup> (V)	V <sub>R</sub> <sup>*3</sup> (V)	V <sub>F</sub> <sup>*4</sup> (V)	Operating temperature T <sub>J</sub> , (°C)
FM320-AL	20	14	20	0.50	-55 to +125
FM330-AL	30	21	30		
FM340-AL	40	28	40		
FM350-AL	50	35	50	0.70	-55 to +150
FM360-AL	60	42	60		
FM380-AL	80	56	80	0.85	
FM3100-AL	100	70	100		
FM3150-AL	150	105	150	0.90	
FM3200-AL	200	140	200	0.92	

\*1 Repetitive peak reverse voltage

\*2 RMS voltage

\*3 Continuous reverse voltage

\*4 Maximum forward voltage@I<sub>F</sub>=3.0A

## Rating and characteristic curves (FM320-AL THRU FM3200-AL)

FIG.1-TYPICAL FORWARD CURRENT DERATING CURVE

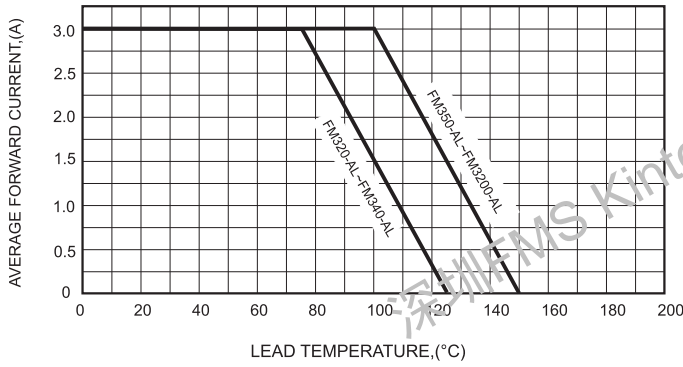


FIG.2-TYPICAL FORWARD CHARACTERISTICS

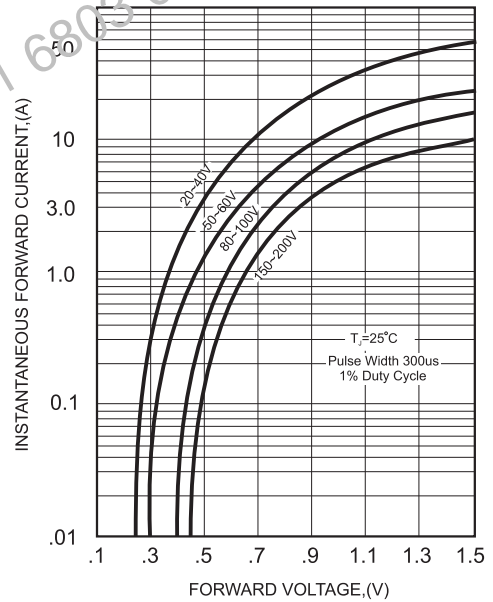


FIG.3-MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT

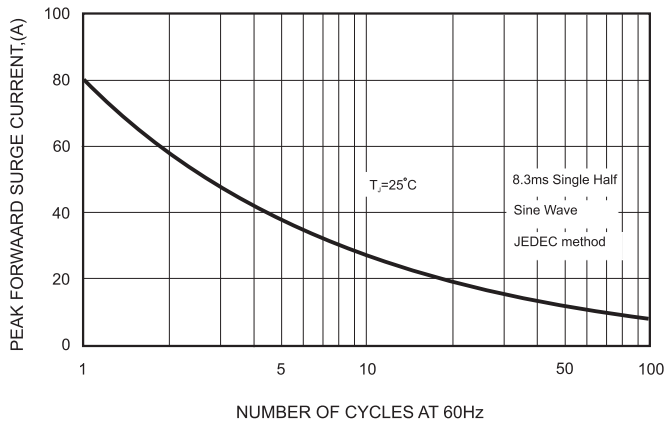


FIG.5 - TYPICAL REVERSE CHARACTERISTICS

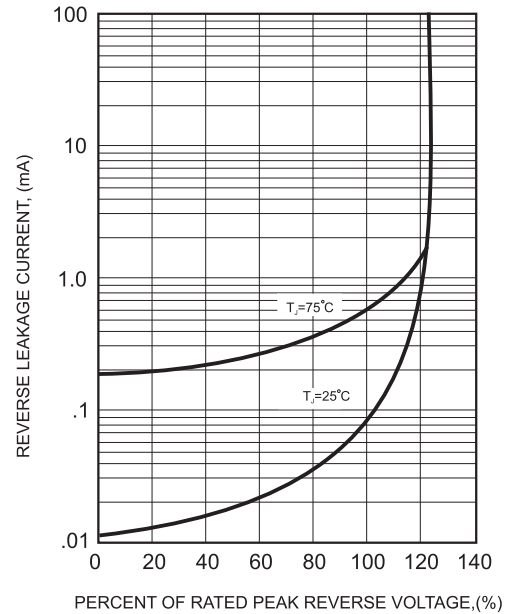
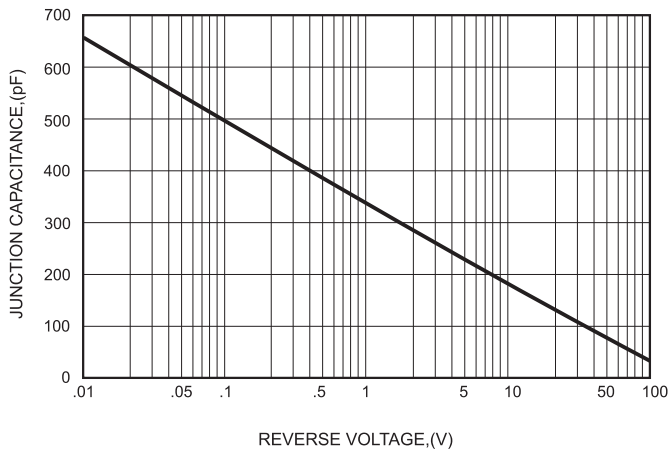




FIG.4-TYPICAL JUNCTION CAPACITANCE



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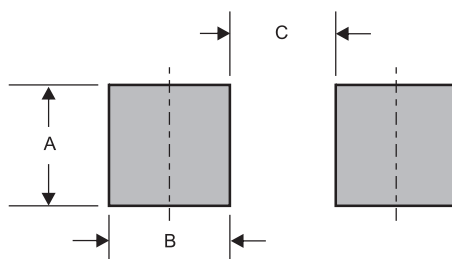
## Pinning information

Pin	Simplified outline	Symbol
Pin1 cathode Pin2 anode		

## Marking

Type number	Marking code
FM320-AL	SS32
FM330-AL	SS33
FM340-AL	SS34
FM350-AL	SS35
FM360-AL	SS36
FM380-AL	SS38
FM3100-AL	S310
FM3150-AL	S315
FM3200-AL	S320

## Suggested solder pad layout

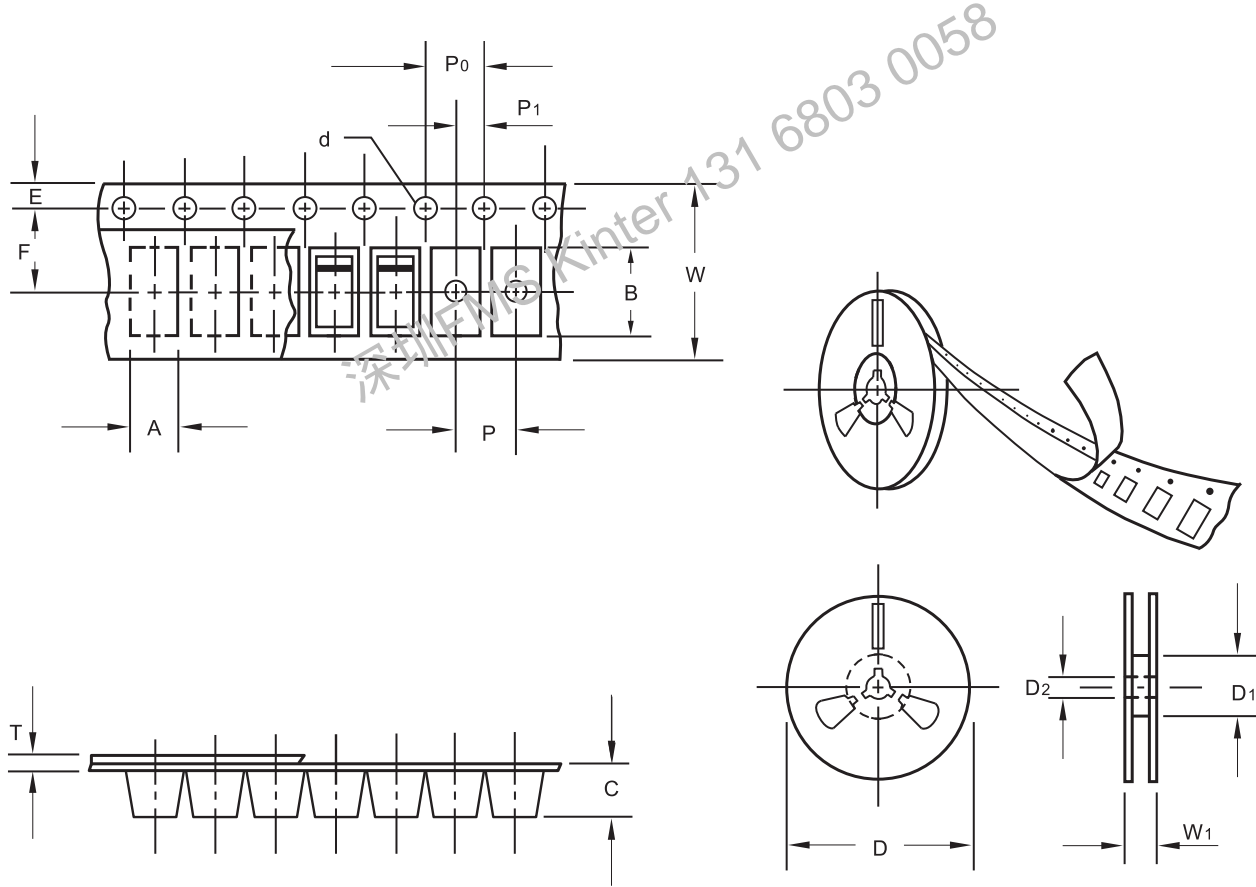


Dimensions in inches and (millimeters)

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.

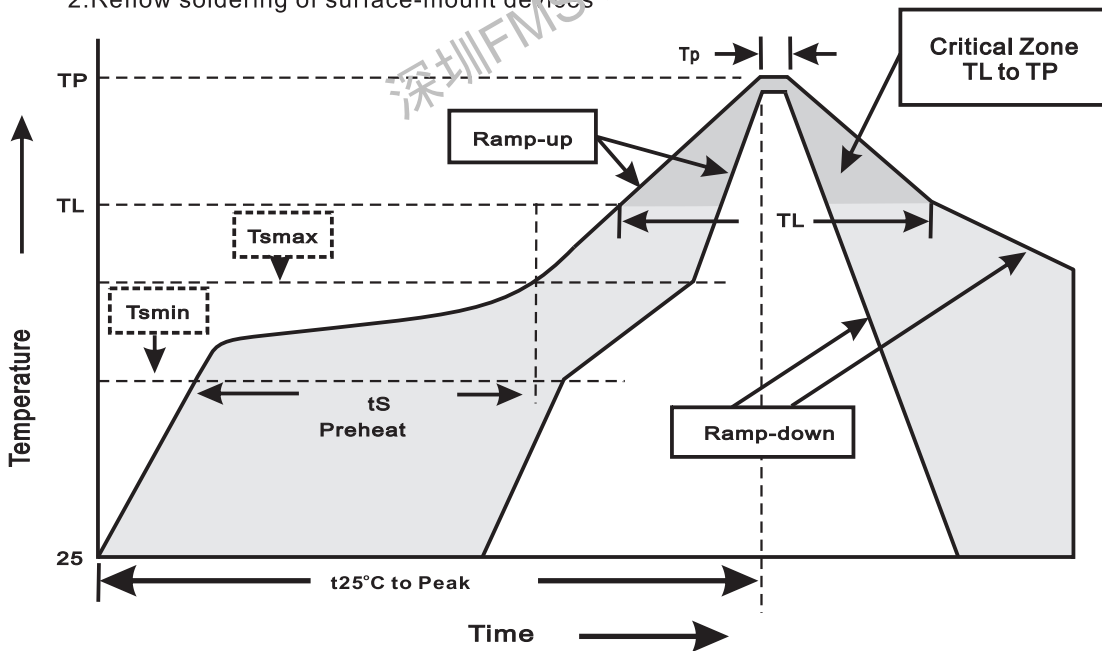
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## Reel packing

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*170*183	178	382*356*387	160,000	15.5
SMA-L	13"	7,500	4.0	15,000	337*337*37	330	350*330*360	120,000	14.2

## 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 <sub>L</sub> to T <sub>P</sub> )	<3°C/sec
Preheat -Temperature Min(T <sub>smmin</sub> ) -Temperature Max(T <sub>smmax</sub> ) -Time(min to max)(t <sub>s</sub> )	150°C 200°C 60~120sec
T <sub>smmax</sub> to T <sub>L</sub> -Ramp-upRate	<3°C/sec
Time maintained above: -Temperature(T <sub>L</sub> ) -Time(t <sub>L</sub> )	217°C 60~260sec
Peak Temperature(T <sub>P</sub> )	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(t <sub>p</sub> )	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes

**FM320-AL THRU FM3200-AL****High reliability test capabilities**

Item Test	Conditions	Reference
1. Solder Resistance	at $260\pm 5^{\circ}\text{C}$ for $10\pm 2\text{sec}$ . immerse body into solder $1/16''\pm 1/32''$	MIL-STD-750D METHOD-2031
2. Solderability	at $245\pm 5^{\circ}\text{C}$ for 5 sec.	MIL-STD-202F METHOD-208
3. High Temperature Reverse Bias	$V_R=80\%$ rate at $T_A=125^{\circ}\text{C}$ for 168 hrs.	MIL-STD-750D METHOD-1038
4. Forward Operation Life	Rated average rectifier current at $T_A=25^{\circ}\text{C}$ for 500hrs.	MIL-STD-750D METHOD-1027
5. Intermittent Operation Life	$T_A = 25^{\circ}\text{C}$ , $I_F = I_O$ On state: power on for 5 min. off state: power off for 5 min. on and off for 500 cycles.	MIL-STD-750D METHOD-1036
6. Pressure Cooker	$15P_{SIG}$ at $T_A=121^{\circ}\text{C}$ for 4 hrs.	JESD22-A102
7. Temperature Cycling	$-55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$ dwelled for 30 min. and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
8. Thermal Shock	$0^{\circ}\text{C}$ for 5 min. rise to $100^{\circ}\text{C}$ for 5 min. total 10 cycles.	MIL-STD-750D METHOD-1056
9. Forward Surge	8.3ms single half sine-wave superimposed on rated load, one surge.	MIL-STD-750D METHOD-4066-2
10. Humidity	at $T_A=85^{\circ}\text{C}$ , RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
11. High Temperature Storage Life	at $175^{\circ}\text{C}$ for 1000 hrs.	MIL-STD-750D METHOD-1031