

FMCRZ100-20 Thru FMCRZ100-60**List**

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FMCRZ100-20 Thru FMCRZ100-60

0.8A Sensitive Gate Silicon Controlled Rectifiers Blocking Voltage : 200 ~ 600V

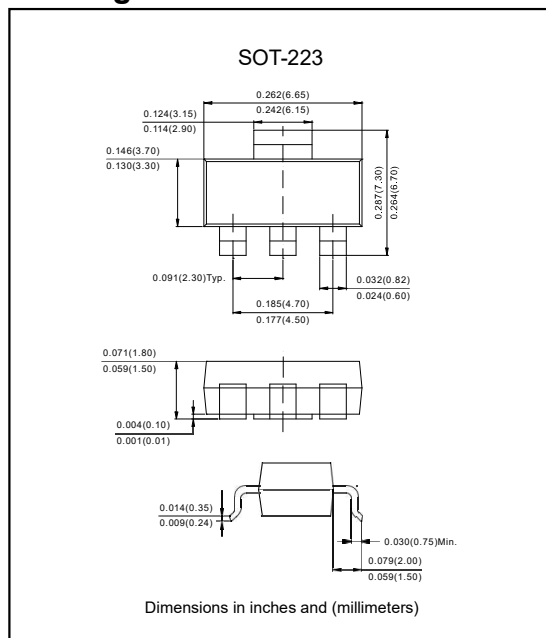
Features

- Sensitive gate allows triggering by micro controllers and other logic circuits.
- Blocking voltage 200V to 600V.
- On-state current rating of 0.8A RMS at 80°C.
- High surge current capability -10A.
- Minimum and maximum values of I_{GT} , V_{GT} and I_H specified for ease of design.
- Immunity to dv/dt -20V/ μ sec minimum at 110°C.
- Glass-passivated surface for reliability and uniformity.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen free parts, ex. FMCRZ100-20-H.

Mechanical data

- Epoxy : UL94-V0 reted Flame retardent.
- Case : Molded plastic, SOT-223.
- Terminals : Solder plated, solder able per MIL-STD-750, Method 2026.
- Polarity : Indicated by cathode band.
- Mounting Position : Any.

Package outline



Absolute maximum ratings ($T_A=25^\circ\text{C}$, Unless otherwise noted)

Parameter	Symbol	Ratings			Unit
		FMCRZ100-20	FMCRZ100-40	FMCRZ100-60	
Peak repetitive off-state voltage (Note 1) ($T_J=-40 \sim 110^\circ\text{C}$, Sine wave, 50 ~ 60Hz; Gate open)	V_{DRM} V_{RRM}	200	400	600	V
On-state RMS current ($T_c=80^\circ\text{C}$) 180°C condition angles	$I_{T(RMS)}$	0.8			A
Peak non-repetitive surge current (1/2 cycle, Sine Wave, 60Hz, $T_J=25^\circ\text{C}$)	I_{TSM}	10			A
Circuit fusing considerations ($t=8.3$ ms)	I^2t	0.415			A ² s
Forward peak gate power ($T_A=25^\circ\text{C}$, Pulse width $\leq 1.0\mu\text{s}$)	P_{GM}	0.1			W
Forward average gate power ($T_A=25^\circ\text{C}$, $t=8.3\text{ms}$)	$P_{G(AV)}$	0.01			W
Peak gate current – forward ($T_A=25^\circ\text{C}$, Pulse width $\leq 1.0\mu\text{s}$)	I_{GM}	1			A
Peak gate voltage – reverse ($T_A=25^\circ\text{C}$, Pulse width $\leq 1.0\mu\text{s}$)	V_{GRM}	5			V
Operating Junction temperature range (Rated V_{RRM} and V_{DRM})	T_J	-40 to +110			°C
Storage temperature range	T_{STG}	-40 to +150			°C
Thermal resistance junction to ambient	$R_{\theta JA}$	180			°C/W

Note :

Absolute maximum ratings are those values beyond which the device could be permanently damaged.
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

FMCRZ100-20 Thru FMCRZ100-60

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off characteristics						
Peak forward or reverse blocking current	I_{DRM}	$V_{\text{D}}=\text{Rated } V_{\text{DRM}} \text{ and } V_{\text{RRM}}; R_{\text{GK}}=1\text{k}\Omega \text{ (} T_{\text{c}}=25^{\circ}\text{C} \text{)}$			10	μA
	I_{RRM}	$V_{\text{D}}=\text{Rated } V_{\text{DRM}} \text{ and } V_{\text{RRM}}; R_{\text{GK}}=1\text{k}\Omega \text{ (} T_{\text{c}}=110^{\circ}\text{C} \text{)}$			100	
On characteristics						
Peak forward on-state voltage (Note 2)	V_{TM}	$I_{\text{TM}}=1\text{A Peak (} T_{\text{A}}=25^{\circ}\text{C} \text{)}$			1.7	V
Gate Trigger Current (Continuous DC) (Note 3)	I_{GT}	$V_{\text{AK}}=7\text{Vdc, } R_{\text{L}}=100\Omega \text{ (} T_{\text{c}}=25^{\circ}\text{C} \text{)}$	30		100	μA
Holding Current	I_{H}	$V_{\text{AK}}=7\text{Vdc, initiating current}=20\text{mA (} T_{\text{c}}=25^{\circ}\text{C} \text{)}$		0.5	5	mA
		$V_{\text{AK}}=7\text{Vdc, initiating current}=20\text{mA (} T_{\text{c}}=-40^{\circ}\text{C} \text{)}$			10	
Latch Current	I_{L}	$V_{\text{AK}}=7\text{V, } I_{\text{g}}=200\mu\text{A (} T_{\text{c}}=25^{\circ}\text{C} \text{)}$		0.6	10	mA
		$V_{\text{AK}}=7\text{V, } I_{\text{g}}=200\mu\text{A (} T_{\text{c}}=-40^{\circ}\text{C} \text{)}$			15	
Gate trigger voltage (Continuous DC)	V_{GT}	$V_{\text{AK}}=7V_{\text{DC}}, R_{\text{L}}=100\Omega \text{ (} T_{\text{c}}=25^{\circ}\text{C} \text{)}$		0.62	0.8	V
		$V_{\text{AK}}=7V_{\text{DC}}, R_{\text{L}}=100\Omega \text{ (} T_{\text{c}}=-40^{\circ}\text{C} \text{)}$			1.2	
Dynamic parameters						
Critical rate of rise of off-state voltage	dv/dt	$V_{\text{D}}=\text{Rated } V_{\text{DRM}}, \text{ Exponential waveform, } R_{\text{GK}}=1\text{K}\Omega, T_{\text{J}}=110^{\circ}\text{C}$	20	35		V/ μs
Critical rate of rise of on-state current	di/dt	$P_{\text{K}}=20\text{A; } P_{\text{W}}=10\mu\text{s; diG/dt}=1\text{A}/\mu\text{s, } I_{\text{gt}}=20\text{mA}$			50	A/ μs

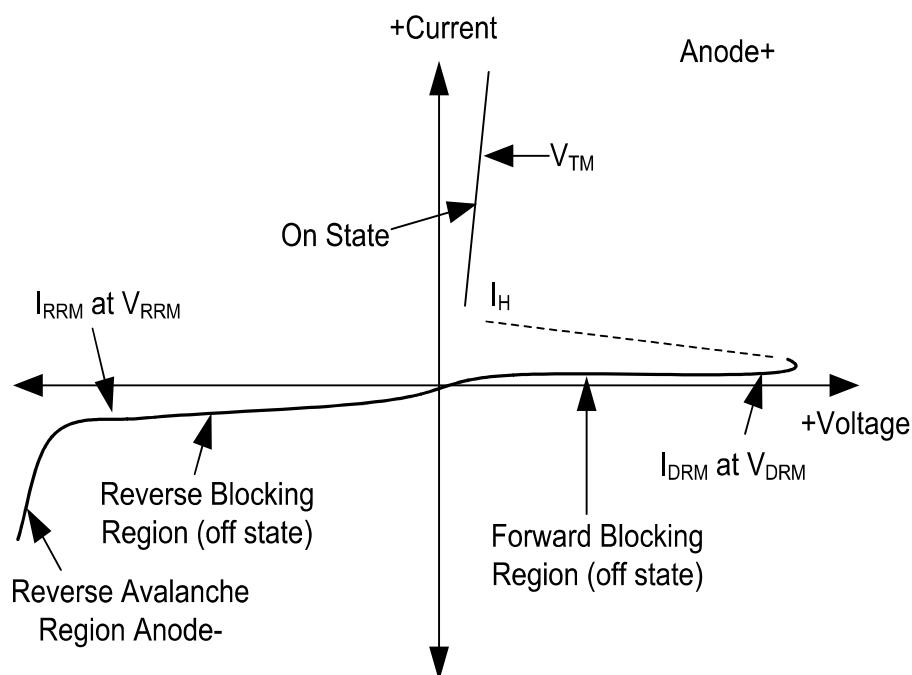
Note:

- V_{DRM} and V_{RRM} for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; however, positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.
- Indicates Pulse Test Width $\leq 1.0\text{ms}$, duty cycle $\leq 1\%$.
- Does not include R_{GK} in measurement.

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Voltage current characteristic of SCR

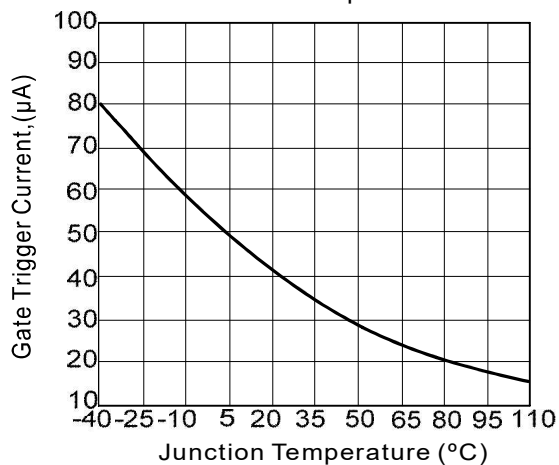
Parameter	Symbol
Peak repetitive off state forward voltage	V_{DRM}
Peak forward blocking current	I_{DRM}
Peak repetitive off state reverse voltage	V_{RRM}
Peak reverse blocking current	I_{RRM}
Peak on state voltage	V_{TM}
Holding current	I_H



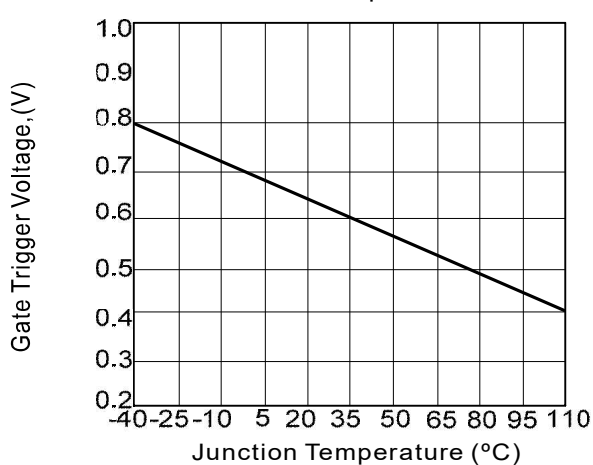
FMCRZ100-20 Thru FMCRZ100-60

Typical characteristics Curves

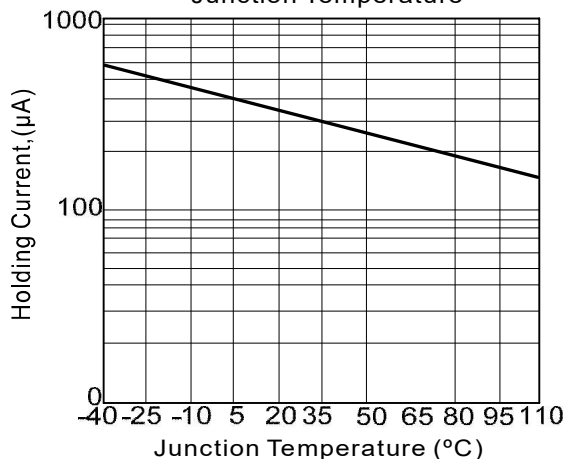
Typical Gate Trigger Current vs. Junction Temperature



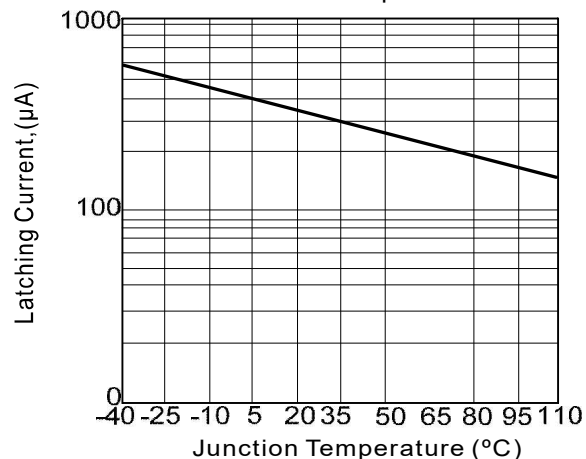
Typical Gate Trigger Voltage vs. Junction Temperature



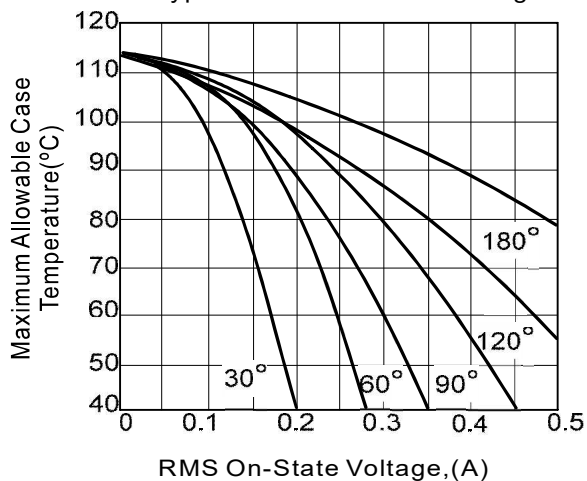
Typical Holding Current vs. Junction Temperature



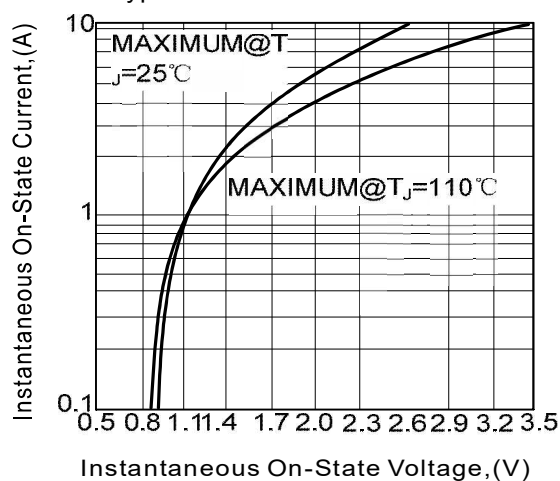
Typical Latching Current vs. Junction Temperature



Typical RMS Current Derating

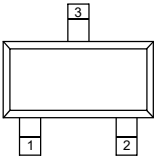
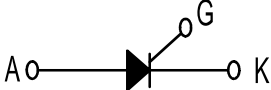


Typical On-State Characteristics

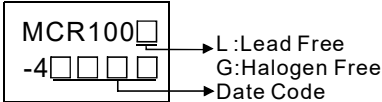
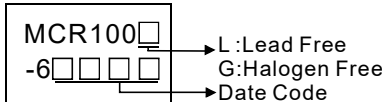
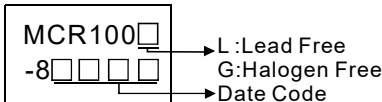


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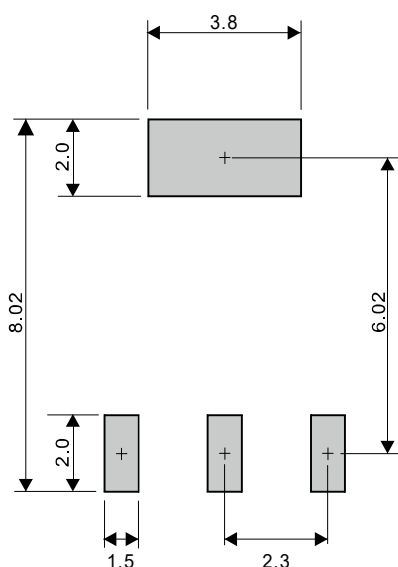
Pinning information

Pin	Simplified outline	Symbol
Pin1 K: Cathode Pin2 G: Gate Pin3 A: Anode		

Marking

FMCRZ100-20	FMCRZ100-40	FMCRZ100-60
		

Suggested solder pad layout

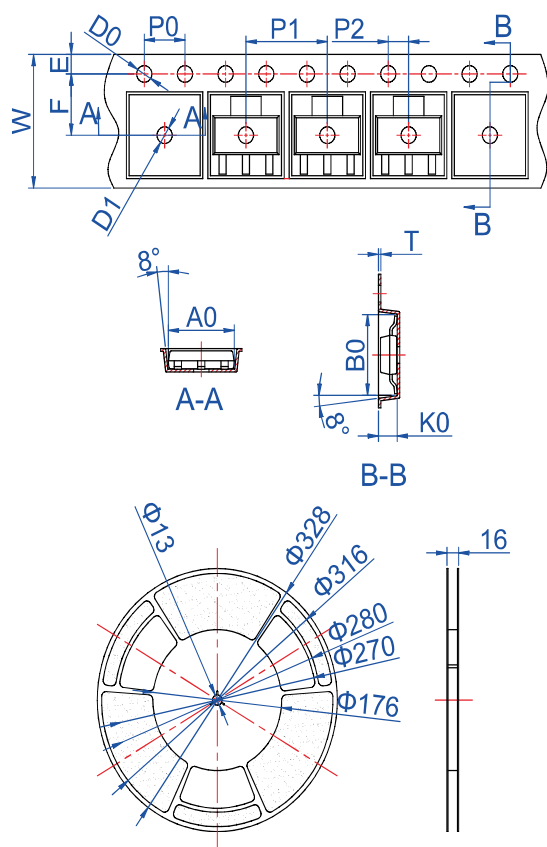


Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.050\text{mm}$.
3. The pad layout is for reference purposes only.

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Packing information

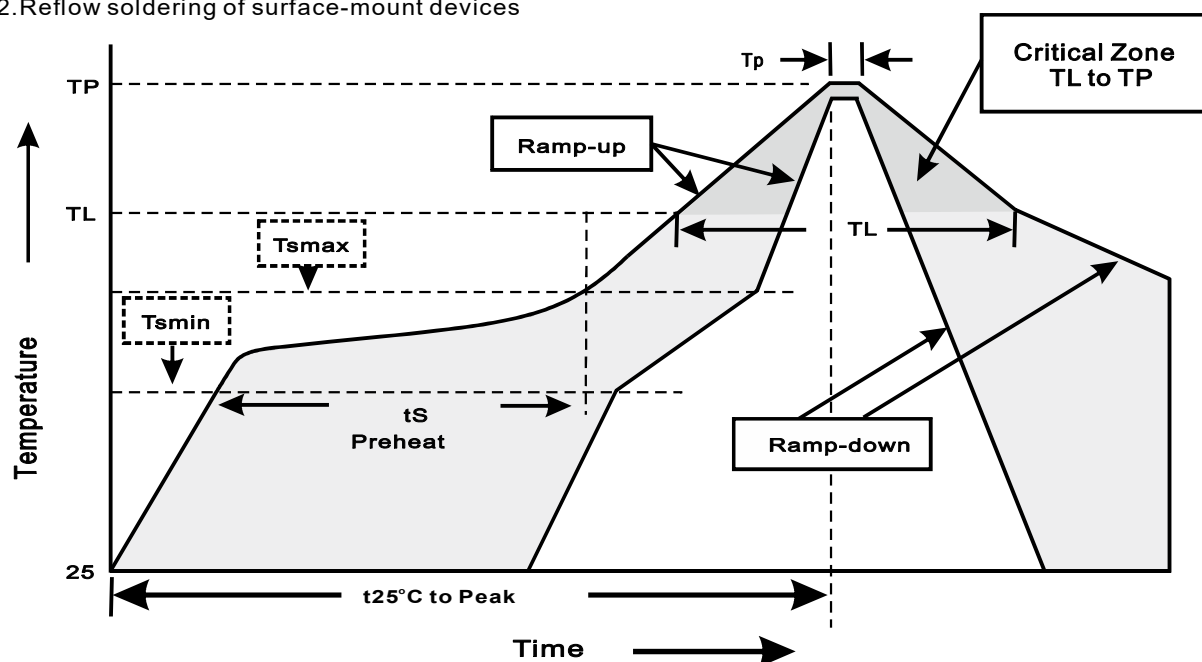


Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	12.00		12.20	0.472		0.483
E	1.65	1.75	1.85	0.065	0.069	0.073
F	5.45	5.50	5.55	0.214	0.217	0.219
D0	1.50		1.60	0.059		0.063
D1	1.55		1.80	0.061		0.071
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.95	2.00	2.05	0.077	0.079	0.081
10P0	39.80	40.00	40.20	1.567	1.575	1.583
A0	6.73	6.83	6.93	0.265	0.269	0.273
B0	7.30	7.40	7.50	0.287	0.291	0.295
K0	1.78	1.88	1.98	0.070	0.074	0.078
T	0.25	0.30	0.35	0.010	0.012	0.014

Reel packing

Outline	Device Package	Reel Size	Reel (pcs)	Per Carton (pcs)
Taping	SOT-223	13 inch	4,000	40,000

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



Profile Feature	Soldering Condition
Average ramp-up rate(T_L to T_P)	$<3^{\circ}\text{C}/\text{sec}$
Preheat -Temperature Min(T_{min}) -Temperature Max(T_{max}) -Time(min to max)(t_s)	150°C 200°C $60\sim 120\text{sec}$
T_{max} to T_L -Ramp-upRate	$<3^{\circ}\text{C}/\text{sec}$
Time maintained above: -Temperature(T_L) -Time(t_L)	217°C $60\sim 260\text{sec}$
Peak Temperature(T_P)	$255^{\circ}\text{C}-0/+5^{\circ}\text{C}$
Time within 5°C of actual Peak Temperature(t_P)	$10\sim 30\text{sec}$
Ramp-down Rate	$<6^{\circ}\text{C}/\text{sec}$
Time 25°C to Peak Temperature	$<6\text{minutes}$