

FMCRP12-60

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FMCRP12-60

12.0A 600V Sensitive Gate Silicon Controlled Rectifiers Blocking Voltage

Features

- $V_D / V_R = 600V$, $I_{T(RMS)} = 12A$, $I_{GT(Max)} = 15mA$.
- High thermal cycling performance.
- Very high current surge capacity.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen free parts, ex. FMCRP12-60-H.

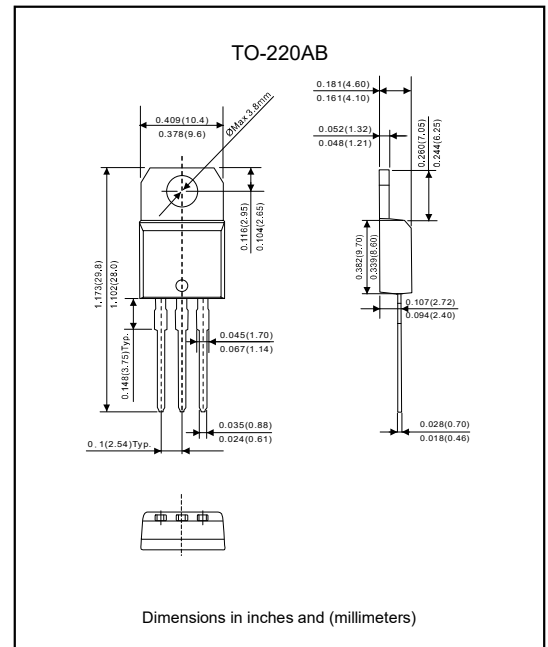
Applications

- Line rectifying 50/60 Hz.
- Soft start AC motor control.
- DC motor control.
- Power converter.
- AC power control.
- Lighting and temperature control.

Mechanical data

- Epoxy : UL94-V0 reted Flame retardent.
- Case : Molded plastic, TO-220AB.
- Terminals : Solder plated, solder able per MIL-STD-750, Method 2026.
- Mounting Position : Any.

Package outline



Maximum ratings ($T_A = 25^\circ C$, Unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Repetitive peak off-state voltage	V_{DRM}	600	V
Repetitive peak reverse voltage	V_{RRM}	600	V
Non- repetitive surge peak off- state voltage	V_{DSM}	$V_{DRM} + 100$	V
Non- repetitive peak reverse voltage	V_{RSM}	$V_{RRM} + 100$	V
RMS on-state current ($T = 110^\circ C$)	$I_{T(RMS)}$	12	A
Non-repetitive surge peak on-state current (180° conduction angle, $F = 50Hz$)	I_{TSM}	140	A
Average on-state current (180° conduction angle)	$I_{T(AV)}$	8	A
Circuit fusing considerations I^2t value for fusing ($t_p = 10ms$)	I^2t	98	A^2s
Peak gate current	I_{GM}	4	A
Average gate power dissipation	$P_{G(AV)}$	1	W
Critical rate of rise of on-state current ($I = 2 \times I_{GT} \times t_r \leq 100ns$)	di/dt	50	$A/\mu s$
Thermal resistance, junction to case (DC)	$R_{\theta JC}$	1.3	$^\circ C/W$
Operating Junction temperature	T_J	+125	$^\circ C$
Storage temperature range	T_{STG}	-40 to +150	$^\circ C$

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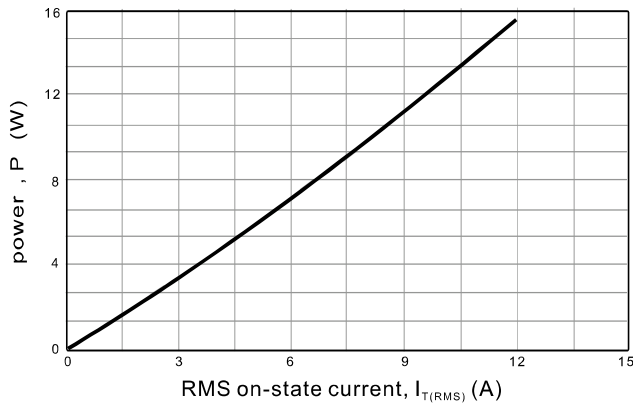
Electrical characteristics (At T=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On characteristics						
Gate Trigger Current	I_{GT}	$V=12V, R=140\Omega$			15	mA
Holding Current	I_H	$I_T=50mA$			40	mA
Latch Current	I_L	$I_G=1.2 I_{GT}$			60	mA
Gate trigger voltage	V_{GT}	$V=12V, R=140\Omega$			1.3	V
Non-triggering gate voltage	V_{GD}	$V_D=V_{DRM}, T_J=125^\circ C, R=1K\Omega$	0.2			V
Static characteristics						
Peak forward on-state voltage	V_{TM}	$I_{TM}=24A, t_p=380\mu s, T_J=25^\circ C$			1.55	V
Forward and reverse leakage current	I_{DRM}	$V_D=V_{DRM}, V_R=V_{RRM}, T_J=25^\circ C$			5	μA
Leakage current for diodes	I_{RRM}	$V_D=V_{DRM}, V_R=V_{RRM}, T_J=125^\circ C$			2	mA
Dynamic parameters						
Critical rate of rise of off-state voltage	dV/dt	$V_D=2/3 V_{DRM}, \text{gate open } T_J=125^\circ C$	400			V/ μs

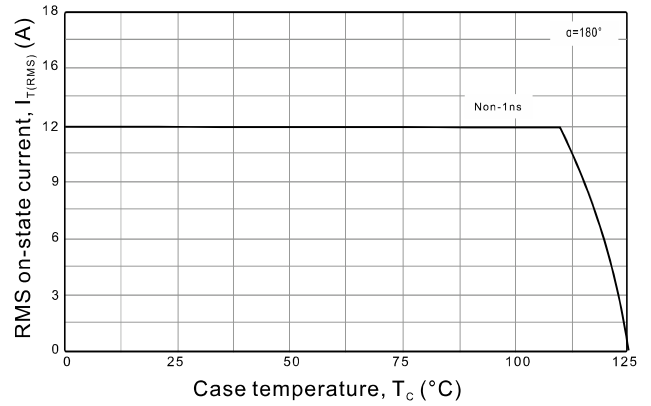
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Rating and characteristic curves

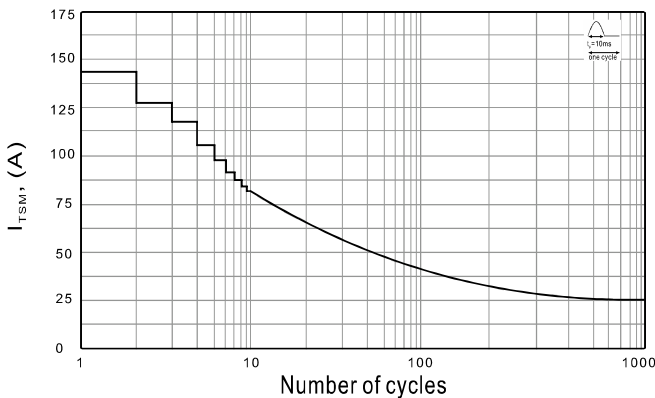
Maximum power dissipation vs. RMS on state current



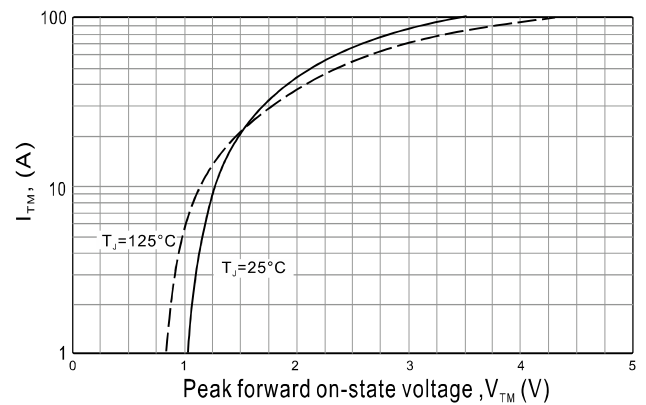
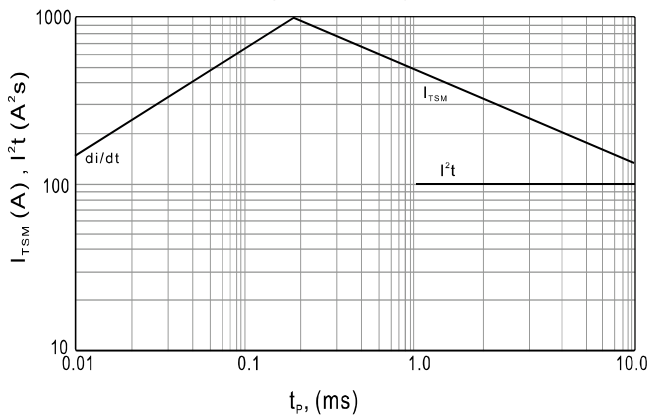
RMS on-state current vs. Case temperature



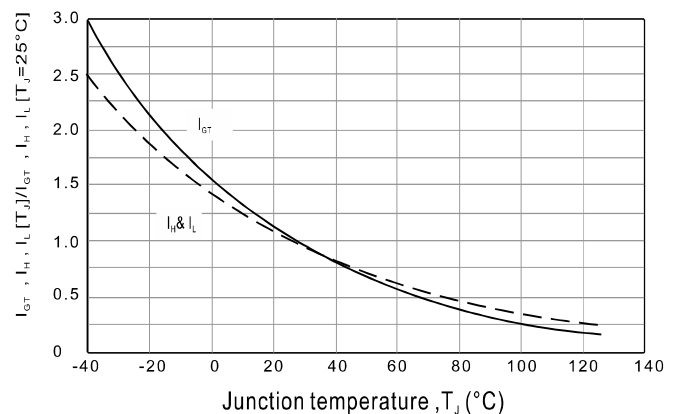
Surge peak on-state current vs. Number of



On-state characteristics (maximum values)

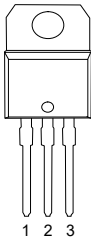
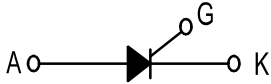
Non-repetitive surge peak on-state current for a sinusoidal pulse with width $t_p < 10\text{ms}$, and corresponding value of $i^2 t$ ($di/dt < 50\text{A}/\mu\text{s}$)

Relative variations of gate trigger current holding current and latching current vs. Junction temperature



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Pinning information

Pin	Simplified outline	Symbol
Pin 1 K: Cathode Pin 2 G: Gate Pin 3 A: Anode		

Marking

Type number	Marking code
FMCRP12-60	S1215-6B

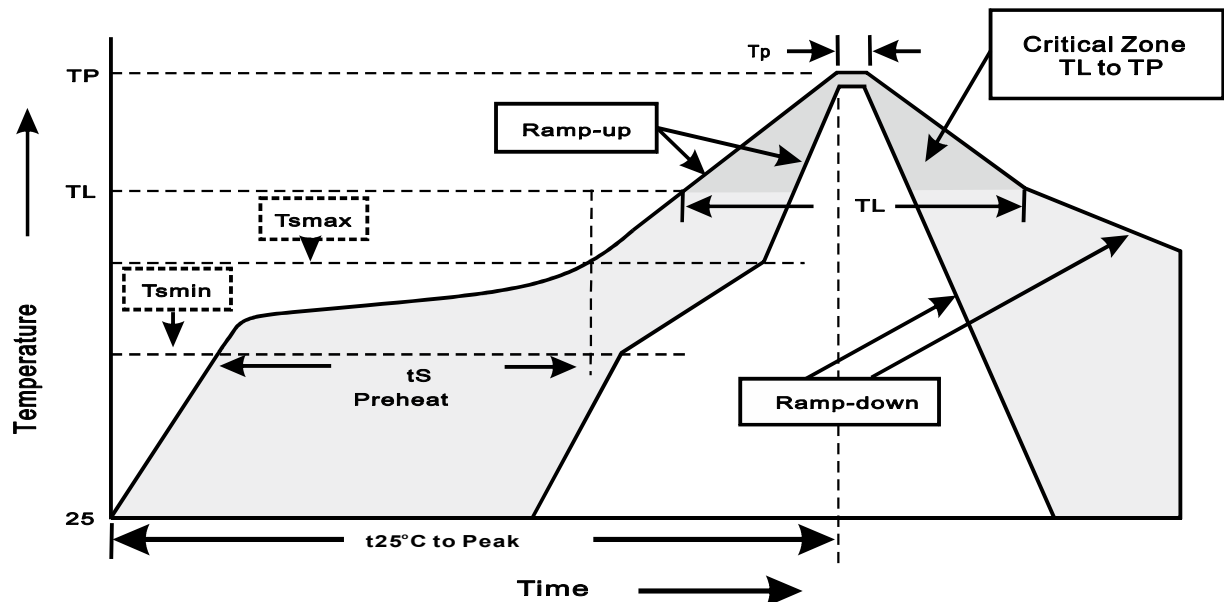
Packing Information

Device	Outline	Device Package	Tube (pcs)
FMCRP12-60	Tube	TO-220AB	50

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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	<3°C/sec
Time 25°C to Peak Temperature	<6minutes