

FMCRP20-60

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20.0A 600V Sensitive Gate Silicon Controlled Rectifiers Blocking Voltage

Features

- $V_D / V_R = 600V$, $I_{T(RMS)} = 20A$, $I_{GT(Max)} = 15mA$.
- High thermal cycling performance and high voltage capacity.
- Very high current surge capacity.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates halogen free parts, ex. FMCRP20-60-H.

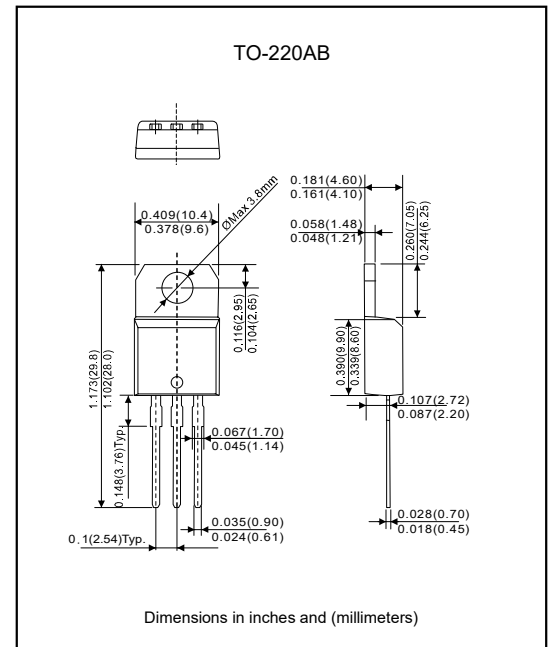
Applications

- 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 ($T = 25^\circ C$)	V_{DRM}	600	V
Repetitive peak reverse voltage ($T = 25^\circ C$)	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 ($T = 110^\circ C$)	$I_{T(RMS)}$	20	A
Non-repetitive surge peak on-state current (180° conduction angle, $F = 50Hz$)	I_{TSM}	220	A
Average on-state current (180° conduction angle)	$I_{T(AV)}$	14	A
Circuit fusing considerations I^2t value for fusing ($t_p = 10ms$)	I^2t	240	A^2s
Peak gate current	I_{GM}	4	A
Peak gate power	$P_{G(AV)}$	1	W
Critical rate of rise of on-state current ($I = 2x I_{GT}$, $t_r \leq 100ns$)	di/dt	50	$A/\mu s$
Thermal resistance, junction to case (DC)	$R_{\theta JC}$	1	$^\circ C/W$
Operating Junction temperature range	T_J	+125	$^\circ C$
Storage temperature range	T_{STG}	-40 to +150	$^\circ C$

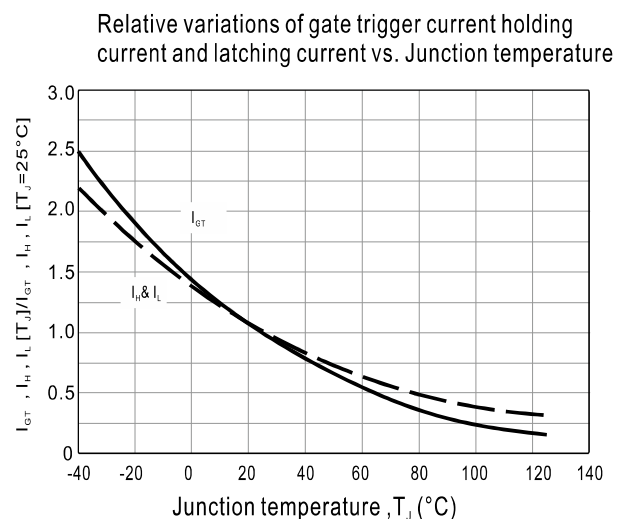
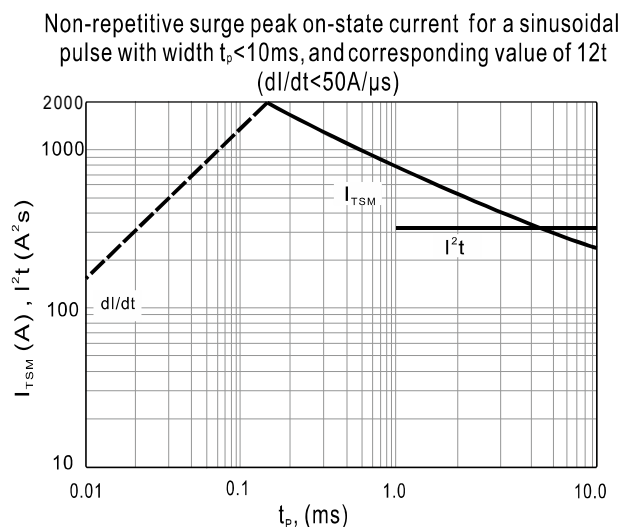
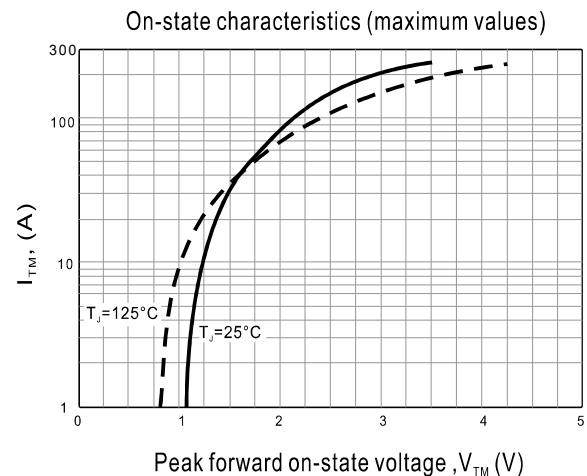
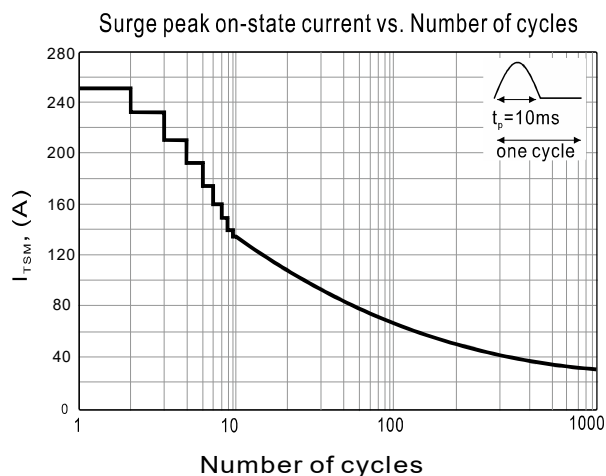
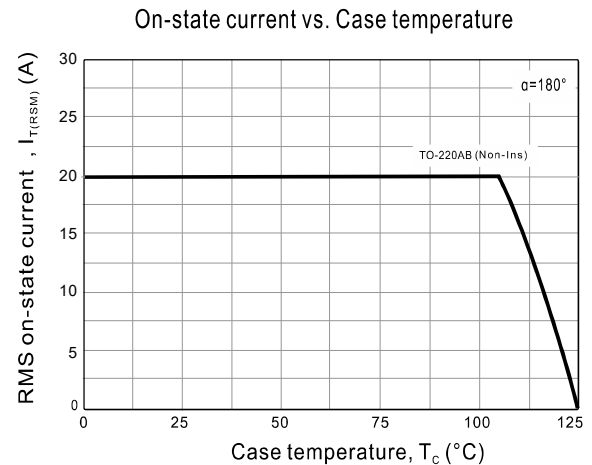
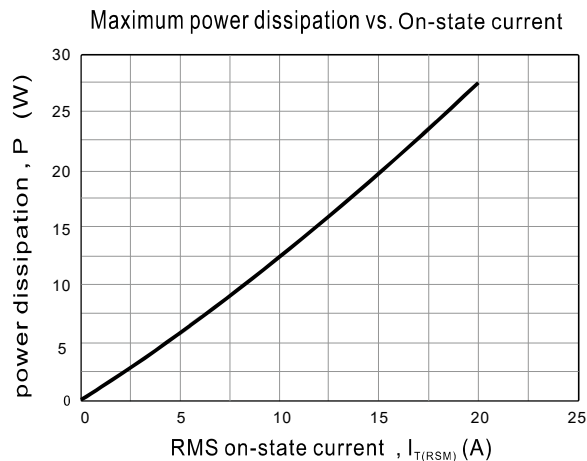
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Electrical characteristics (At T=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On characteristics						
Gate Trigger Current	I_{GT}	V=12V, R=140Ω			15	mA
Holding Current	I_H	$I_T=50\text{mA}$			50	mA
Latch Current	I_L	$I_G=1.2 I_{GT}$			60	mA
Gate trigger voltage	V_{GT}	V=12V, R=140Ω			1.3	V
Non-triggering gate voltage	V_{GD}	$V_D=V_{DRM}$, $T_J=125^\circ\text{C}$	0.2			V
Static characteristics						
Peak forward on-state voltage	V_{TM}	$I_{TM}=40\text{A}$, $t_p=380\mu\text{s}$, $T_J=25^\circ\text{C}$			1.6	V
Forward and reverse leakage current	I_{DRM}	$V_D=V_{DRM}$, $V_R=V_{RRM}$, $T_J=25^\circ\text{C}$			5	μA
Leakage current for diodes	I_{RRM}	$V_D=V_{DRM}$, $V_R=V_{RRM}$, $T_J=125^\circ\text{C}$			2	mA
Dynamic parameters						
Critical rate of rise of off-state voltage	dV/dt	$V_D=2/3 V_{DRM}$, gate open $T_J=125^\circ\text{C}$	500			V/μs

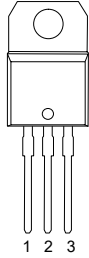
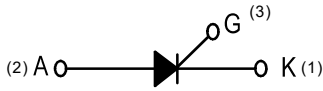
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Rating and characteristic curves



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Pinning information

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

Marking

Type number	Marking code
FMCRP20-60	S2015-6B YYWW

*YYWW : Wafer lot code.
 YY : Year.
 WW : Week.

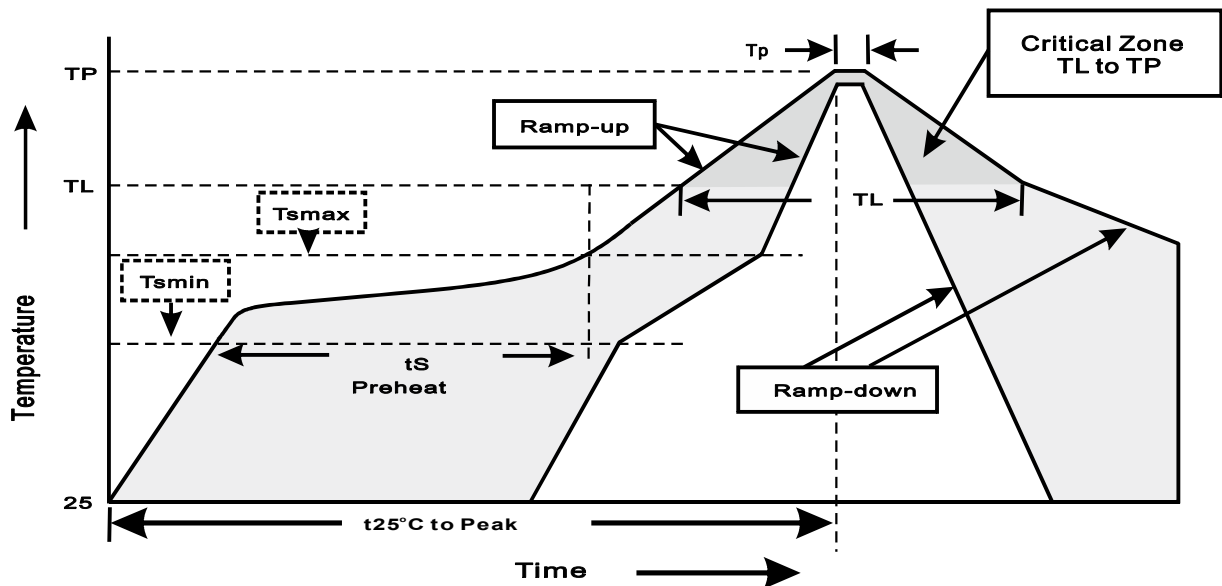
Tube packing

PACKAGE	TUBE (pcs)	TUBE SIZE (m/m)	BOX (pcs)	INNER BOX (m/m)	CARTON SIZE (m/m)	CARTON (pcs)
TO-220AB	50	535*32*7.5	2,000	550*167*75	570*345*170	8,000

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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