

FMBCRPAF16-120

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FMBCRPAF16-120

16A 1200V Triode AC Semiconductor Switch

Features

- V_D / V_R : 1200V, $I_{T(RMS)}$: 16A, I_{GT} : 5mA.
- Glass passivated junctions.
- High voltage and surge capability.
- Low thermal resistance and durability.
- Triggering in all four quadrants.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex.FMBCRPAF16-120-H.

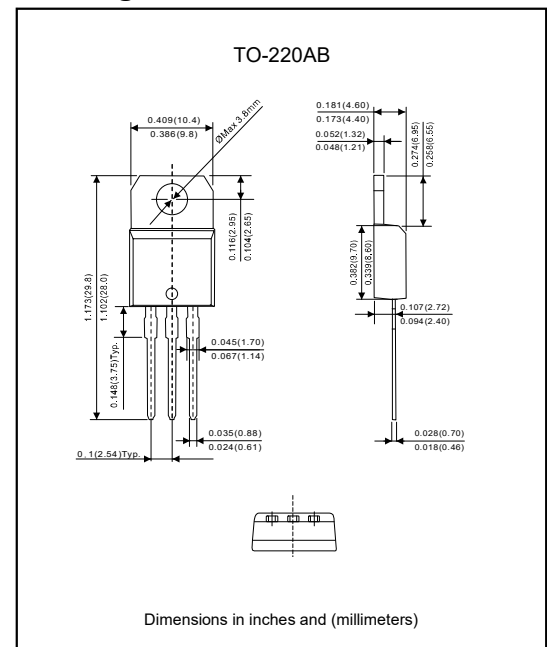
Applications

- Static relays.
- Heating regulation.
- In-duction motor starting circuits.
- Phase control operation in light dimmers.
- Motor speed controllers.

Mechanical data

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

Package outline



Maximum ratings (At $T_c=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Repetitive peak off-state voltage ($T = 25^\circ\text{C}$)	V_{DRM}	1200	V
Repetitive peak reverse voltage ($T = 25^\circ\text{C}$)	V_{RRM}	1200	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 ($T_c = 86^\circ\text{C}$)	$I_{T(RMS)}$	16	A
Non repetitive surge peak on-state current (180° conduction angle, $f = 50\text{Hz}$)	I_{TSM}	160	A
I^2t value for fusing ($t_p = 10\text{ms}$)	I^2t	128	A^2S
Critical rate of rise of on-state current ($I = 2 \times I_{GT}$, $t_r \leq 100\text{ ns}$)	di/dt	50	$\text{A}/\mu\text{S}$
Peak gate current	I_{GM}	4	A
Average gate power dissipation	$P_{G(AV)}$	1	W
Operating junction temperature range	T_J	-40 to +125	$^\circ\text{C}$
Storage junction temperature range	T_{STG}	-40 to +150	$^\circ\text{C}$
Junction to case thermal resistance (AC)	$R_{\theta JC}$	2.1	$^\circ\text{C}/\text{W}$

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Electrical characteristics ($T_c=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Quadrant	Min.	Typ.	Max.	Unit
Gate trigger current	I_{GT}	$V_D=12\text{V}$	I-II-III			5	mA
			IV			10	
Gate trigger voltage	V_{GT}		ALL			1.5	V
Gate Non-trigger voltage	V_{GD}	$V_D=V_{DRM}$, $T_J=125^\circ\text{C}$	ALL	0.2			V
Latching current	I_L	$I_G=1.2I_{GT}$	I-III-IV			5	mA
			II			10	
Holding current	I_H	$I_T=200\text{mA}$				5	mA
Critical rate of rise of off-state voltage	dv/dt	$V_D=2/3V_{DRM}$ gate open, $T_J=125^\circ\text{C}$		15			V/ μs

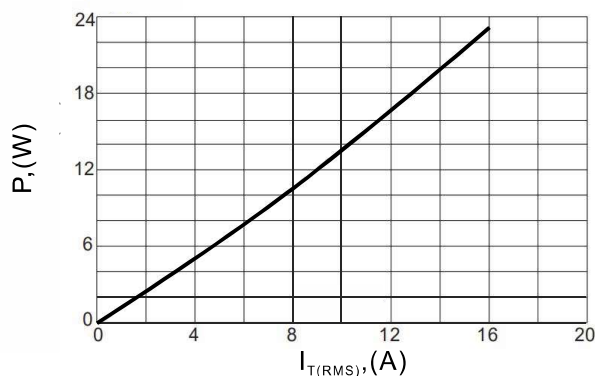
Static characteristics

Peak on-state voltage	V_{TM}	$I_{TM}=22.5\text{A}$, $t_p=380\mu\text{s}$ ($T_J=25^\circ\text{C}$)				1.55	V
Repetitive peak off-state current	I_{DRM}	$V_D=V_{DRM}$, $V_R=V_{RRM}$	$(T_J=25^\circ\text{C})$			5	μA
Repetitive peak reverse current	I_{RRM}					2	mA

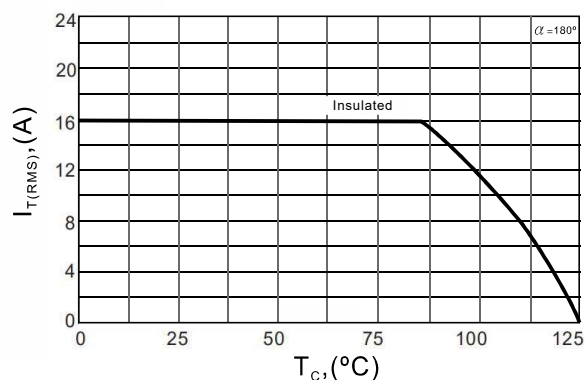
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Rating and characteristic curves

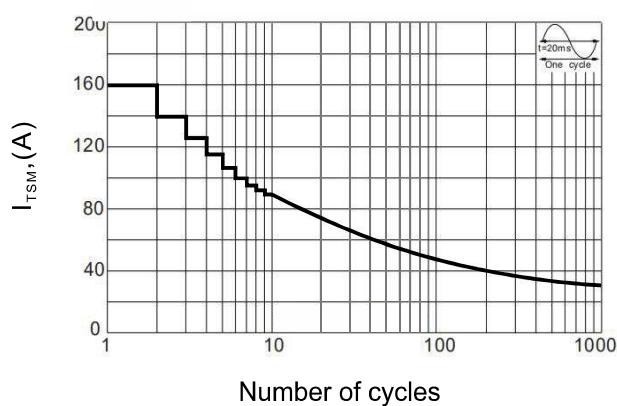
Maximum power dissipation vs. On-state current



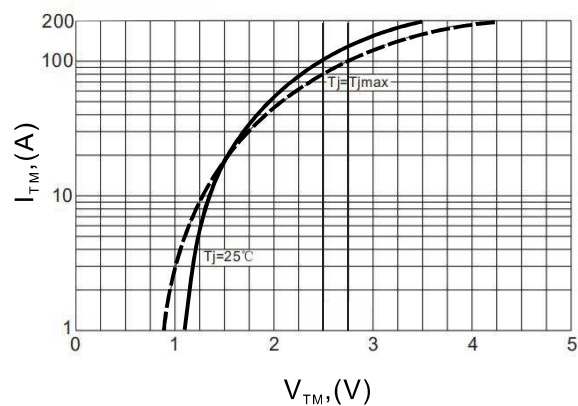
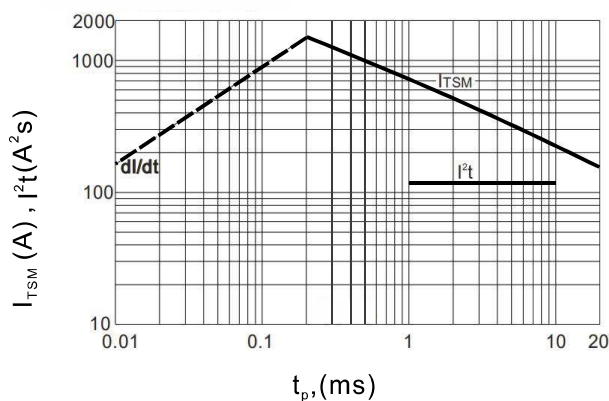
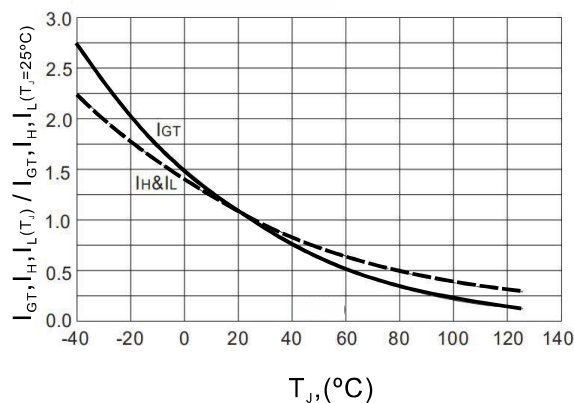
On-state current vs. Case temperature



Surge peak on-state current vs. Number of cycles

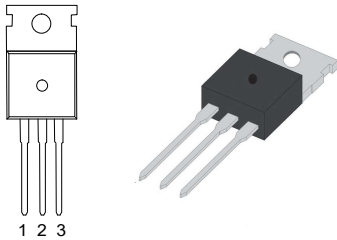
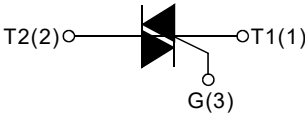


On-state characteristics (maximum values)

Non-repetitive surge peak on-state current
(for a sinusoidal pulse with width $t_p < 10ms$,
and corresponding value of $I^2 t$ ($dI/dt < 50A/\mu s$))Relative variations of gate trigger current
holding current and latching current vs.
junction temperature

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Pinning information

Pin	Simplified outline	Symbol
Pin1 T1 (Main Terminal-1) Pin2 T2 (Main Terminal-2) Pin3 Gate		

Marking

Type number	Marking code
FMBCRPAF16-120	F1605-12A

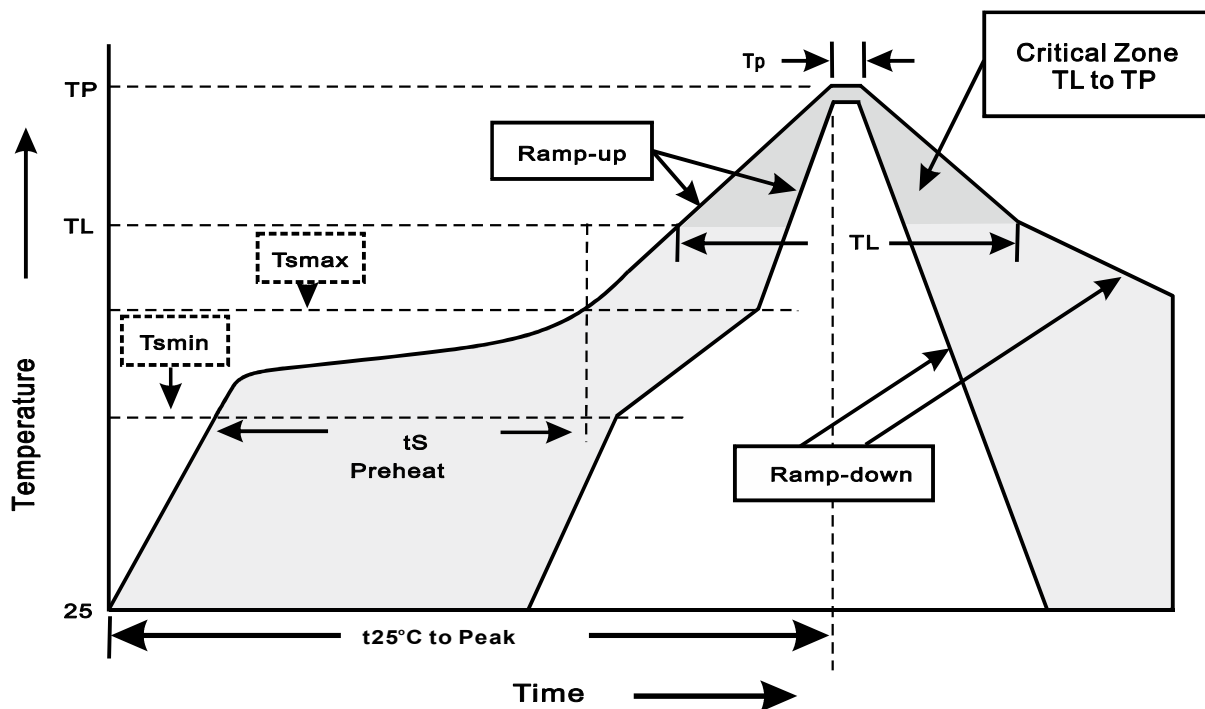
Packing Information

Device	Outline	Device Package	Tube (pcs)	Inner Box (pcs)	Per Carton (pcs)
FMBCRPAF16-120	Tube	TO-220AB	50	1,000	8,000

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Suggested thermal profiles for soldering processes

- 1.Storage environment: Temperature= $5^{\circ}\text{C}\sim 40^{\circ}\text{C}$ Humidity= $55\%\pm 25\%$
- 2.Reflow soldering of surface-mount devices



3.Reflow soldering

Profile Feature	Soldering Condition
Average ramp-up rate(T_L to T_P)	$<3^{\circ}\text{C}/\text{sec}$
Preheat -Temperature Min(T_{smin}) -Temperature Max(T_{smax}) -Time(min to max)(t_s)	150°C 200°C $60\sim 120\text{sec}$
T_{smax} 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	$<3^{\circ}\text{C}/\text{sec}$
Time 25°C to Peak Temperature	$<6\text{minutes}$