

DATA SHEET

BTA212 series D, E and F
Three quadrant triacs
guaranteed commutation

Product specification

June 2003



Three quadrant triacs guaranteed commutation

BTA212 series D, E and F

GENERAL DESCRIPTION

Passivated guaranteed commutation triacs in a plastic envelope intended for use in motor control circuits or with other highly inductive loads. These devices balance the requirements of commutation performance and gate sensitivity. The "sensitive gate" E series and "logic level" D series are intended for interfacing with low power drivers, including micro controllers.

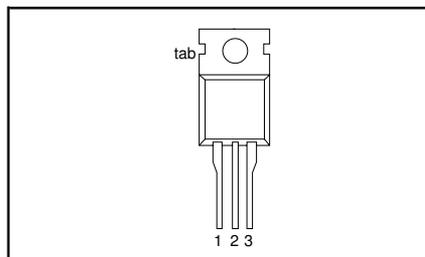
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V_{DRM}	Repetitive peak off-state voltages	600D 600E 600F 600	V
$I_{T(RMS)}$	RMS on-state current	12	A
I_{TSM}	Non-repetitive peak on-state current	95	A

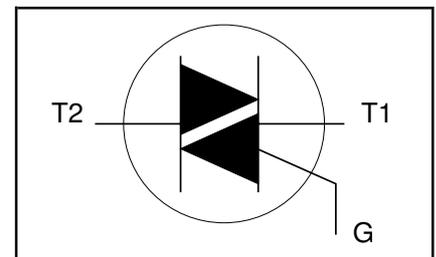
PINNING - TO220AB

PIN	DESCRIPTION
1	main terminal 1
2	main terminal 2
3	gate
tab	main terminal 2

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DRM}	Repetitive peak off-state voltages		-	600 ¹	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 99\text{ }^\circ\text{C}$	-	12	A
I_{TSM}	Non-repetitive peak on-state current	full sine wave; $T_j = 25\text{ }^\circ\text{C}$ prior to surge	-	95	A
I^2t	I^2t for fusing	$t = 20\text{ ms}$	-	105	A ² s
di_T/dt	Repetitive rate of rise of on-state current after triggering	$t = 16.7\text{ ms}$ $t = 10\text{ ms}$ $I_{TM} = 20\text{ A}; I_G = 0.2\text{ A};$ $di_G/dt = 0.2\text{ A}/\mu\text{s}$	-	45	A/ μs
I_{GM}	Peak gate current		-	2	A
P_{GM}	Peak gate power		-	5	W
$P_{G(AV)}$	Average gate power	over any 20 ms period	-	0.5	W
T_{stg}	Storage temperature		-40	150	$^\circ\text{C}$
T_j	Operating junction temperature		-	125	$^\circ\text{C}$

¹ Although not recommended, off-state voltages up to 800V may be applied without damage, but the triac may switch to the on-state. The rate of rise of current should not exceed 15 A/ μs .

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THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-mb}$	Thermal resistance junction to mounting base	full cycle	-	-	1.5	K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient	half cycle in free air	-	60	2.0	K/W
			-		-	K/W

STATIC CHARACTERISTICS

$T_j = 25\text{ °C}$ unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				...D	...E	...F	
BTA212-							
I_{GT}	Gate trigger current ²	$V_D = 12\text{ V}; I_T = 0.1\text{ A}$ T2+ G+ T2+ G- T2- G-	-	5	10	25	mA
			-	5	10	25	mA
			-	5	10	25	mA
I_L	Latching current	$V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$ T2+ G+ T2+ G- T2- G-	-	15	20	25	mA
			-	25	30	40	mA
			-	25	30	40	mA
I_H	Holding current	$V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$	-	15	25	30	mA
V_T	On-state voltage	$I_T = 17\text{ A}$	-	1.6			V
V_{GT}	Gate trigger voltage	$V_D = 12\text{ V}; I_T = 0.1\text{ A}$ $V_D = 400\text{ V}; I_T = 0.1\text{ A};$ $T_j = 125\text{ °C}$	0.25	1.5			V
				-			V
I_D	Off-state leakage current	$V_D = V_{DRM(max)}; T_j = 125\text{ °C}$	-	0.5			mA

DYNAMIC CHARACTERISTICS

$T_j = 25\text{ °C}$ unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.			MAX.	UNIT
			...D	...E	...F		
BTA212-							
dV_D/dt	Critical rate of rise of off-state voltage	$V_{DM} = 67\% V_{DRM(max)};$ $T_j = 110\text{ °C};$ exponential waveform; gate open circuit	30	60	70	-	V/ μ s
di_{com}/dt	Critical rate of change of commutating current	$V_{DM} = 400\text{ V}; T_j = 125\text{ °C};$ $I_{T(RMS)} = 12\text{ A};$ $dV_{com}/dt = 10\text{ V}/\mu\text{s};$ gate open circuit	1.0	8	21	-	A/ms
di_{com}/dt	Critical rate of change of commutating current	$V_{DM} = 400\text{ V}; T_j = 125\text{ °C};$ $I_{T(RMS)} = 12\text{ A};$ $dV_{com}/dt = 0.1\text{ V}/\mu\text{s};$ gate open circuit	3.5	16	32	-	A/ms

² Device does not trigger in the T2-, G+ quadrant.

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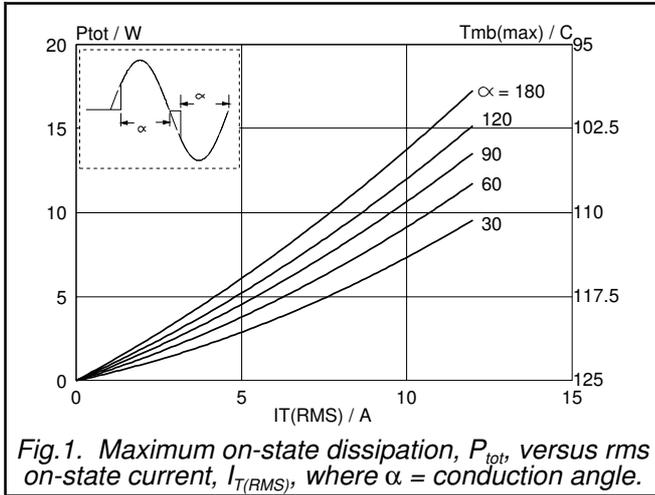


Fig. 1. Maximum on-state dissipation, P_{tot} , versus rms on-state current, $I_{T(RMS)}$, where α = conduction angle.

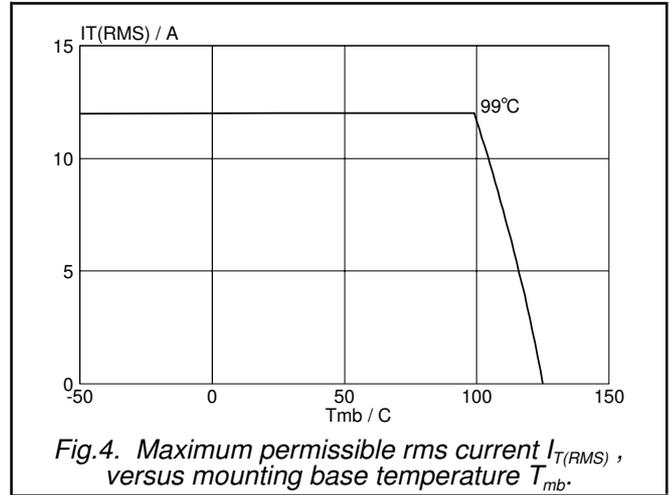


Fig. 4. Maximum permissible rms current $I_{T(RMS)}$, versus mounting base temperature T_{mb} .

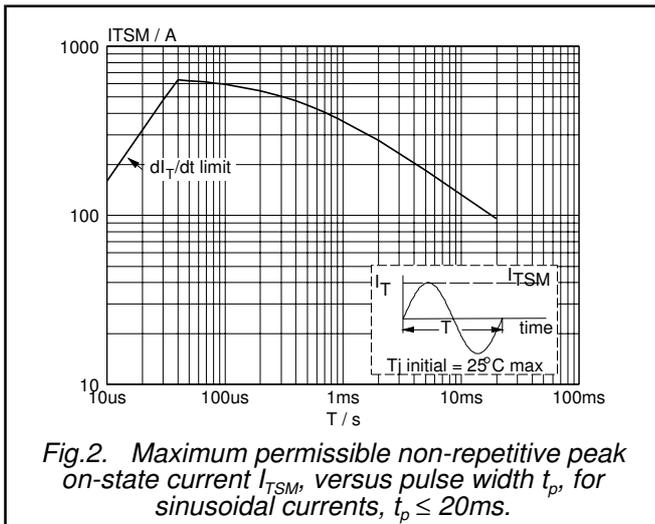


Fig. 2. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus pulse width t_p , for sinusoidal currents, $t_p \leq 20\text{ms}$.

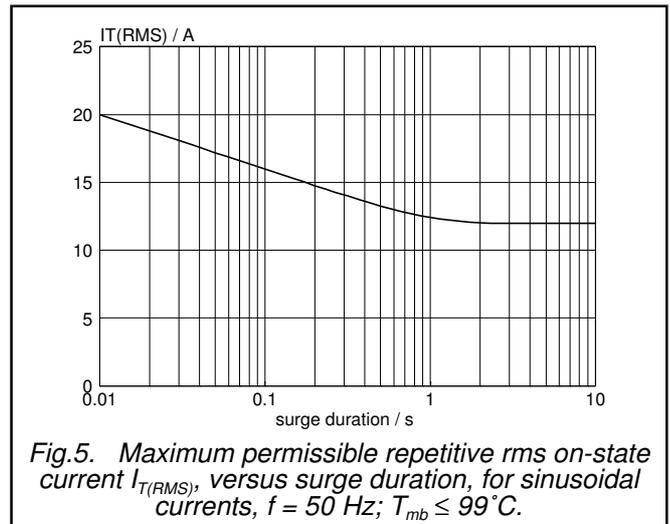


Fig. 5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, $f = 50\text{ Hz}$; $T_{mb} \leq 99^\circ\text{C}$.

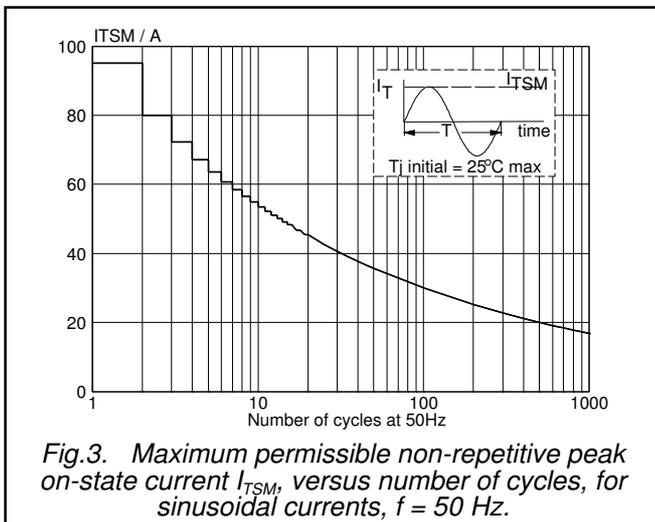


Fig. 3. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus number of cycles, for sinusoidal currents, $f = 50\text{ Hz}$.

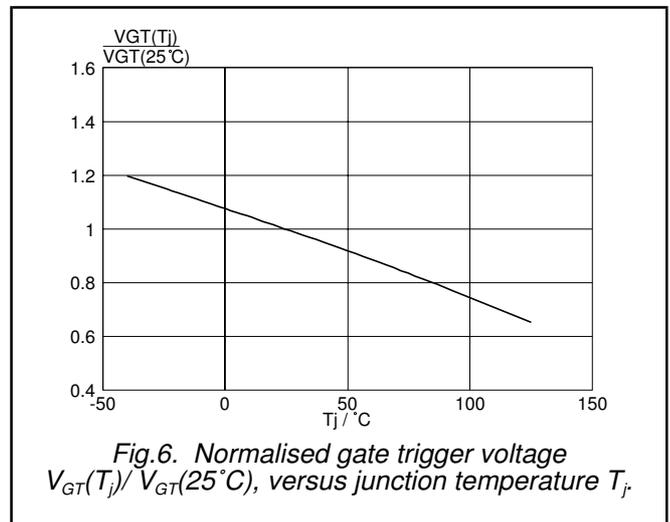
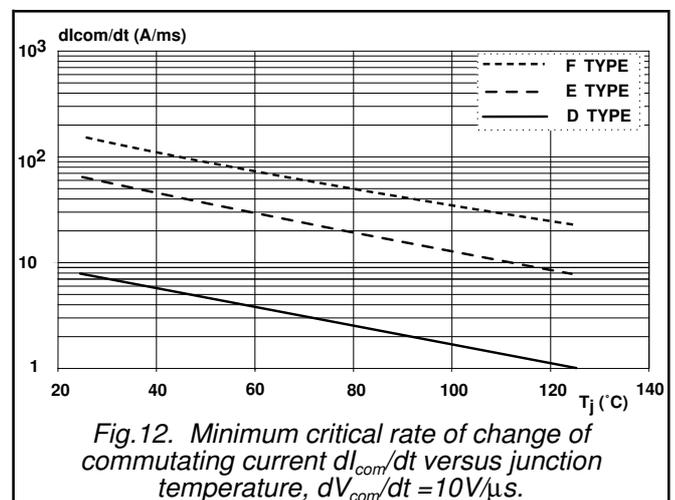
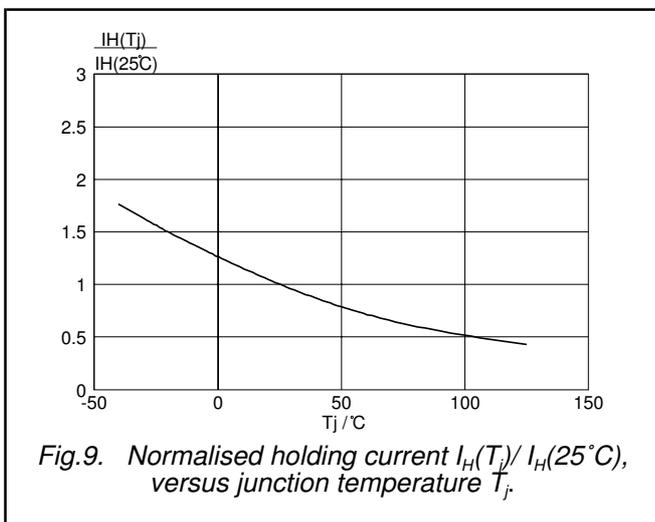
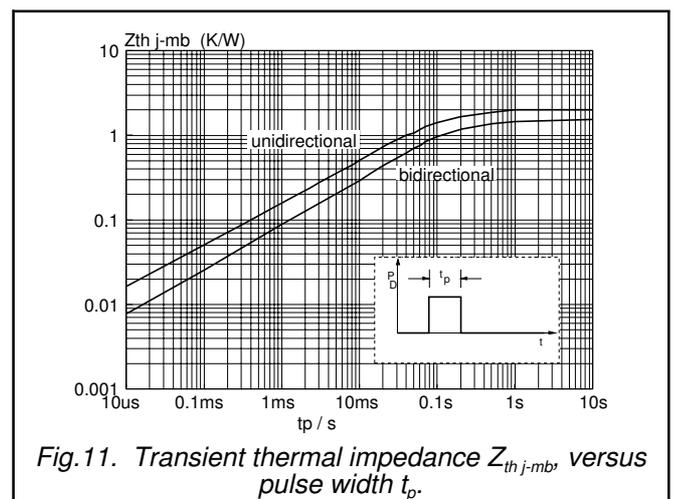
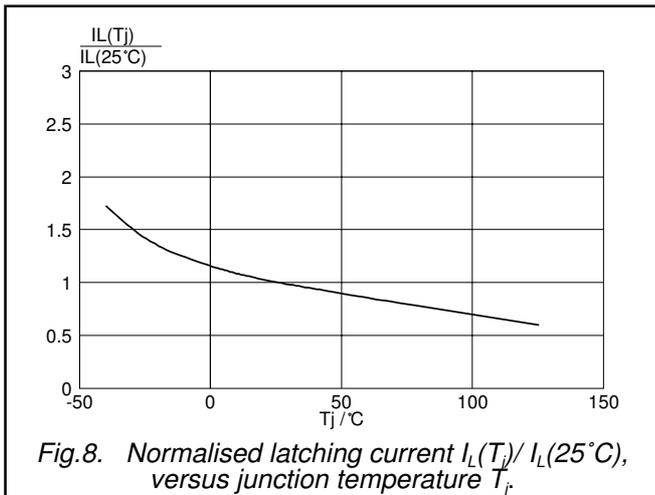
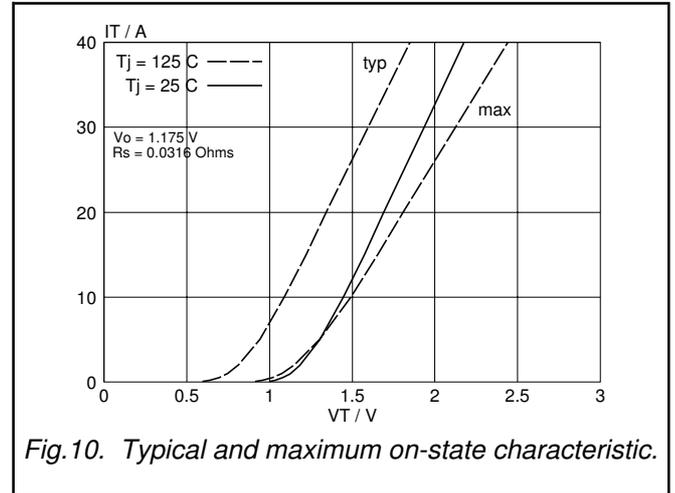
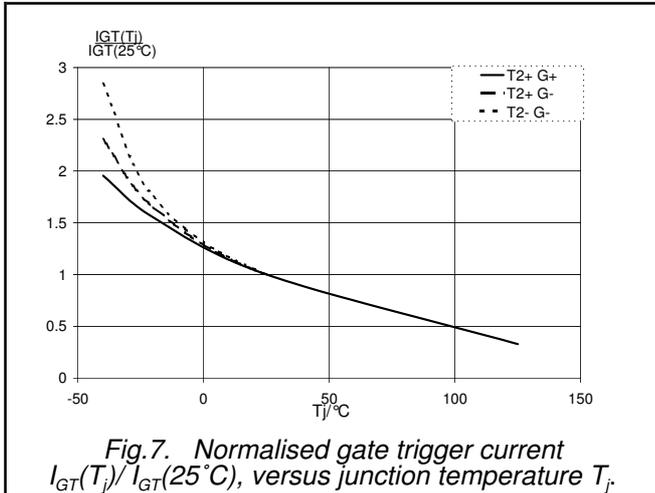


Fig. 6. Normalised gate trigger voltage $V_{GT}(T_j) / V_{GT}(25^\circ\text{C})$, versus junction temperature T_j .

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MECHANICAL DATA

Dimensions in mm

Net Mass: 2 g

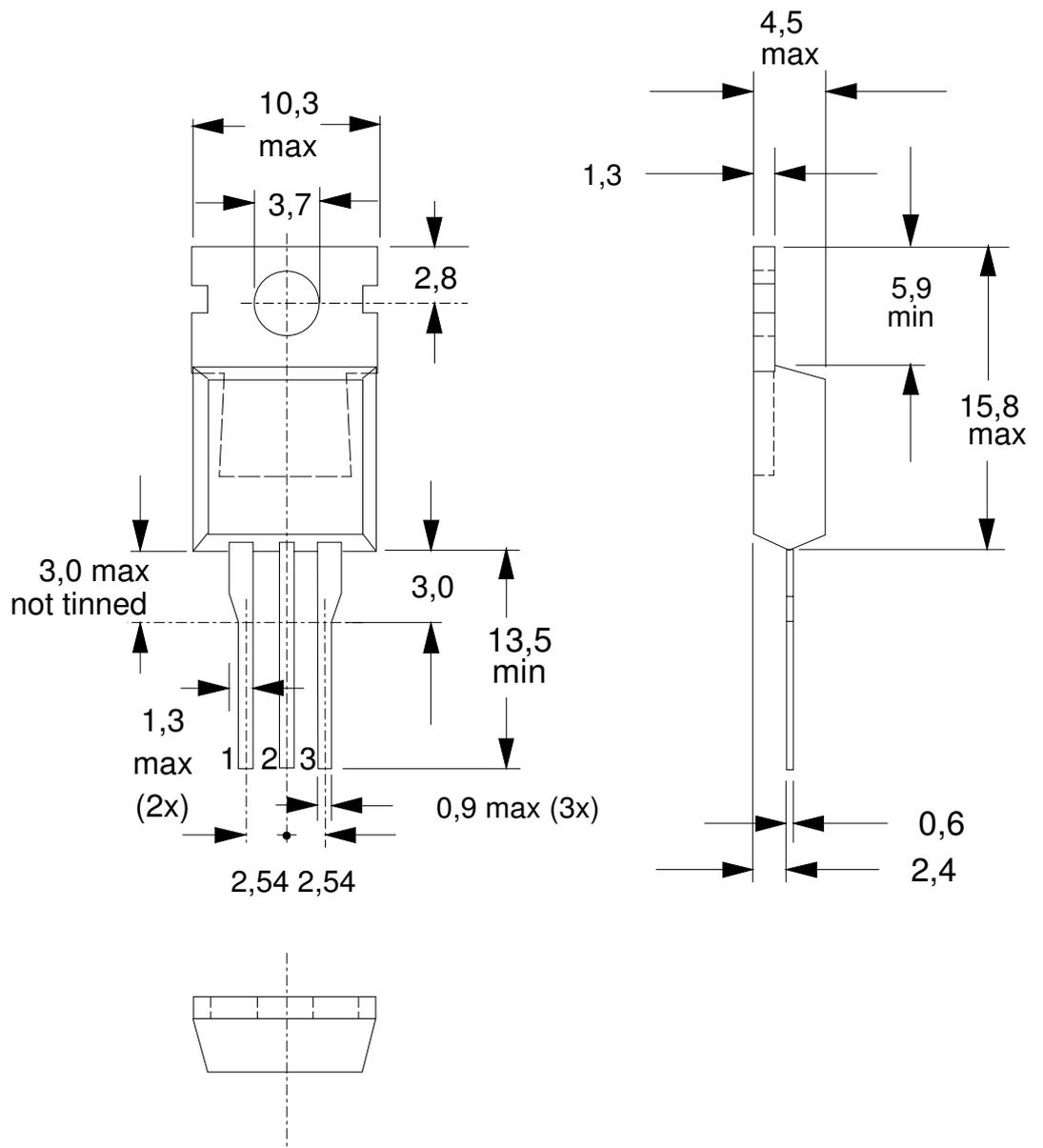


Fig.13. SOT78 (TO220AB). pin 2 connected to mounting base.

Notes

1. Refer to mounting instructions for SOT78 (TO220) envelopes.
2. Epoxy meets UL94 V0 at 1/8".

Legal information

DATA SHEET STATUS

DOCUMENT STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾	DEFINITION
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Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

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