

TRIAC

T-Modules

50A

## Features

- Electrically isolated base plate
- 3500 V<sub>RMS</sub> isolating voltage
- Standard JEDEC package
- Simplified mechanical designs, rapid assembly
- Large creepage distances
- UL E 78996 approved

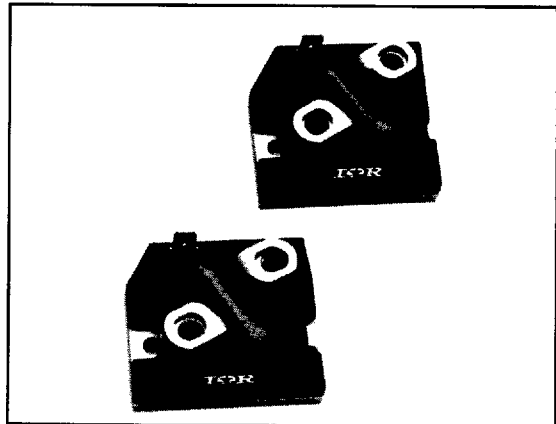
## Description

These T50AC.A series of T-modules consist of power TRIAC configured in a single package. With their isolating base plate, mechanical designs are greatly simplified giving advantages of cost reduction and reduced size.

Applications include power supplies, control circuits, light dimmers and battery chargers.

## Major Ratings and Characteristics

Parameters	T50AC.A	Units
$I_{T(RMS)}$	50	A
@ $T_C$	75	A
$I_{TSM}$	50Hz	620 A
	60Hz	650 A
$i^2t$	50Hz	1900 A <sup>2</sup> s
	60Hz	1760 A <sup>2</sup> s
$i^2\sqrt{t}$	19100	A <sup>2</sup> /s
$V_{DRM} - V_{RRM}$	400 to 1200	V
$T_J$	-40 to 125	°C



## ELECTRICAL SPECIFICATIONS

## Voltage Ratings

Part number	Voltage Code	$V_{RRM}$ , $V_{DRM}$ maximum repetitive peak reverse and off-state voltage gate open circuit V	$V_{RSM}$ maximum non-repetitive peak reverse voltage V
T50AC.A	40	400	500
	60	600	700
	80	800	900
	100	1000	1100
	120	1200	1300

## On-state Conduction

Parameter	Value	Units	Conditions
$I_{T(RMS)}$ Max. RMS on-state current	50	A	180° cond. full sine wave, $T_C = 75^\circ\text{C}$
$I_{TSM}$ Maximum peak one cycle non repetitive surge current	440	A	20ms 100% $V_{RRM}$ Sinusoidal full-wave
	460	A	16.6ms reappplied Initial $T_J = 125^\circ\text{C}$
$I_{TSM}$ Maximum peak one half cycle non repetitive surge current	620	A	10ms No voltage
	650	A	8.3ms reappplied Sinusoidal half Wave
	520	A	10ms 100% $V_{RRM}$ Initial $T_J = 125^\circ\text{C}$
	550	A	8.3ms reappplied Either direction
$I^2t$ Maximum $I^2t$ for fusing	1900	$\text{A}^2\text{s}$	10ms No voltage
	1760	$\text{A}^2\text{s}$	8.3ms reappplied Initial $T_J = 125^\circ\text{C}$
	1350	$\text{A}^2\text{s}$	10ms 100% $V_{RRM}$ Either direction
	1250	$\text{A}^2\text{s}$	8.3ms reappplied
$I^2/t$ Maximum $I^2/t$ for fusing (1)	19100	$\text{A}^2/\text{s}$	$t=0$ to 10ms, no voltage reappplied, Initial $T_J = 125^\circ\text{C}$
$V_{TM}$ Maximum peak on-state voltage	2.0	V	$T_J = 25^\circ\text{C}$ , $I_{TM} = 70\text{Apk}$ , either direction
$I_H$ Maximum holding current	90	mA	$T_J = 25^\circ\text{C}$ anode supply = 22V, Initial $I_T = 2\text{A}$ , either direction

## Switching

Parameter	Value	Units	Conditions
$di/dt$ Maximum rate of rise of of turned-on current	100	$\text{A}/\mu\text{s}$	$T_J = 125^\circ\text{C}$ , $V_{DRM} = \text{rated } V_{DRM}$ , $I_{TM} = 100\text{A}$ , gate pulse: 20V, 15Ω, $t_p > 10\mu\text{s}$ . Per JEDEC standard RS - 397, 5.2.2.6

(1)  $I^2t$  for time  $t_x = I^2/t \times \sqrt{t_x}$ 

## Blocking

Parameter	Value	Units	Conditions
$I_{RRM}$ $I_{DRM}$ Max. peak leakage current	10	mA	$T_J = 125^\circ\text{C}$
$I_{RRM}$ $I_{DRM}$ Max. peak leakage current	100	$\mu\text{A}$	$T_J = 25^\circ\text{C}$

**Off-state**

Parameter	T50AC.A	Units	Conditions
$\frac{dv}{dt}$ Minimum critical rate-of-rise of commutation voltage	15	V/ $\mu$ s	$T_J = 125^\circ\text{C}$ , rated $V_{\text{DRM}}$ Either direction
$\frac{dv}{dt}$ Minimum critical rate-of-rise of on-state voltage	200	V/ $\mu$ s	$T_J = 125^\circ\text{C}$ , Exponential to 100% rated $V_{\text{DRM}}$ Either direction
$I_{\text{DM}}$ Max. peak off-state current	20	mA	$T_J = 125^\circ\text{C}$ , rated $V_{\text{DRM}}$ , either direction
$V_{\text{INS}}$ RMS Isolation voltage	3500	V	50Hz, circuit to base, all terminals shorted $T_J = 25^\circ\text{C}$ , $t = 1$ s

**Triggering**

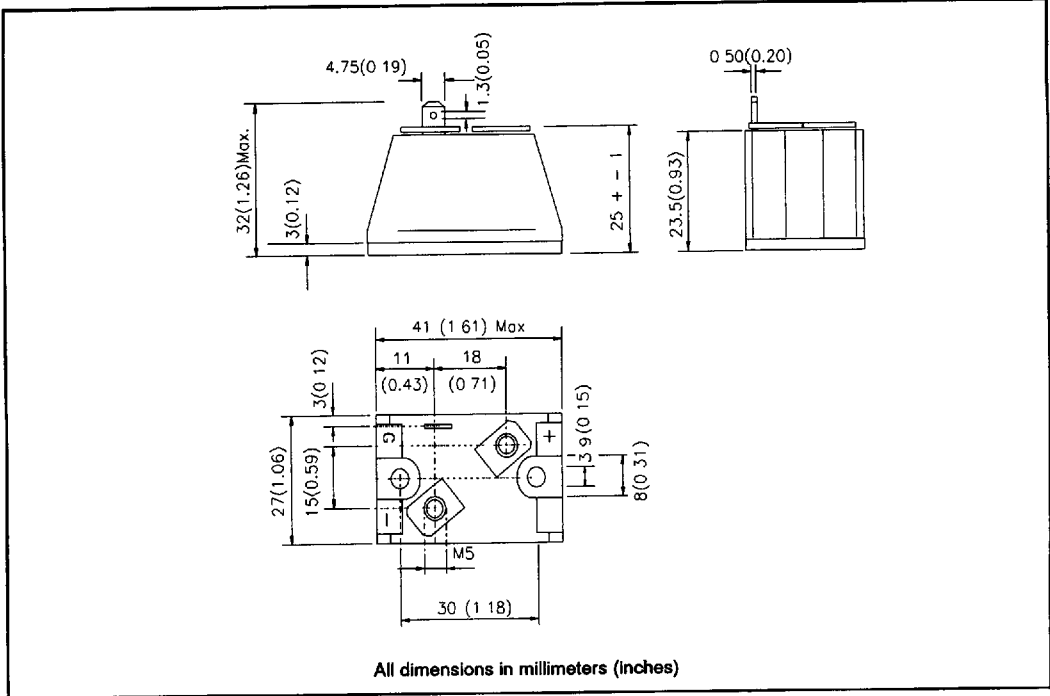
Parameter	T50AC.A	Units	Conditions
$P_{\text{GM}}$ Maximum peak gate power	20	W	2.0ms pulse width
$P_{\text{G(AV)}}$ Maximum average gate power	2.0	W	
$+I_{\text{GM}}$ Maximum peak gate current	3	A	
$-V_{\text{GM}}$ Maximum peak negative gate voltage	20	V	
$V_{\text{GT}}$ Maximum required DC gate current to trigger	2.5	V	$T_J = 25^\circ\text{C}$ , 12V MT1 to MT2
$I_{\text{GT}}$ Maximum required DC gate current to trigger	200	mA	$T_J = 25^\circ\text{C}$ , 12V MT1 to MT2 for other temperatures refer to Fig. 7
	200	mA	
	200	mA	
	200	mA	
$V_{\text{GD}}$ Maximum gate voltage that will not trigger	0.2	V	@ $T_J = 125^\circ\text{C}$ , rated $V_{\text{DRM}}$ applied
$I_{\text{GD}}$ Maximum gate current that will not trigger	2.0	V	@ $T_J = 125^\circ\text{C}$ , rated $V_{\text{DRM}}$ applied

**Thermal and Mechanical Specifications**

Parameter	T50AC.A	Units	Conditions
$T_J$ Junction temperature range	-40 to 125	$^\circ\text{C}$	
$T_{\text{stg}}$ Storage temperature range	-40 to 125	$^\circ\text{C}$	
$R_{\text{thJC}}$ Maximum thermal resistance, junction to case	0.70	K/W	DC operation
$R_{\text{thC-S}}$ Max. thermal resistance case to heatsink	0.20	K/W	Mounting surface smooth flat and greased
T Mounting torque $\pm 10\%$	Module to heatsink	1.3 $\pm 10\%$	M3.5 mounting screws (2) Non-lubricated threads
	Terminals MT1 and MT2	3 $\pm 10\%$	
wt Approximate weight	54	g(oz)	M5 screw terminals; non-lubricated threads
Case style	"T" Type		See outline table

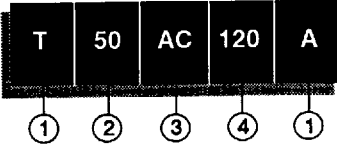
(2)A mounting compound is recommended and the torque should be rechecked after a period of about 3 hours to allow for the spread of the compound

Outline Table



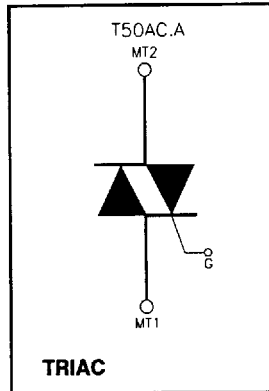
Ordering Information Table

Device Code



- 1** - Module type
- 2** - Max. RMS on-state current
- 3** - Circuit configuration \*\*
- 4** - Voltage code: Code X 10 =  $V_{RRM}$   
(See Voltage Ratings Table)

Circuit configuration \*\*



INTERNATIONAL RECTIFIER

65E D

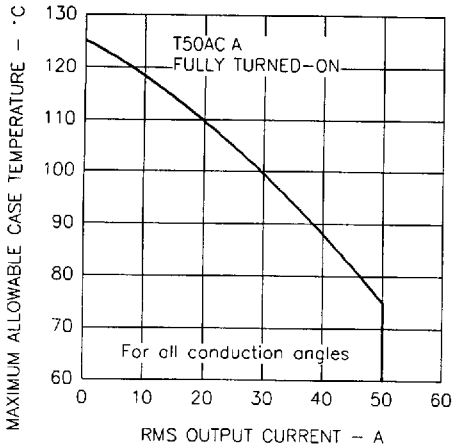


Fig. 1 - Current Ratings Characteristics

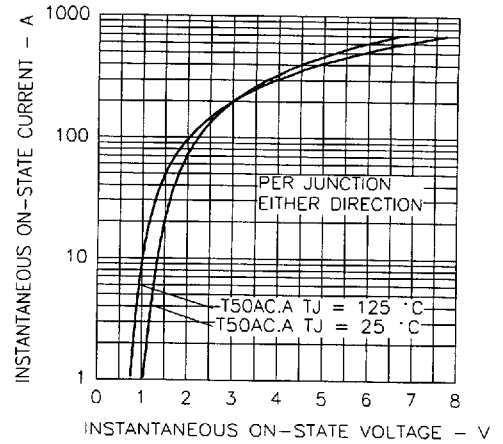


Fig. 2 - On-state Voltage Drop Characteristics

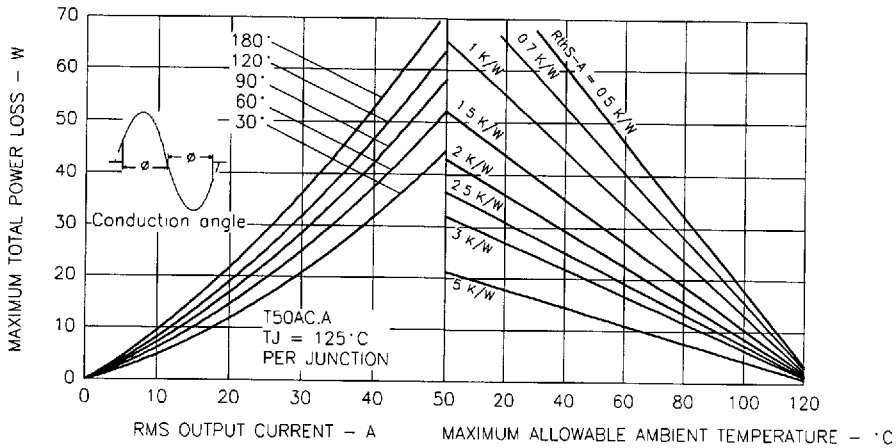


Fig. 3 - On-state Power Loss Characteristics

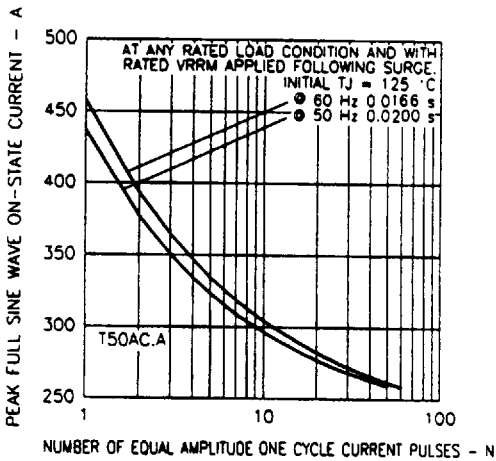


Fig. 4 - Maximum Non-Repetitive Surge Current

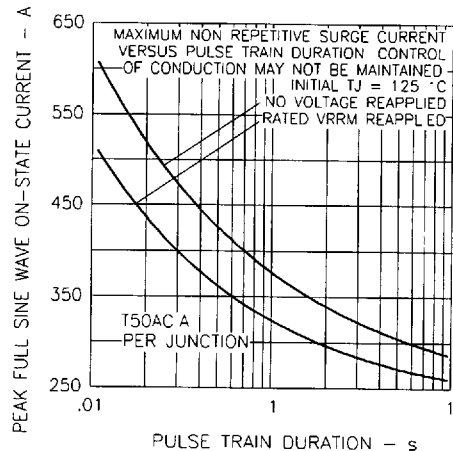


Fig. 5 - Maximum Non-Repetitive Surge Current

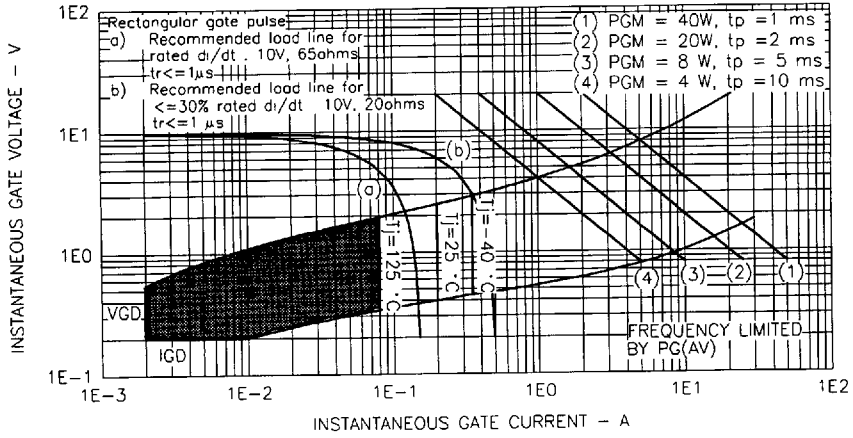


Fig. 6 - Gate Characteristics

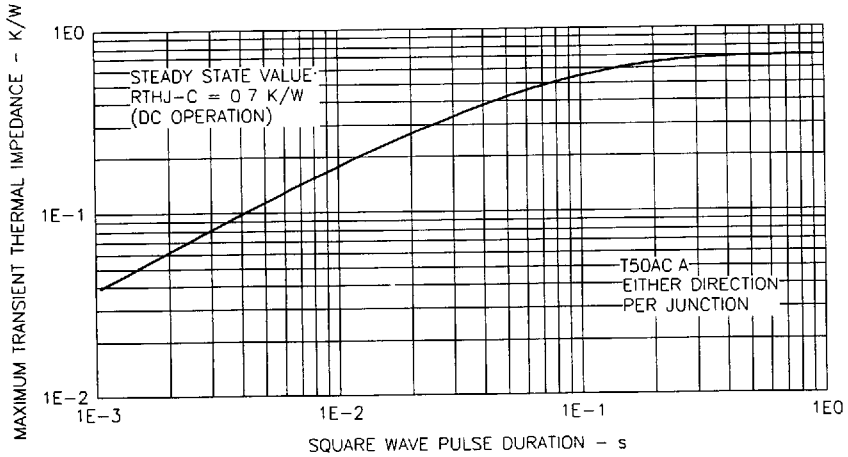


Fig. 7 - Thermal Impedance  $Z_{thJC}$  Characteristics