

Bulletin I2115 rev. D 12/98

International
IR Rectifier

SAFEIR Series
16TTS..

PHASE CONTROL SCR

Description/Features

The 16TTS.. **SAFEIR** series of silicon controlled rectifiers are specifically designed for medium power switching and phase control applications. The glass passivation technology used has reliable operation up to 125° C junction temperature.

Typical applications are in input rectification (soft start) and these products are designed to be used with International Rectifier input diodes, switches and output rectifiers which are available in identical package outlines.

	$V_T < 1.4V @ 10A$ $I_{TSM} = 200A$ $V_{RRM} = 800 \text{ to } 1600V$
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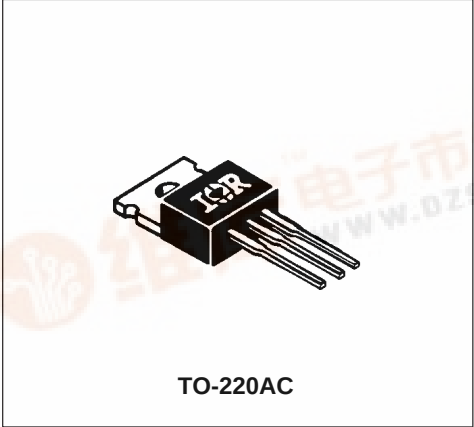
Output Current in Typical Applications

Applications	Single-phase Bridge	Three-phase Bridge	Units
Capacitive input filter $T_A = 55^\circ C$, $T_J = 125^\circ C$, common heatsink of $1^\circ C/W$	13.5	17	A

Major Ratings and Characteristics

Characteristics	16TTS..	Units
$I_{T(AV)}$ Sinusoidal waveform	10	A
I_{RMS}	16	A
V_{RRM}/V_{DRM}	upto1600	V
I_{TSM}	200	A
$V_T @ 10A, T_J = 25^\circ C$	1.4	V
dv/dt	500	V/ μs
di/dt	150	A/ μs
T_J range	-40to125	$^\circ C$

Package Outline



Also available in SMD-220 package (series 16TTS..S)



Voltage Ratings

Part Number	V_{RRM} , maximum peak reverse voltage V	V_{DRM} , maximum peak direct voltage V	I_{RRM}/I_{DRM} 125°C mA
16TTS08	800	800	10
16TTS12	1200	1200	
16TTS16	1600	1600	

Absolute Maximum Ratings

Parameters	16TTS..	Units	Conditions
$I_{T(AV)}$ Max. Average On-state Current	10	A	@ $T_C = 98^\circ\text{C}$, 180° conduction half sine wave
I_{RMS} Max. RMS On-state Current	16		
I_{TSM} Max. Peak One Cycle Non-Repetitive Surge Current	170 200		10ms Sine pulse, rated V_{RRM} applied 10ms Sine pulse, no voltage reapplied
I^2t Max. I^2t for fusing	144 200	A^2s	10ms Sine pulse, rated V_{RRM} applied 10ms Sine pulse, no voltage reapplied
$I^2\sqrt{t}$ Max. $I^2\sqrt{t}$ for fusing	2000	$\text{A}^2\sqrt{\text{s}}$	$t = 0.1$ to 10ms, no voltage reapplied
V_{TM} Max. On-state Voltage Drop	1.4	V	@ 10A, $T_J = 25^\circ\text{C}$
r_t On-state slope resistance	24.0	$\text{m}\Omega$	$T_J = 125^\circ\text{C}$
$V_{T(TO)}$ Threshold Voltage	1.1	V	
I_{RM}/I_{DM} Max. Reverse and Direct Leakage Current	0.5 10	mA	$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$
			$V_R = \text{rated } V_{RRM} / V_{DRM}$
I_H Holding Current	Typ. Max. – 100 100 150	mA	Anode Supply = 6V, Resistive load, Initial $I_T = 1\text{A}$ 16TTS08, 16TTS12 16TTS16
I_L Max. Latching Current	200		Anode Supply = 6V, Resistive load
dv/dt Max. Rate of Rise of off-state Voltage	500	$\text{V}/\mu\text{s}$	
di/dt Max. Rate of Rise of turned-on Current	150	$\text{A}/\mu\text{s}$	

Triggering

Parameters	16TTS..	Units	Conditions
P_{GM} Max. peak Gate Power	8.0	W	
$P_{G(AV)}$ Max. average Gate Power	2.0		
+ I_{GM} Max. peak positive Gate Current	1.5	A	
- V_{GM} Max. peak negative Gate Voltage	10	V	
I_{GT} Max. required DC Gate Current to trigger	90	mA	Anode supply = 6V, resistive load, $T_J = -65^\circ\text{C}$
	60		Anode supply = 6V, resistive load, $T_J = 25^\circ\text{C}$
	35		Anode supply = 6V, resistive load, $T_J = 125^\circ\text{C}$
V_{GT} Max. required DC Gate Voltage to trigger	3.0	V	Anode supply = 6V, resistive load, $T_J = -65^\circ\text{C}$
	2.0		Anode supply = 6V, resistive load, $T_J = 25^\circ\text{C}$
	1.0		Anode supply = 6V, resistive load, $T_J = 125^\circ\text{C}$
V_{GD} Max. DC Gate Voltage not to trigger	0.2		$T_J = 125^\circ\text{C}$, V_{DRM} = rated value
I_{GD} Max. DC Gate Current not to trigger	2.0	mA	$T_J = 125^\circ\text{C}$, V_{DRM} = rated value

Switching

Parameters	16TTS..	Units	Conditions
t_{gt} Typical turn-on time	0.9	μs	$T_J = 25^\circ\text{C}$
t_{rr} Typical reverse recovery time	4		$T_J = 125^\circ\text{C}$
t_{qf} Typical turn-off time	110		

Thermal-Mechanical Specifications

Parameters			16TTS..	Units	Conditions
T _J	Max. Junction Temperature Range		-40 to 125	°C	
T _{stg}	Max. Storage Temperature Range		-40 to 125		
R _{thJC}	Max. Thermal Resistance Junction to Case		1.3	°C/W	DC operation
R _{thJA}	Max. Thermal Resistance Junction to Ambient		62		
R _{thCS}	Typ. Thermal Resistance Case to Heatsink		0.5		Mounting surface, smooth and greased
wt	Approximate Weight		2(0.07)	g(oz.)	
T	Mounting Torque	Min.	6(5)	Kg-cm (lbf-in)	
		Max.	12(10)		
Case Style			TO-220AC		

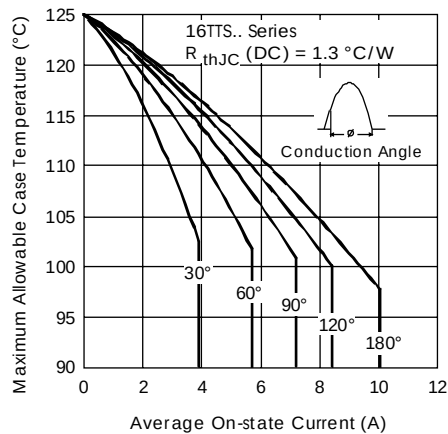


Fig. 1 - Current Rating Characteristics

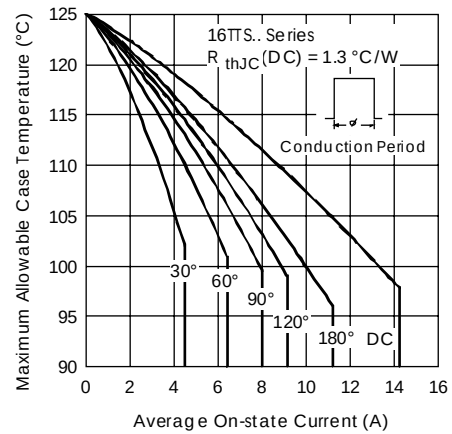


Fig. 2 - Current Rating Characteristics

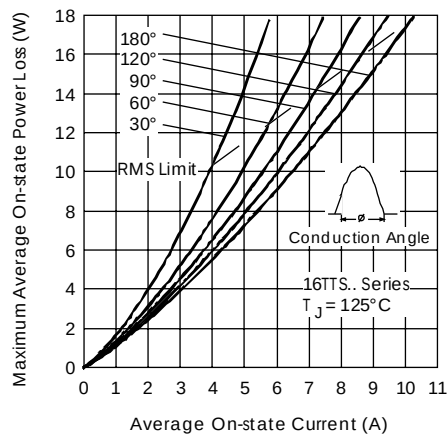


Fig. 3 - On-state Power Loss Characteristics

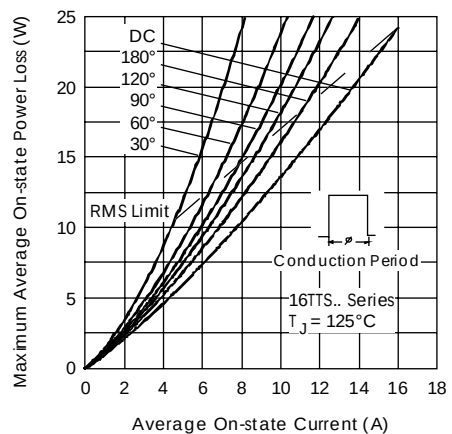


Fig. 4 - On-state Power Loss Characteristics

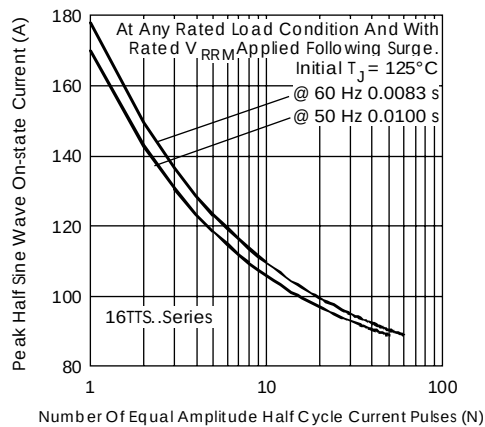


Fig. 6 - Maximum Non-Repetitive Surge Current

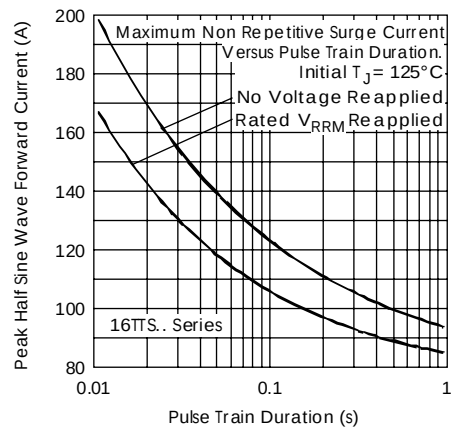


Fig. 7 - Maximum Non-Repetitive Surge Current

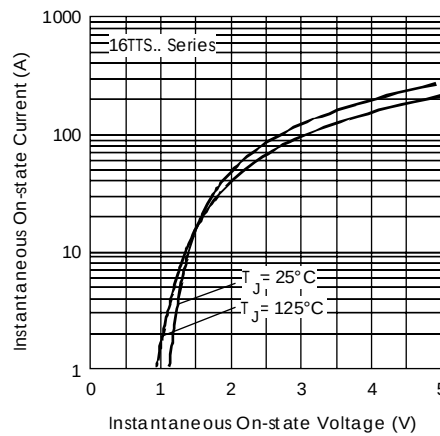


Fig. 7 - On-state Voltage Drop Characteristics

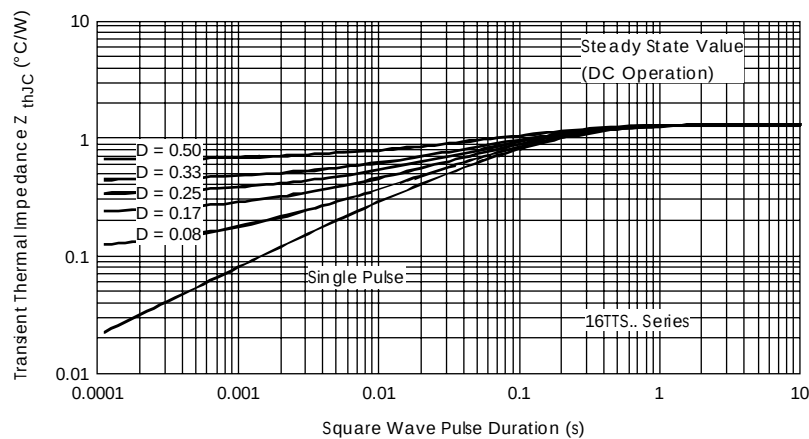


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

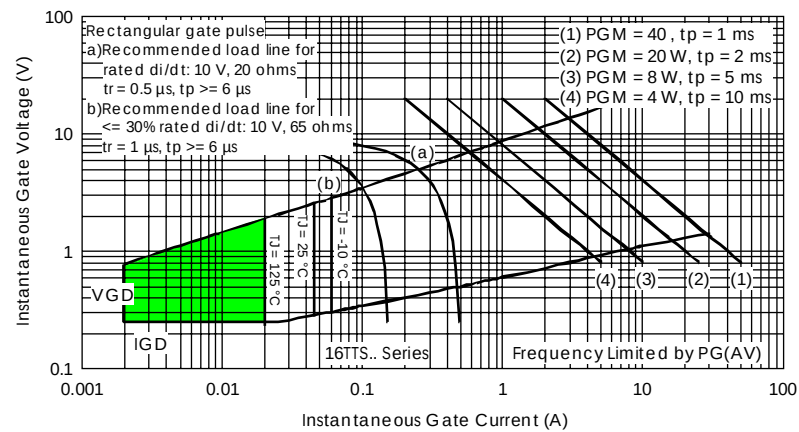


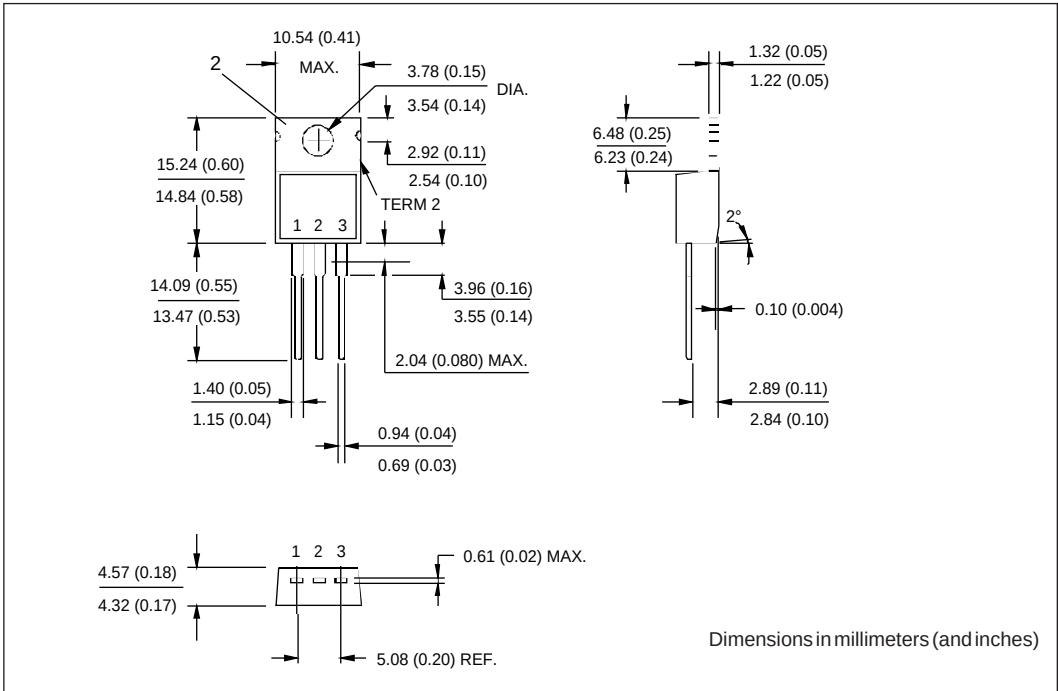
Fig. 9 - Gate Characteristics

16TTS.. *SAFEIR* Series

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Outline Table



Ordering Information Table

Device Code				
16	T	T	S	16
1	2	3	4	5
1	- Current Rating			
2	- Circuit Configuration:			
	T = Single Thyristor			
3	- Package:			
	T = TO-220AC			
4	- Type of Silicon:			
	S = Converter Grade			
5	- Voltage code: Code x 100 = V_{RRM}			
				08 = 800V
				12 = 1200V
				16 = 1600V

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IR FAR EAST: K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo, Japan 171. Tel: 81 3 3983 0086.
IR SOUTHEAST ASIA: 1 Kim Seng Promenade, Great World City West Tower, 13-11, Singapore 237994. Tel: ++ 65 838 4630.
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