

FEATURES

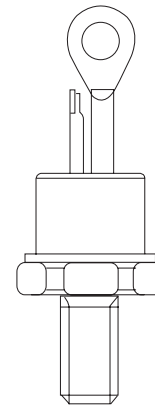
- 1). Improved glass passivation for high reliability and exceptional stability at high temperature
- 2). High di/dt and dv/dt capabilities
- 3). Standard package
- 4). Low thermal resistance
- 5). Metric threads version available
- 6). Types up to 1600V V_{DRM}/V_{RRM}

TYPICAL APPLICATIONS

- 1). Medium power switching
- 2). Phase control applications
- 3). Can be supplied to meet stringent military, aerospace and other high-reliability requirements

MAJOR RATINGS AND CHARACTERISTICS

Parameters		16RIA		Unit
		10 to 120	140 to 160	
$I_{F(AV)}$		16	16	A
	@ T_C	85	85	°C
$I_{F(RMS)}$		35	35	A
I_{FSM}	@ 50Hz	340	225	A
	@ 60Hz	360	235	A
I^2t	@ 50Hz	574	255	A ² s
	@ 60Hz	524	235	A ² s
V_{DRM}/V_{RRM}		100 to 1200	1400 to 1600	V
T_q	typical	110		μs
T_J		- 65 to 125		°C



ELECTRICAL SPECIFICATIONS

1). Voltage Ratings

Type number	Voltage Code	V_{DRM}/V_{RRM} , maximum repetitive peak reverse voltage *(1)	V_{RSM} , maximum non-repetitive peak reverse voltage *(2)	I_{DRM}/I_{RRM} max. @ $T_J = T_{J\ max}$
		V	V	mA
16RIA	10	100	150	20
	20	200	300	
	40	400	500	
	60	600	700	10
	80	800	900	
	100	1000	1100	
	120	1200	1300	
	140	1400	1500	
	160	1600	1700	

*(1) Units may be broken over non-repetitively in the off-state direction without damage, if di/dt does not exceed 20A/μs

*(2) For voltage pulses with $t_p \leq 5ms$

2). Forward Conduction

Parameters		16RIA		Unit	Conditions		
		10 to 120	140 to 160				
$I_{T(AV)}$	Max. average forward current	16	16	A	180° conduction, half sine wave		
	@ Case temperature	85	85	°C			
$I_{T(RMS)}$	Max. RMS forward current	35	35	A			
I_{TSM}	Max. peak, one-cycle forward, non-repetitive surge current	340	225	A	t = 10ms	No voltage	Sinusoidal half wave, Initial $T_J = T_J \text{ max.}$
		360	235		t = 8.3ms	reapplied	
		285	190		t = 10ms	100% V_{RRM}	
		300	200		t = 8.3ms	reapplied	
I^2t	Maximum I^2t for fusing	574	255	A^2s	t = 10ms	No voltage	
		524	235		t = 8.3ms	reapplied	
		405	180		t = 10ms	100% V_{RRM}	
		375	165		t = 8.3ms	reapplied	
$I^2\sqrt{t}$	Maximum $I^2\sqrt{t}$ for fusing	5740	2550	$A^2\sqrt{s}$	t = 0.1 to 10ms, no voltage reapplied		
$V_{T(TO)1}$	Low level value of threshold voltage	0.97	1.14	V	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$, $T_J = T_J \text{ max.}$		
$V_{T(TO)2}$	High level value of threshold voltage	1.24	1.31	V	$(I > \pi \times I_{F(AV)})$, $T_J = T_J \text{ max.}$		
r_{T1}	Low level value of forward slope resistance	17.9	14.83	$m\Omega$	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$, $T_J = T_J \text{ max.}$		
r_{T2}	High level value of forward slope resistance	13.6	12.03	$m\Omega$	$(I > \pi \times I_{F(AV)})$, $T_J = T_J \text{ max.}$		
V_{TM}	Max. forward voltage drop	1.75	-	V	$I_{pk} = 50A$, $T_J = 25^\circ C$, $t_p = 10ms$ sine pulse		
		-	1.80				
I_H	Maximum holding current	130		mA	$T_J = 25^\circ C$, anode supply 12V resistive load		
I_L	Typical latching current	200					
di/dt	Max. rate of rise of turned-on current			$A/\mu s$	$T_J = T_J \text{ max.}$, $V_{DM} = \text{rated } V_{DRM}$ Gate pulse = 20V, 15Ω , $t_p = 6\mu s$, $tr = 0.1\mu s \text{ max.}$, $I_{TM} = (2x \text{ rated } di/dt) A$		
	$V_{DRM} \leq 600V$	200					
	$V_{DRM} \leq 800V$	180					
	$V_{DRM} \leq 1000V$	160					
	$V_{DRM} \leq 1600V$	150					
t_{gt}	Typical turn-on time	0.9			$T_J = 25^\circ C$, at = rated V_{DRM}/V_{RRM} , $T_J = 125^\circ C$		
t_{rr}	Typical reverse recovery time	4			$T_J = T_J \text{ max.}$, $I_{TM} = I_{T(AV)}$, $t_p > 200\mu s$, $di/dt = -10A/\mu s$		
t_q	Typical turn-off time	110		μs	$T_J = T_J \text{ max.}$, $I_{TM} = I_{T(AV)}$, $t_p > 200\mu s$, $V_R = 100V$, $di/dt = -10A/\mu s$, $dv/dt = 20V/\mu s$ linear to 67% V_{DRM} , gate bias 0V-100W		
dv/dt	Max. critical rate of rise of off-state voltage	100		$V/\mu s$	$T_J = T_J \text{ max.}$ linear to 100% rated V_{DRM}		
		300 (*)			$T_J = T_J \text{ max.}$ linear to 67% rated V_{DRM}		

(*) $t_q = 10\mu s$ sup to 600V, $t_q = 30\mu s$ up to 1600V available on special request.

(**) Available with: $dv/dt = 1000V/\mu s$, to complete code add S90 i.e. 16RIA120S90.

3). Triggering

Parameters		16RIA	Unit	Conditions	
P_{GM}	Maximum peak gate power	8.0	W	$T_J = T_J \text{ max.}$	
$P_{G(AV)}$	Maximum average gate power	2.0			
I_{GM}	Max. peak positive gate current	1.5	A	$T_J = T_J \text{ max.}$	
$-V_{GM}$	Maximum peak negative gate voltage	10	V	$T_J = T_J \text{ max.}$	
I_{GT}	DC gate current required to trigger	90	mA	$T_J = -65^\circ\text{C}$ Max. required gate trigger current/ $T_J = 25^\circ\text{C}$ voltage are the lowest value which $T_J = 125^\circ\text{C}$ will trigger all units 6V anode-to- cathode applied	
		60			
		35			
V_{GT}	DC gate voltage required to trigger	3.0	V	$T_J = -65^\circ\text{C}$ $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	
		2.0			
		1.0			
I_{GD}	DC gate current not to trigger	2.0	mA	$T_J = T_J \text{ max.}, V_{DRM} = \text{rated value}$	
V_{GD}	DC gate voltage not to trigger	0.2	V	$T_J = T_J \text{ max.}$ Max. gate current/ voltage $V_{DRM} = \text{rated value}$ not to trigger is the max. value which. will not trigger any unit with rated V_{DRM} anode-to-cathode applied	
T_J	Max. operating temperature range	- 65 to 125	$^\circ\text{C}$		
T_{stg}	Max. storage temperature range	- 65 to 125	$^\circ\text{C}$		
R_{thJC}	Max. thermal resistance, junction to case	0.86	K/W	DC operation	
R_{thCS}	Max. thermal resistance, case to heatsink	0.35	K/W	Mounting surface, smooth, flat and greased	
T	Mounting torque	to nut	to device	Lubricated threads (Non-lubricated threads)	
		20(27.5)	25		lbf-in
		0.23(0.32)	0.29		kgf.m
		2.3(3.1)	2.8		Nm
wt	Approximate weight	14 (0.49)	g (oz)	See Outline Table	
	Case style	TO-48			

ΔR_{thJC} Conduction

(The following table shows the increment of thermal resistance R_{thJC} when devices operate at different conduction angles than DC)

Conduction angle	Sinusoidal conduction	Rectangular conduction	Units	Conditions
180°	0.21	0.15	K/W	$T_J = T_J \text{ max.}$
120°	0.25	0.25		
90°	0.31	0.34		
60°	0.45	0.47		
30°	0.76	0.76		

PERFORMANCE CURVES FIGURE

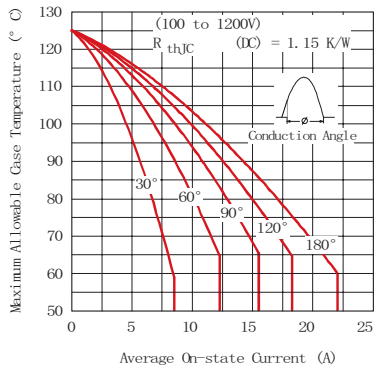


Fig. 1 - Current Ratings Characteristic

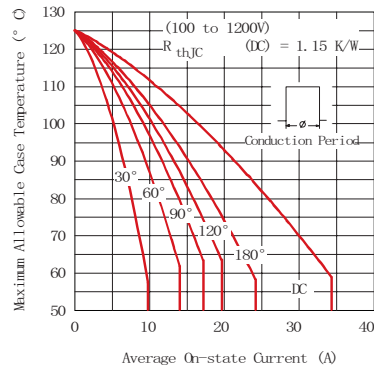


Fig. 2 - Current Ratings Characteristic

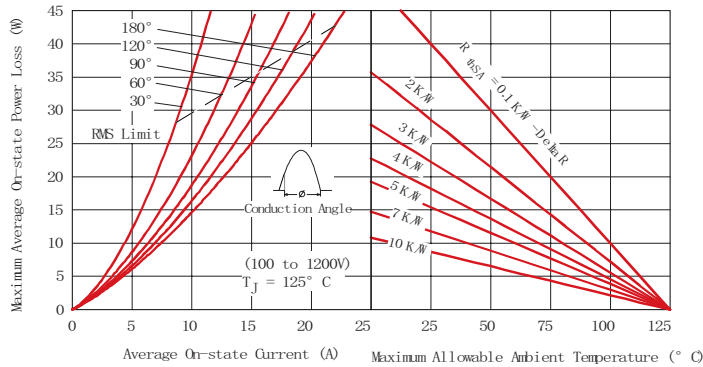


Fig. 3 - On-state Power Loss Characteristics

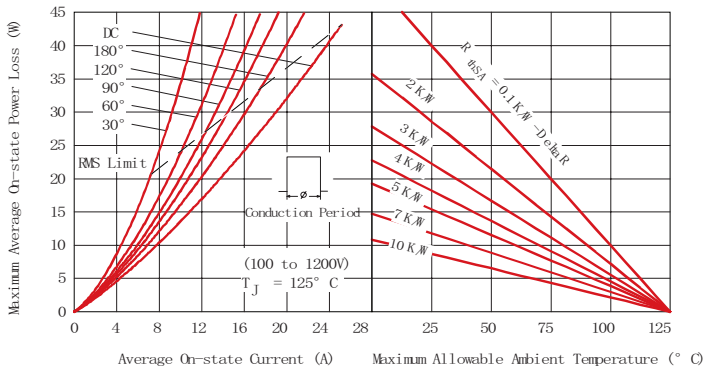
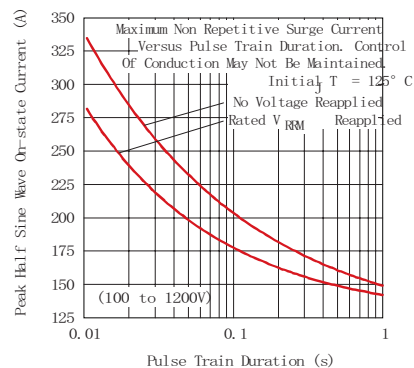
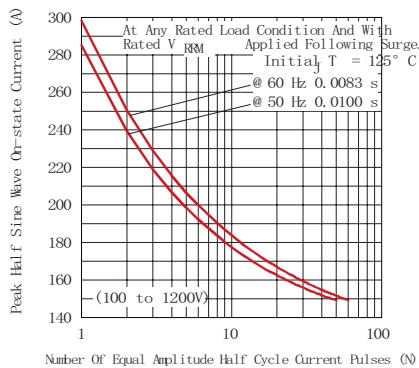


Fig. 4 - On-state Power Loss Characteristics



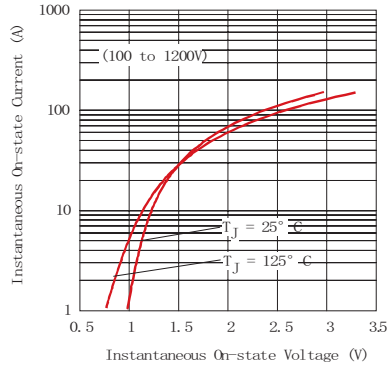


Fig. 7 - Forward Voltage Drop Characteristics

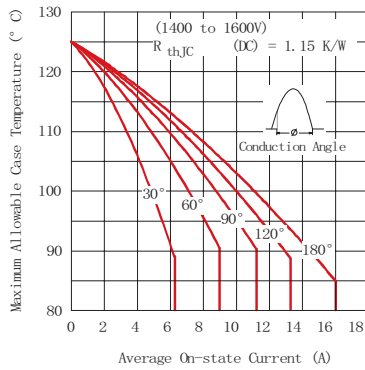


Fig. 8 - Current Ratings Characteristics

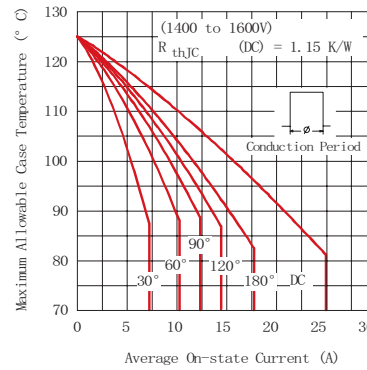


Fig. 9 - Current Ratings Characteristics

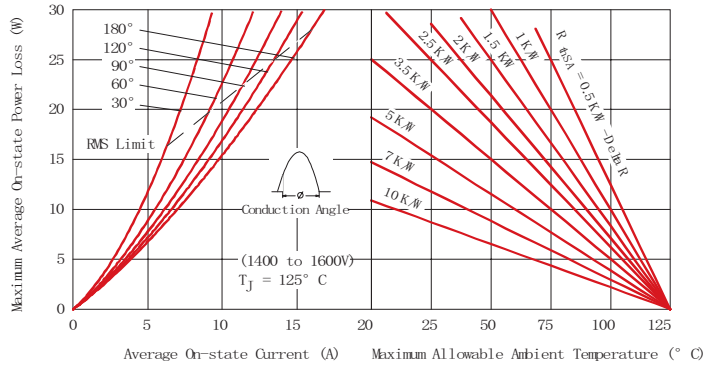


Fig. 10 - On-state Power Loss Characteristics

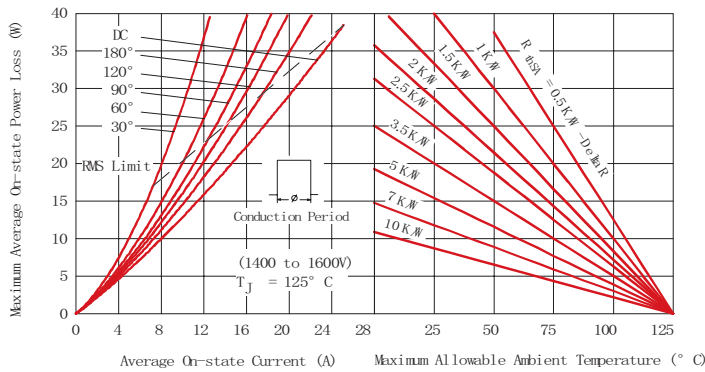


Fig. 11 - On-state Power Loss Characteristics

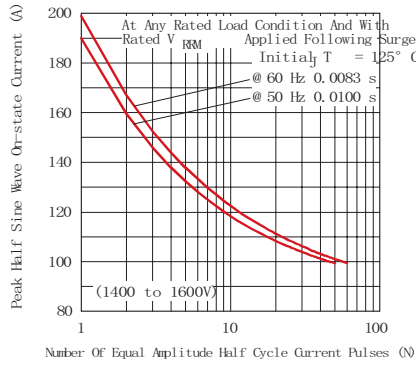


Fig. 12 - Maximum Non-Repetitive Surge Current

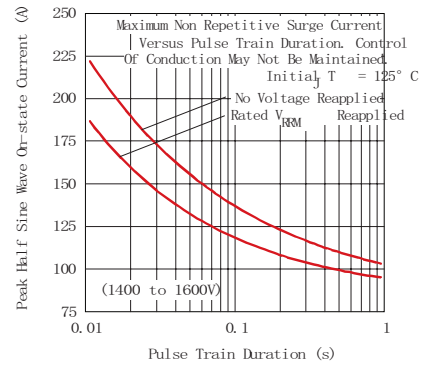


Fig. 13 - Maximum Non-Repetitive Surge Current

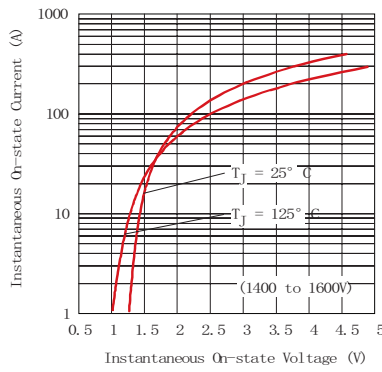


Fig. 14 - Forward Voltage Drop Characteristics

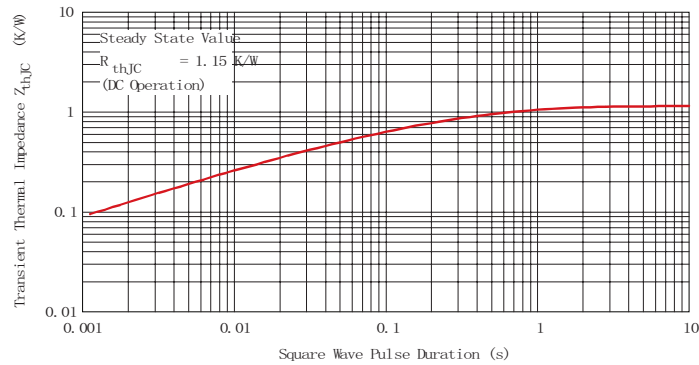


Fig. 15 - Thermal Impedance Z_{thJC} Characteristics

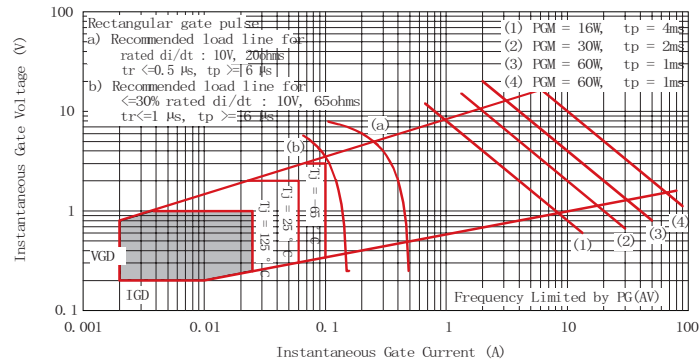
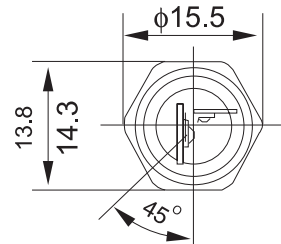
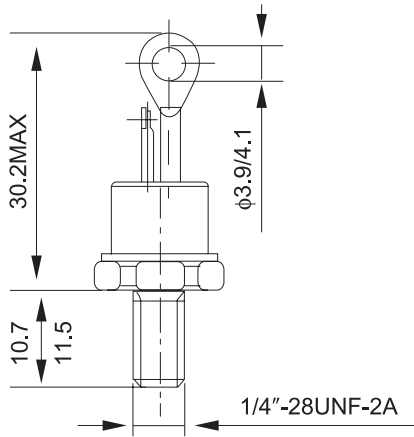


Fig. 16 - Gate Characteristics

OUTLINE



*FOR METRIC DEVICE:M6×1

Case Style TO-48

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