Bulletin I27122 rev. C 04/02

International
IOR Rectifier

IRKT152/04

THYRISTOR/ THYRISTOR

INT-A-pak™ Power Module

Features

- Electrically Isolated by DBC Ceramic (Al_2O_3)
- 3500 V_{RMS} Isolating Voltage
- Industrial Standard Package
- High Surge Capability
- Glass Passivated Chips
- Simple Mounting
- UL E78996 approved

150 A

Applications

- Battery Charges
- Welders
- Power Converters

Major Ratings and Characteristics

Parameters		IRKT152/04	Units
$I_{T(AV)}$		150	A
	@T_C	85	°C
$I_{T(RMS)}$		330	A
I_{TSM}	@50Hz	4000	
	@60Hz	4200	
I^2t	@50Hz	80	KA^2s
	@60Hz	73	
$I^2\sqrt{t}$		800	$KA^2\sqrt{s}$
V_{RRM}		400	V
T_{STG}	range	-40 to 150	°C
T_J	range	-40 to 125	

CASE STYLE NEW INT-A-PAK

ELECTRICAL SPECIFICATIONS

Voltage Ratings

Type number	V_{RRM}/V_{DRM} , Maximum repetitive peak reverse voltage V	V_{RSM}/V_{DSM}, Maximum non-repetitive peak reverse voltage V	I_{RRM} / I_{DRM} @ 125°C m A
IRKT152/04	400	500	50

On-state Conduction

	Parameter	IRKT152/04	Units	Conditions		
$I_{T(AV)}$	Max. average on-state current	150	A	180° conduction half sine wave		
	@ Case temperature	85	°C			
$I_{T(RMS)}$	Maximum RMS on-state current	330	A	as AC switch		
I_{TSM}	Maximum peak, one-cycle	4000	A	t = 10ms	No voltage	Sine half wave, Initial $T_J = T_J$ max
	on-state, non-repetitive	4200		t = 8.3ms	reapplied	
	surge current	3350		t = 10ms	100% V_{RRM}	
		3500		t = 8.3ms	reapplied	
I^2t	Maximum I^2t for fusing	80	KA^2s	t = 10ms	No voltage	
		73		t = 8.3ms	reapplied	
		56		t = 10ms	100% V_{RRM}	
		51		t = 8.3ms	reapplied	
$I^2\sqrt{t}$	Maximum $I^2\sqrt{t}$ for fusing	800	$KA^2\sqrt{s}$	t = 0.1 to 10ms, no voltage reapplied		
$V_{T(TO)}$	Value of threshold voltage	0.82	V	@ T_J max.		
r_t	On-state slope resistance	1.44	mΩ			
V_{TM}	Maximum on-state voltage drop	1.44	V	I_{pk} = 470A, T_J = 25°C		
I_H	Maximum Holding Current	200	mA	T_J = 25°C, anode supply = 6V, resistive load, gate open circuit		
I_L	Maximum Latching Current	400		T_J = 25°C, anode supply = 6V, resistive load		

Switching

t_{gd}	Typical delay time	1	µs	T_J = 25°C	Gate Current=1A dIg/dt=1A/µs
t_{gr}	Typical rise time	2		T_J = 25°C	Vd=0,67% V_{DRM}
t_q	Typical turn-off time	50 - 200		I_{TM} = 300 A; -dI/dt = 15 A/µs; $T_J = T_J$ max V_r = 50 V; dV/dt = 20 V/µs; Gate 0 V, 100Ω	

Blocking

I_{RRM} I_{DRM}	Maximum peak reverse and off-state leakage current	50	mA	T_J = 125°C
V_{INS}	RMS isolation voltage	3500	V	50Hz, circuit to base, all terminals shorted, t = 1s
dV/dt	critical rate of rise of off-state voltage	1000	V/µs	$T_J = T_J$ max., exponential to 67% rated V_{DRM}

Triggering

	Parameter	IRKT152/04	Units	Conditions	
P_{GM}	Max. peak gate power	12	W	tp≤5ms, $T_J = T_J$ max.	
$P_{G(AV)}$	Max. average gate power	3	W	f=50Hz, $T_J = T_J$ max.	
I_{GM}	Max. peak gate current	3	A	tp≤5ms, $T_J = T_J$ max.	
$-V_{GT}$	Max. peak negative gate voltage	10	V		
V_{GT}	Max. required DC gate voltage to trigger	4	V	T_J = -40°C	Anode supply = 6V, resistive load; Ra = 1Ω
		2.5		T_J = 25°C	
		1.7		$T_J = T_J$ max.	
I_{GT}	Max. required DC gate current to trigger	270	mA	T_J = -40°C	Anode supply = 6V, resistive load; Ra = 1Ω
		150		T_J = 25°C	
		80		$T_J = T_J$ max.	
V_{GD}	Max. gate voltage that will not trigger	0.3	V	@ $T_J = T_J$ max., rated V_{DRM} applied	
I_{GD}	Max. gate current that will not trigger	10	mA		
$di/_{dt}$	Max. rate of rise of turned-on current	300	A/µs	@ $T_J = T_J$ max., I_{TM} = 400A rated V_{DRM} applied	

Thermal and Mechanical Specifications

	Parameter		IRKT152/04	Units	Conditions
T_J	Max. junction operating temperature range		-40 to 125	°C	
T_{stg}	Max. storage temperature range		-40 to 150	°C	
R_{thJC}	Max. thermal resistance, junction to case		0.18	K/W	DC operation, per junction
R_{thCS}	Max. thermal resistance, case to heatsink		0.05	K/W	Mounting surface smooth, flat and greased Per module
T	Mounting torque ± 10%	IAP to heatsink	4 to 6	Nm	A mounting compound is recommended and the torque should be rechecked after a period of 3 hours to allow for the spread of the compound. Lubricated threads.
		busbar to IAP	4 to 6		
wt	Approximate weight		200 (7.1)	g(oz)	
	Case Style		New Int-A-Pak		

ΔR Conduction (per Junction)

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

Devices	Sinusoidal conduction @ T_J max.					Rectangular conduction @ T_J max.					Units
	180°	120°	90°	60°	30°	180°	120°	90°	60°	30°	
IRKT152/04	0.007	0.010	0.013	0.016	0.017	0.009	0.012	0.014	0.016	0.017	K/W

Ordering Information Table

Device Code

IRK	T	152	/	04
①	②	③		④

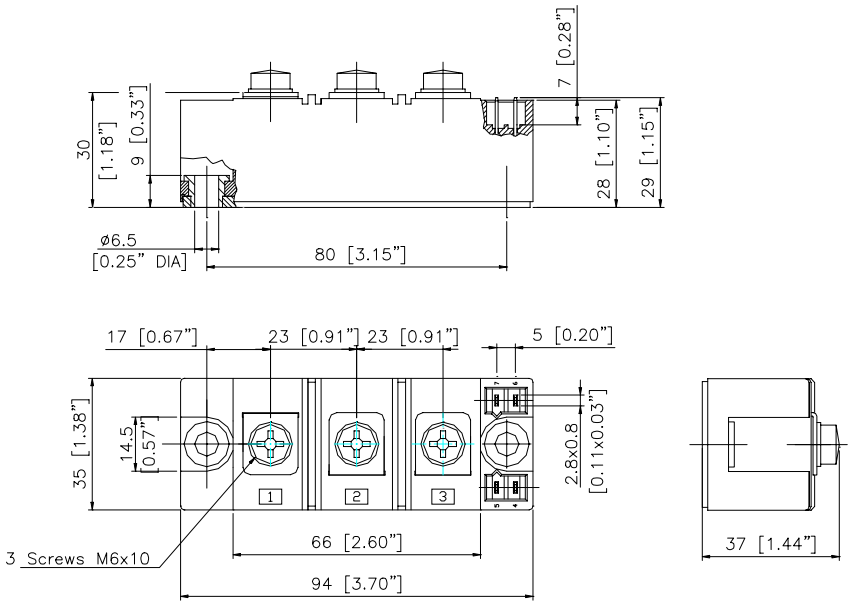
1 - Module Type

2 - Circuit Configuration

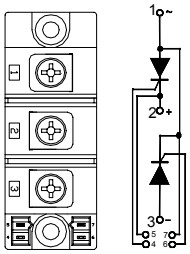
3 - Current Rating: $I_{T(AV)}$

4 - Voltage Code: Code x 100 = V_{RRM}

Outline Table



All dimensions are in millimeters



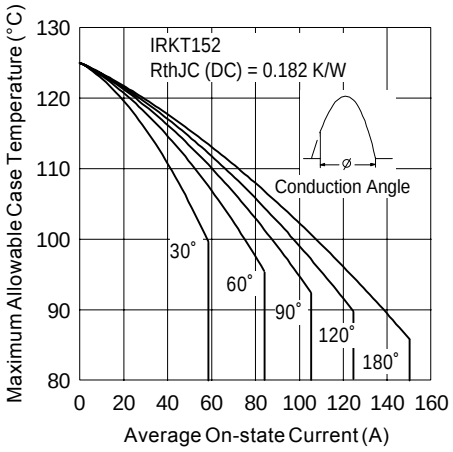


Fig. 1 - Current Ratings Characteristics

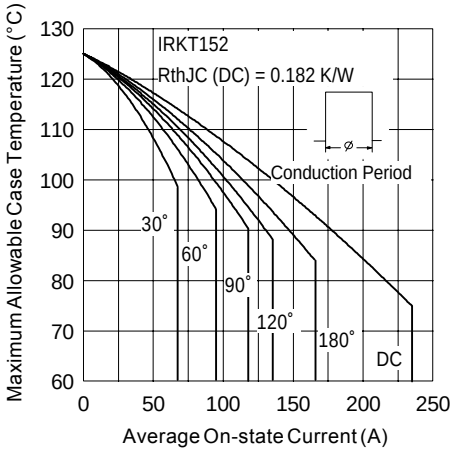


Fig. 2 - Current Ratings Characteristics

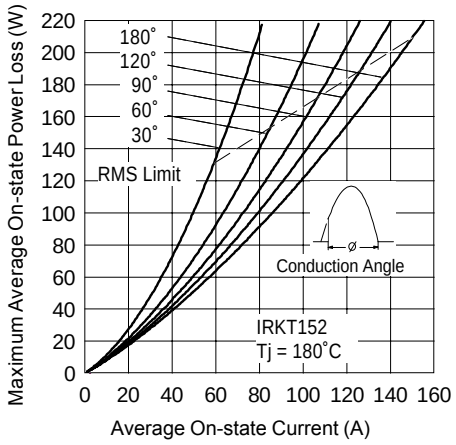


Fig. 3 - Forward Power Loss Characteristics

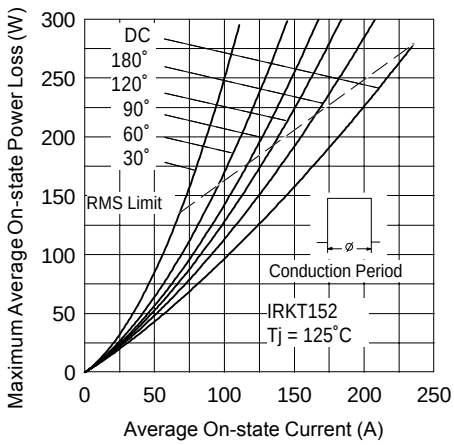


Fig. 4 - Forward Power Loss Characteristics

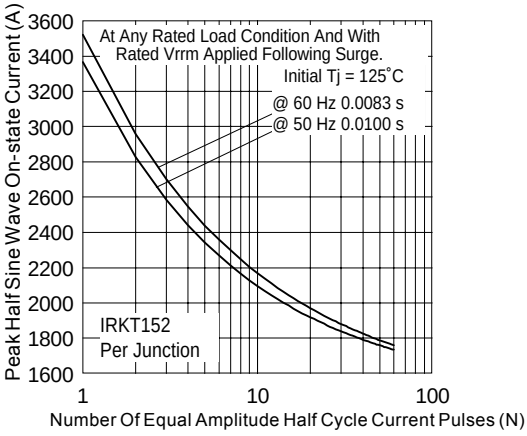


Fig.5 - Maximum Non-Repetitive Surge Current

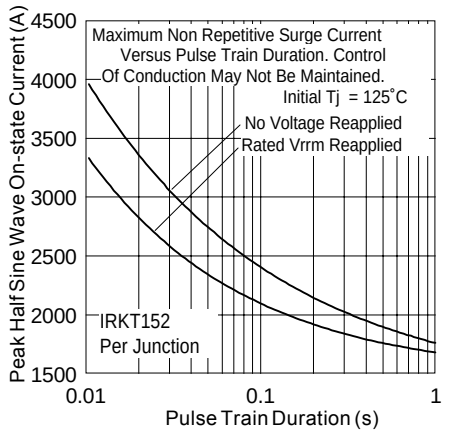


Fig. 6 - Maximum Non-Repetitive Surge Current

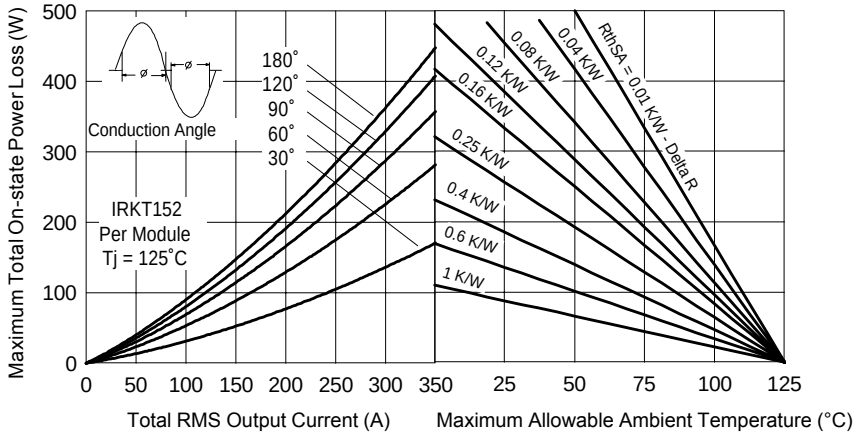


Fig.7 - On State Power Loss Characteristics

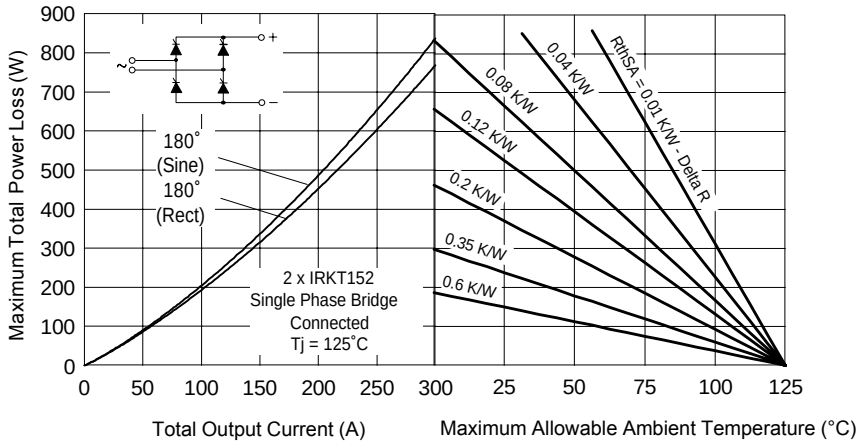


Fig.8 - On State Power Loss Characteristics

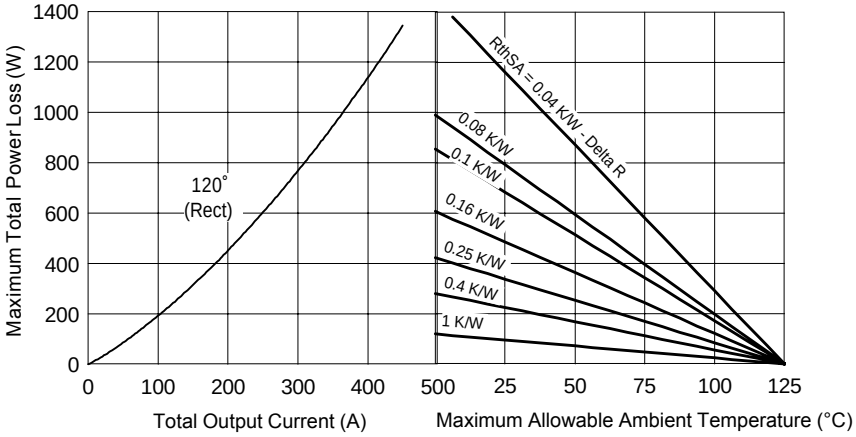


Fig. 9 - On State Power Loss Characteristics

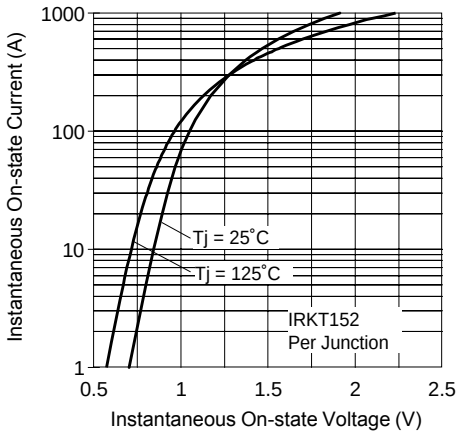


Fig. 10 - On-State Voltage Drop Characteristics

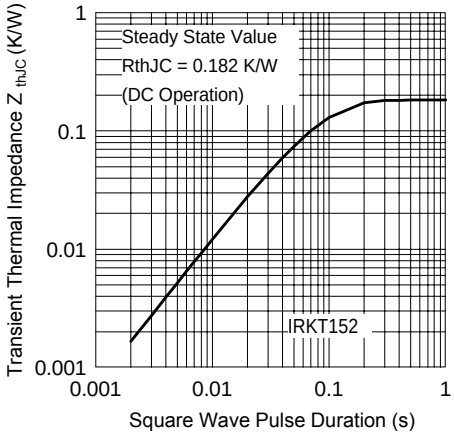


Fig. 11 - Thermal Impedance ZthJC Characteristics

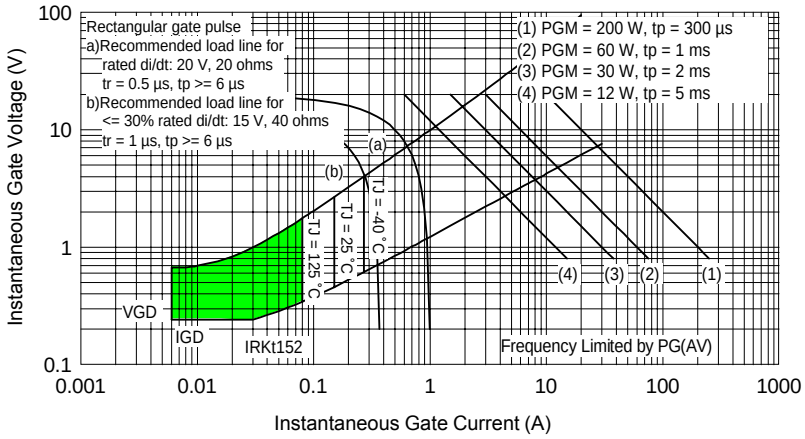


Fig.12 - Gate Characteristics

Data and specifications subject to change without notice.
This product has been designed and qualified for Multiple Level.
Qualification Standards can be found on IR's Web site.

International
IOR Rectifier

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7309
Visit us at www.irf.com for sales contact information. 04/02