

International IR Rectifier

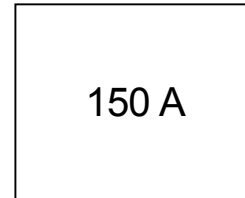
IRKT152/04

THYRISTOR/ THYRISTOR

INT-A-pak™ Power Module

Features

- Electrically Isolated by DBC Ceramic (Al₂O₃)
- 3500 V_{RMS} Isolating Voltage
- Industrial Standard Package
- High Surge Capability
- Glass Passivated Chips
- Simple Mounting
- UL E78996 approved 



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	KA ² s
@60Hz	4200	
i ² t @50Hz	80	KA ² √s
@60Hz	73	
i ² √t	800	KA ² √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 mA
IRKT152/04	400	500	50

On-state Conduction

Parameter	IRKT152/04	Units	Conditions
$I_{T(AV)}$ Max. average on-state current @ Case temperature	150	A	180° conduction half sine wave
	85	°C	
$I_{T(RMS)}$ Maximum RMS on-state current	330	A	as AC switch
I_{TSM} Maximum peak, one-cycle on-state, non-repetitive surge current	4000	A	t = 10ms No voltage
	4200		t = 8.3ms reapplied
	3350		t = 10ms 100% V_{RRM}
	3500		t = 8.3ms reapplied
I^2t Maximum I^2t for fusing	80	KA ² s	t = 10ms No voltage
	73		t = 8.3ms reapplied
	56		t = 10ms 100% V_{RRM}
	51		t = 8.3ms reapplied
I^2vt Maximum I^2vt for fusing	800	KA ² vs	t = 0.1 to 10ms, no voltage reapplied
$V_{T(TH)}$ 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	1.48	V	$I_{pk} = \pi \cdot I_{T(AV)}$, $T_J = 25^\circ\text{C}$
I_H Maximum Holding Current	200	mA	$T_J = 25^\circ\text{C}$, anode supply = 6V, resistive load, gate open circuit
I_L Maximum Latching Current	400		$T_J = 25^\circ\text{C}$, anode supply = 6V, resistive load

Switching

Parameter	Value	Units	Conditions
t_{gd} Typical delay time	1	μs	$T_J = 25^\circ\text{C}$ Gate Current=1A $di/dt=1A/\mu\text{s}$
t_{gr} Typical rise time	2		$T_J = 25^\circ\text{C}$ $V_d=0,67\% V_{DRM}$
t_q Typical turn-off time	50 - 200		$I_{TM} = 300\text{ A}$; $-di/dt = 15\text{ A}/\mu\text{s}$; $T_J = T_J \text{ max}$ $V_f = 50\text{ V}$; $dV/dt = 20\text{ V}/\mu\text{s}$; Gate 0 V, 100Ω

Blocking

I_{RRM} Maximum peak reverse and	50	mA	$T_J = 125^\circ\text{C}$
I_{DRM} off-state leakage current			
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	$T_J = T_J \text{ max.}$, exponential to 67% rated V_{DRM}

Triggering

Parameter	IRKT152/04	Units	Conditions
P_{GM} Max. peak gate power	12	W	$t_p \leq 5ms, T_J = T_{Jmax}$.
$P_{G(AV)}$ Max. average gate power	3	W	$f=50Hz, T_J = T_{Jmax}$.
I_{GM} Max. peak gate current	3	A	$t_p \leq 5ms, T_J = T_{Jmax}$.
$-V_{GT}$ Max. peak negative gate voltage	10	V	
V_{GT} Max. required DC gate voltage to trigger	4	V	$T_J = -40^\circ C$ Anode supply = 6V, resistive load; $R_a = 1\Omega$ $T_J = 25^\circ C$ $T_J = T_{Jmax}$.
	2.5		
	1.7		
I_{GT} Max. required DC gate current to trigger	270	mA	$T_J = -40^\circ C$ Anode supply = 6V, resistive load; $R_a = 1\Omega$ $T_J = 25^\circ C$ $T_J = T_{Jmax}$.
	150		
	80		
V_{GD} Max. gate voltage that will not trigger	0.3	V	@ $T_J = T_{Jmax}$, 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	@ $T_J = T_{Jmax}$, $I_{TM} = 400A$ rated V_{DRM} applied

Thermal and Mechanical Specifications

Parameter	IRKT152/04	Units	Conditions
T_J Max. junction operating temperature range	-40 to 125	$^\circ C$	
T_{stg} Max. storage temperature range	-40 to 150	$^\circ C$	
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 IAP to heatsink torque $\pm 10\%$ busbar to IAP	4 to 6 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.
wt Approximate weight	200 (7.1)		
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

IRKT152/04

Bulletin I27122 rev. D 11/04

Ordering Information Table

Device Code				
IRK	T	152	/	04
①	②	③		④
1	- Module Type			
2	- Circuit Configuration			
3	- Current Rating			
4	- Voltage Rating (04 = 400V)			

Outline Table

Technical drawing showing the outline of the IRKT152/04 module. The drawing includes a side view and a top view. Dimensions are provided in millimeters and inches.

Side View Dimensions:

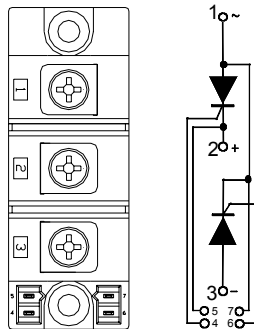
- Total height: 30 [1.18"]
- Mounting hole offset: 9 [0.33"]
- Mounting hole diameter: $\phi 6.5$ [0.25" DIA]
- Module length: 80 [3.15"]
- Terminal height: 7 [0.28"]
- Terminal offset: 28 [1.10"]
- Terminal width: 29 [1.15"]

Top View Dimensions:

- Terminal width: 35 [1.38"]
- Terminal offset: 14.5 [0.57"]
- Terminal pitch: 17 [0.67"]
- Terminal width: 23 [0.91"]
- Terminal pitch: 23 [0.91"]
- Terminal width: 5 [0.20"]
- Terminal pitch: 2.8x0.8 [0.11x0.03"]
- Terminal width: 37 [1.44"]
- Terminal pitch: 66 [2.60"]
- Terminal width: 94 [3.70"]

3 Screws M6x10

All dimensions are in millimeters



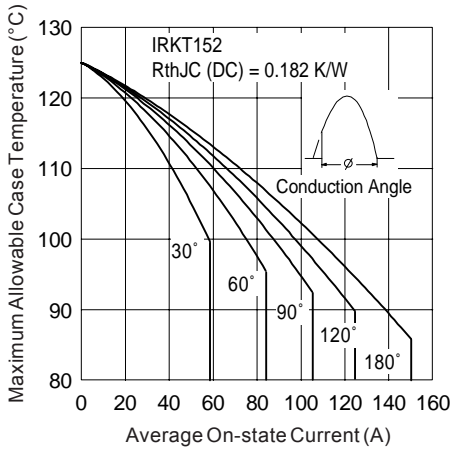


Fig. 1 - Current Ratings Characteristics

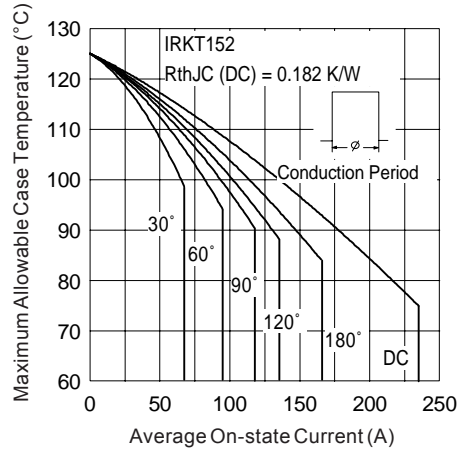


Fig. 2 - Current Ratings Characteristics

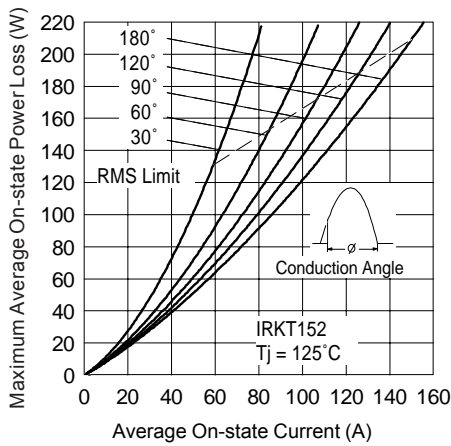


Fig. 3 - Forward Power Loss Characteristics

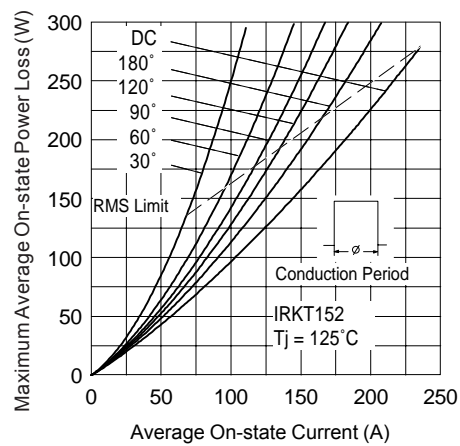


Fig. 4 - Forward Power Loss Characteristics

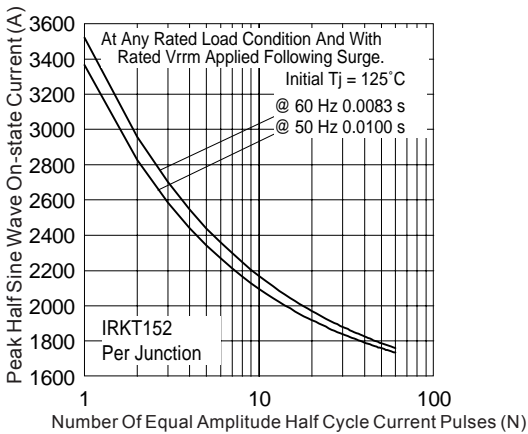


Fig. 5 - Maximum Non-Repetitive Surge Current

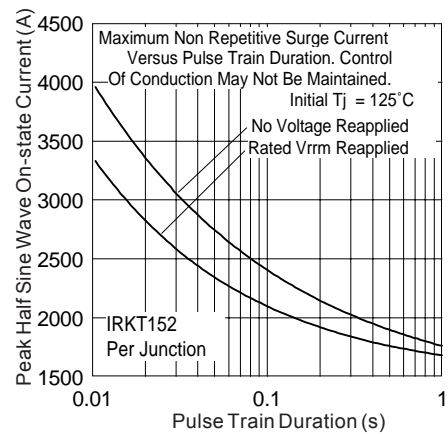


Fig. 6 - Maximum Non-Repetitive Surge Current

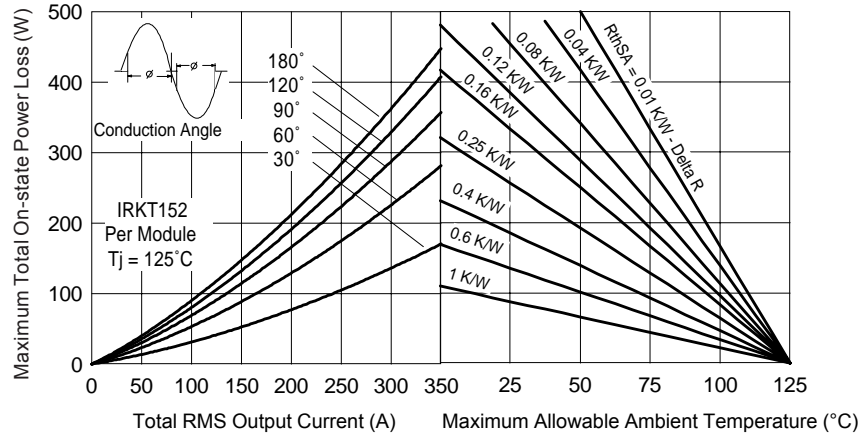


Fig.7 - On State Power Loss Characteristics

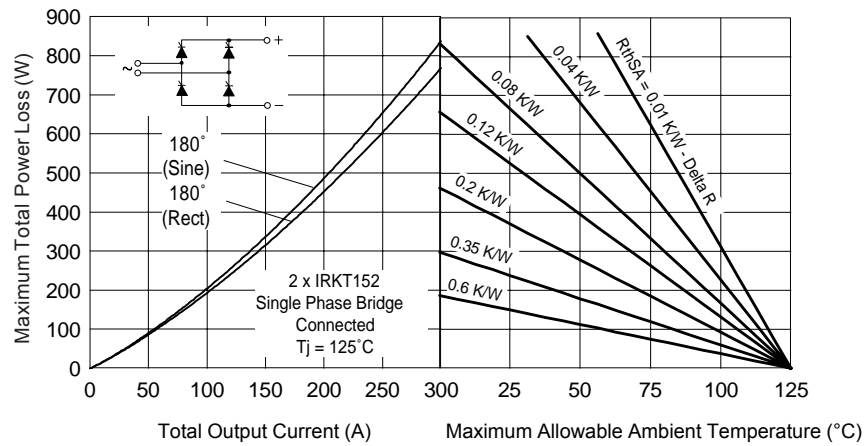


Fig.8 - On State Power Loss Characteristics

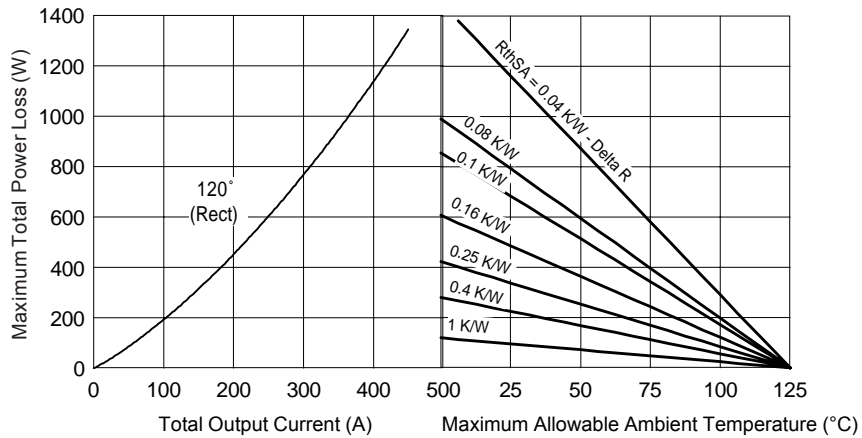


Fig.9 - On State Power Loss Characteristics

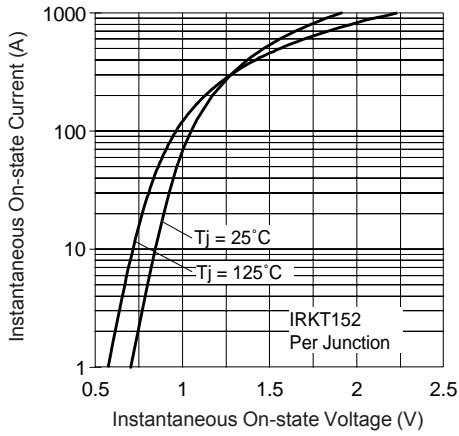


Fig. 10 - On-State Voltage Drop Characteristics

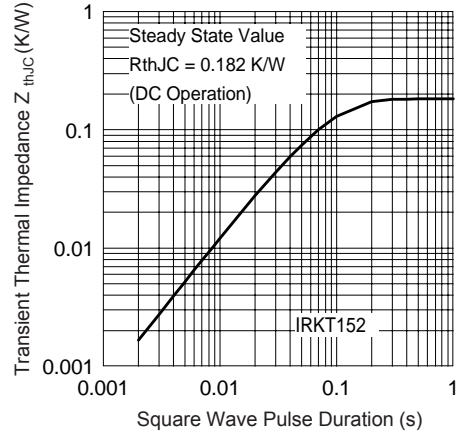


Fig. 11 - Thermal Impedance Z_{thJC} Characteristics

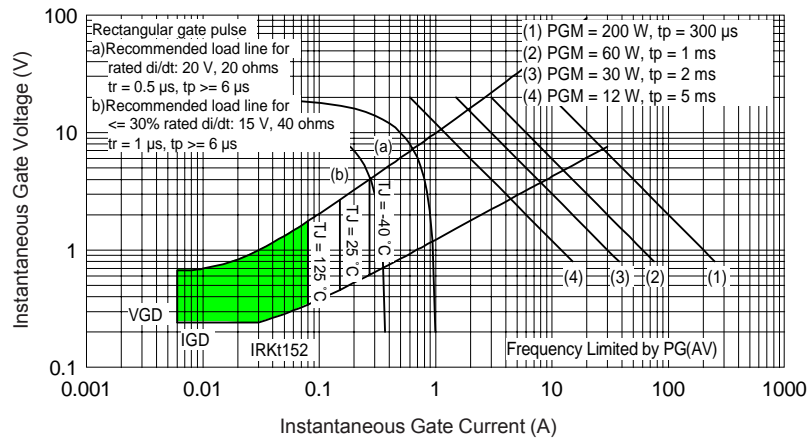


Fig. 12 - Gate Characteristics

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.