Bulletin I27402 rev. B 07/03

International
IOR Rectifier

IRKD600.. SERIES

STANDARD DIODES **SUPER MAGN-A-pak™ Power Modules**

600 A

Features

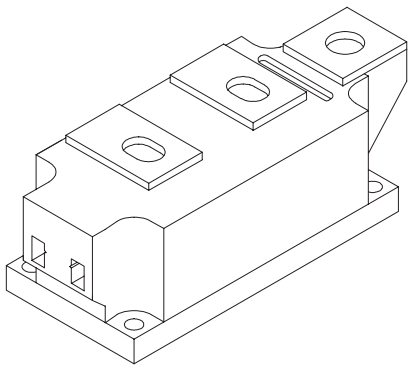
- High current capability
- 3000 V_{RMS} isolating voltage with non-toxic substrate
- High surge capability
- High voltage ratings up to 2000V
- Industrial standard package
- UL E78996 approved

Typical Applications

- Rectifying bridge for large motor drives
- Rectifying bridge for large UPS

Major Ratings and Characteristics

Parameters		IRKD600..	Units
$I_{F(AV)}$		600	A
	@T_C	100	°C
$I_{F(RMS)}$		942	A
	@T_C	100	°C
I_{FSM}	@50Hz	19.0	KA
	@60Hz	20.1	KA
I^2t	@50Hz	1805	KA^2s
	@60Hz	1683	KA^2s
$I^2\sqrt{t}$		18050	$KA^2\sqrt{s}$
V_{RRM}	range	800 to 2000	V
T_{STG}	range	-40 to 150	°C
T_J	range	-40 to 150	°C



ELECTRICAL SPECIFICATIONS

Voltage Ratings

Type number	Voltage Code	V_{RRM} , maximum repetitive peak reverse voltage V	V_{RSM} , maximum non-repetitive peak rev. voltage V	I_{RRM} max. @ T_J max. mA
IRKD600..	08	800	900	50
	12	1200	1300	
	16	1600	1700	
	20	2000	2100	

Forward Conduction

	Parameter	IRKD600..	Units	Conditions		
$I_{F(AV)}$	Maximum average forward current	600	A	180° conduction, half sine wave		
	@ Case temperature	100	°C			
$I_{F(RMS)}$	Maximum RMS forward current	942	A	180° conduction, half sine wave @ T_C = 100°C		
I_{FSM}	Maximum peak, one-cycle forward, non-repetitive surge current	19.0	KA	t = 10ms	No voltage reapplied	Sinusoidal half wave, Initial T_J = T_J max.
		20.1		t = 8.3ms		
		16.2		t = 10ms	100% V_{RRM} reapplied	
		17.2		t = 8.3ms		
I^2t	Maximum I^2t for fusing	1805	KA^2s	t = 10ms	No voltage reapplied	
		1683		t = 8.3ms		
		1319		t = 10ms	100% V_{RRM} reapplied	
		1230		t = 8.3ms		
$I^2\sqrt{t}$	Maximum $I^2\sqrt{t}$ for fusing	18050	$KA^2\sqrt{s}$	t = 0.1 to 10ms, no voltage reapplied		
$V_{F(TO)1}$	Low level value of threshold voltage	0.70	V	(16.7% x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), T_J = T_J max.		
$V_{F(TO)2}$	High level value of threshold voltage	0.77		(I > π x $I_{F(AV)}$), T_J = T_J max.		
r_{f1}	Low level value of forward slope resistance	0.28	mΩ	(16.7% x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), T_J = T_J max.		
r_{f2}	High level value of forward slope resistance	0.25		(I > π x $I_{F(AV)}$), T_J = T_J max.		
V_{FM}	Maximum forward voltage drop	1.45	V	I_{pk} = 1800A, T_J = 25°C, t_p = 10ms sine pulse		

Blocking

	Parameter	IRKD600..	Units	Conditions
V_{INS}	RMS isolation voltage	3000	V	t = 1 s
I_{RRM}	Maximum peak reverse and off-state leakage current	50	mA	T_J = T_J max., rated V_{RRM} applied

Thermal and Mechanical Specifications

	Parameter	IRKD600..	Units	Conditions
T_J	Max. junction operating temperature range	-40 to 150	°C	
T_{stg}	Max. storage temperature range	-40 to 150		
R_{thJC}	Max. thermal resistance, junction to case	0.065	K/W	Per junction, DC operation
R_{thC-hs}	Max. thermal resistance, case to heatsink	0.02	K/W	
T	Mounting torque ± 10% SMAP to heatsink	6 - 8	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
	busbar to SMAP	12 - 15		
wt	Approximate weight	1500	g	
	Case style	SUPER MAGN-A-pak		See outline table

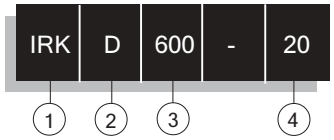
ΔR_{thJC} Conduction

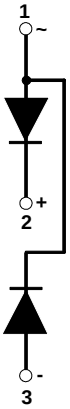
(The following table shows the increment of thermal resistance R_{thJC} when devices operate at different conduction angles than DC)

Conduction angle	Sinusoidal conduction	Rectangular conduction	Units	Conditions
180°	0.009	0.006	K/W	$T_J = T_J$ max.
120°	0.011	0.011		
90°	0.014	0.015		
60°	0.021	0.022		
30°	0.037	0.038		

Ordering Information Table

Device Code





1 - Module type

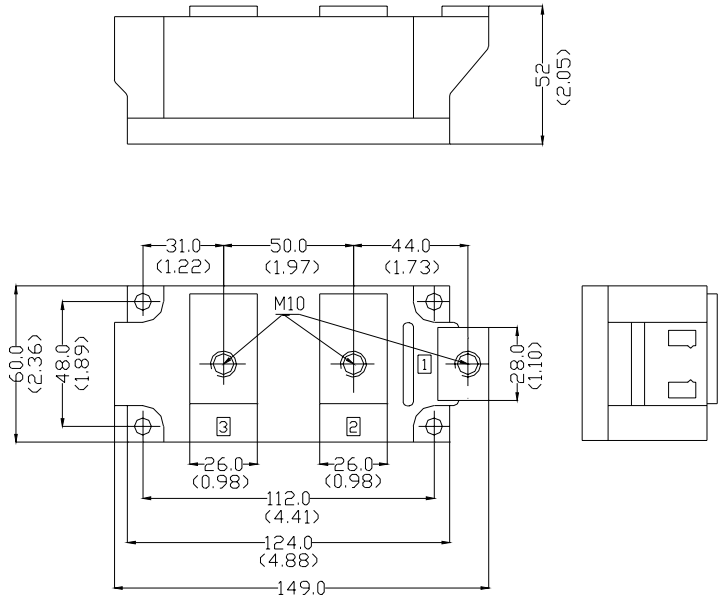
2 - Circuit configuration D = 2 diodes in series

3 - Current rating

4 - Voltage code: Code x 100 = V_{RRM} (See Voltage Ratings Table)

Outline Table

All dimensions in millimeters (inches)



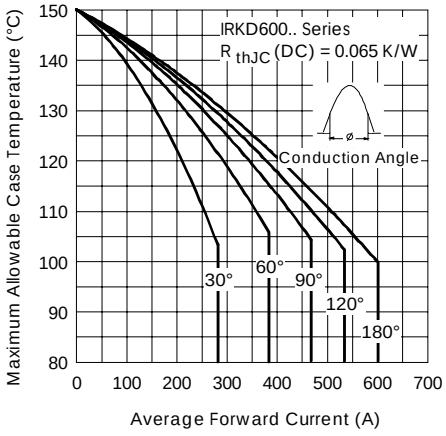


Fig. 1 - Current Ratings Characteristics

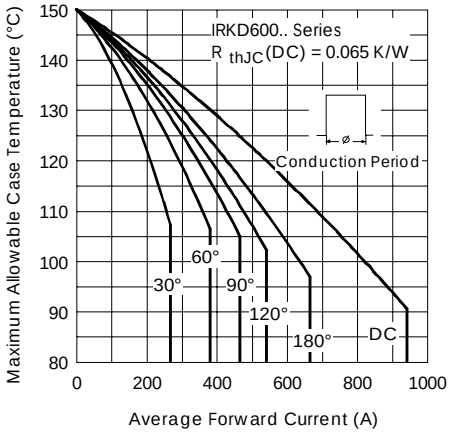


Fig. 2 - Current Ratings Characteristics

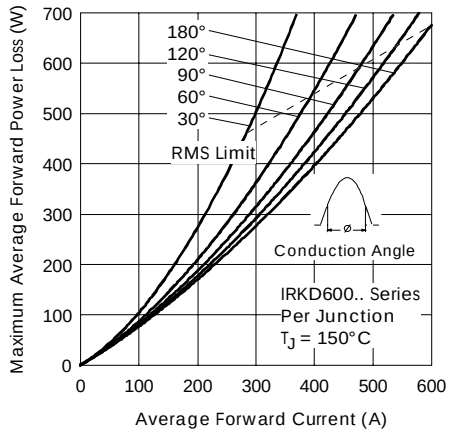


Fig. 3 - Forward Power Loss Characteristics

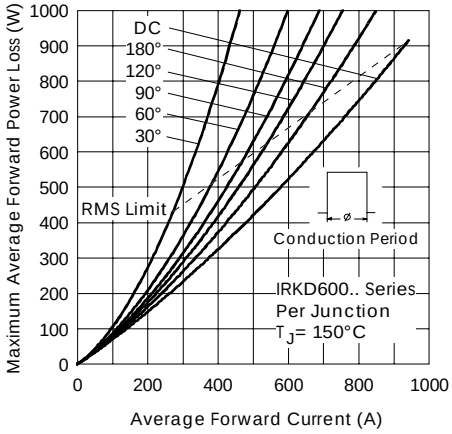


Fig. 4 - Forward Power Loss Characteristics

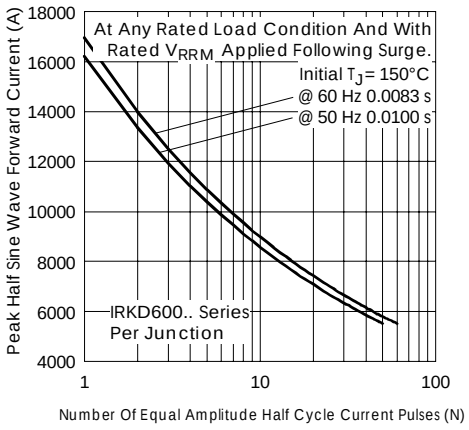


Fig. 5 - Maximum Non-Repetitive Surge Current

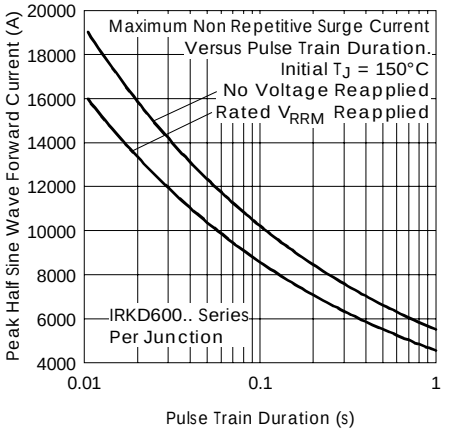


Fig. 6 - Maximum Non-Repetitive Surge Current

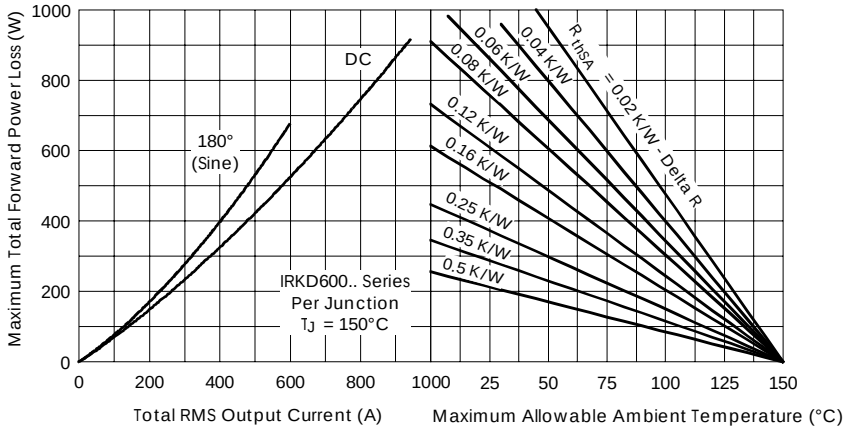


Fig. 7 - Forward Power Loss Characteristics

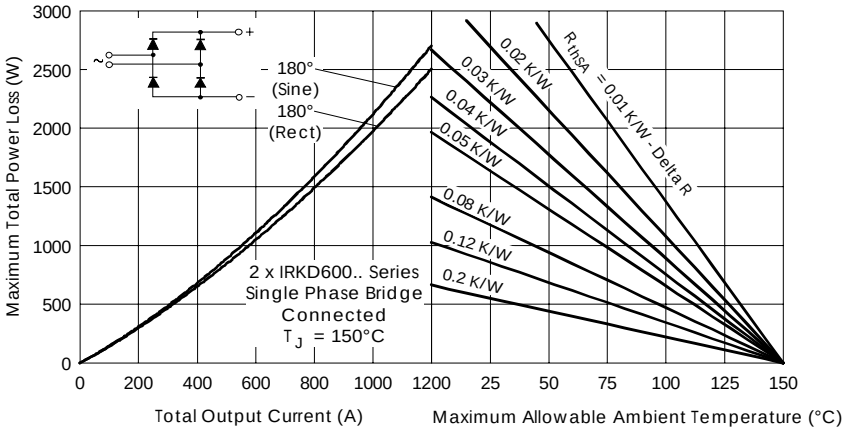


Fig. 8 - Forward Power Loss Characteristics

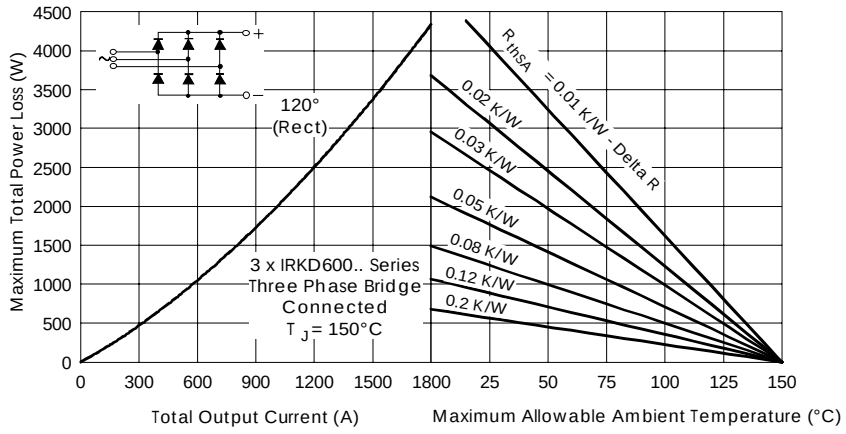


Fig. 9 - Forward Power Loss Characteristics

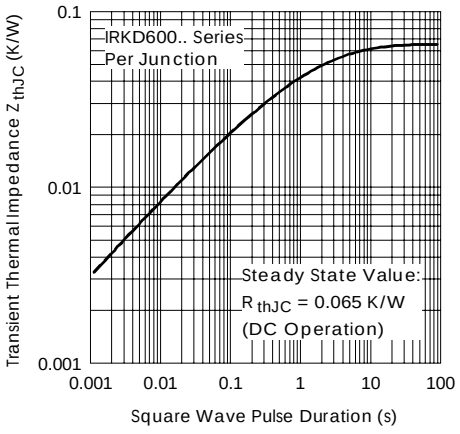


Fig. 10 - Thermal Impedance Z_{thJC} Characteristic

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