


STANDARD DIODES

SUPER MAGN-A-pak™ Power Modules

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 
- RoHS Compliant

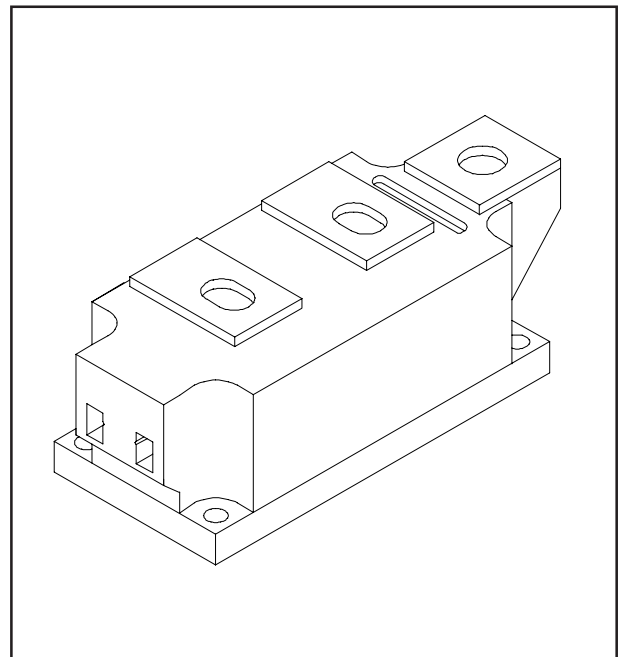
600 A

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 ² t	@50Hz	1805 KA ² s
	@60Hz	1683 KA ² s
I ² /t	18050	KA ² /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 @ Case temperature	600	A	180° conduction, half sine wave		
	100	°C			
$I_{F(RMS)}$ Maximum RMS forward current	942	A	180° conduction, half sine wave @ $T_C = 100^\circ\text{C}$		
I_{FSM} Maximum peak, one-cycle forward, non-repetitive surge current	19.0	KA	t = 10ms No voltage		
	20.1		t = 8.3ms reapplied		
	16.2		t = 10ms 100% V_{RRM}		
	17.2		t = 8.3ms reapplied		
I^2t Maximum I^2t for fusing	1805	KA ² s	t = 10ms No voltage		
	1683		t = 8.3ms reapplied		
	1319		t = 10ms 100% V_{RRM}		
	1230		t = 8.3ms reapplied		
$I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing	18050	KA ² √s	t = 0.1 to 10ms, no voltage reapplied		
	$V_{F(TO)1}$ Low level value of threshold voltage		0.70	V	($16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}$), $T_J = T_J$ max.
	$V_{F(TO)2}$ High level value of threshold voltage		0.77		($I > \pi \times I_{F(AV)}$), $T_J = T_J$ max.
	r_{f1} Low level value of forward slope resistance		0.28	mΩ	($16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}$), $T_J = T_J$ max.
r_{f2} High level value of forward slope resistance	0.25	($I > \pi \times I_{F(AV)}$), $T_J = T_J$ max.			
V_{FM} Maximum forward voltage drop	1.24	V	$I_{pk} = 1800\text{A}$, $T_J = 25^\circ\text{C}$, $t_p = 10\text{ms}$ 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 busbar to SMAP	6 - 8 12 - 15	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
wt Approximate weight	1500		
Case style	SUPERMAGN-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	0.015 0.022 0.037	K/W T _J = T _J max.
120°	0.011	0.011		
90°	0.014	0.014		
60°	0.021	0.021		
30°			0.037	0.038

Ordering Information Table

Device Code

IRK	D	600	-	20
①	②	③		④

- 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

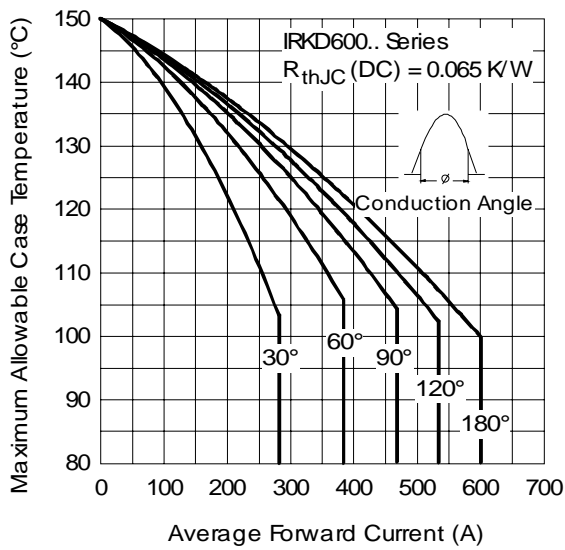
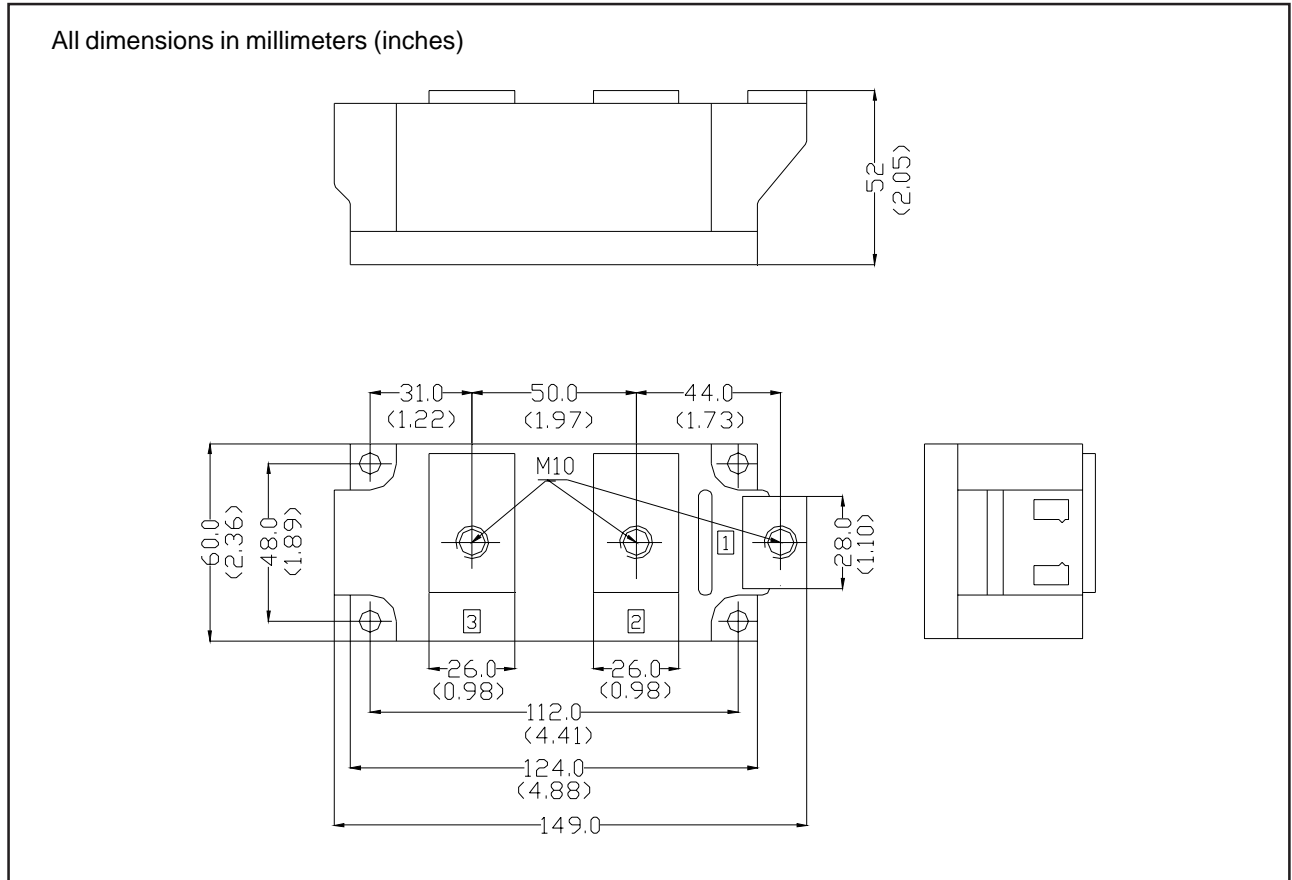


Fig. 1 - Current Ratings Characteristics

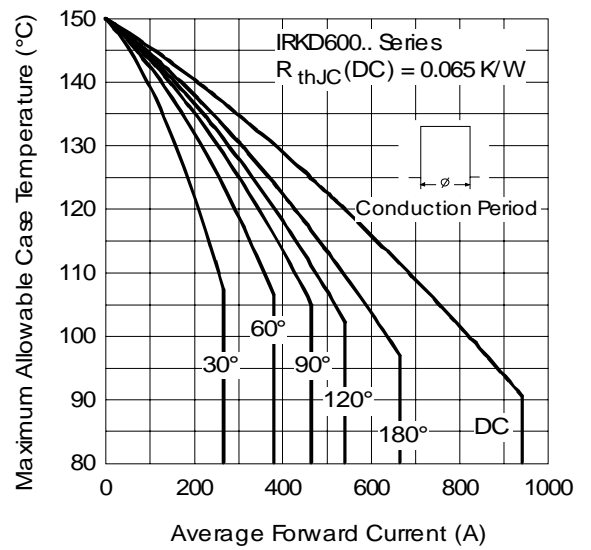


Fig. 2 - Current Ratings Characteristics

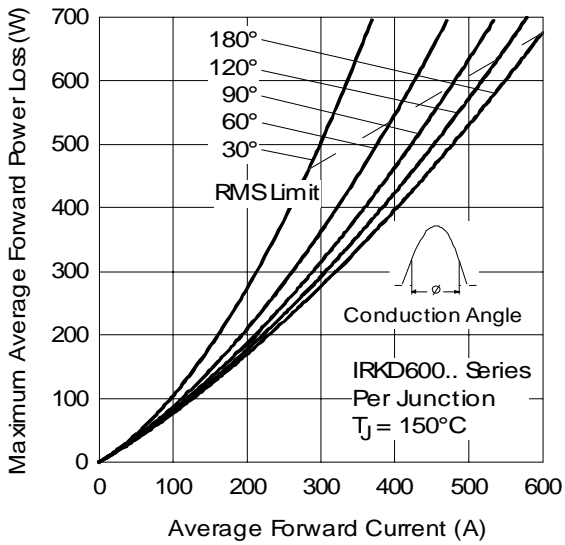


Fig. 3 - Forward Power Loss Characteristics

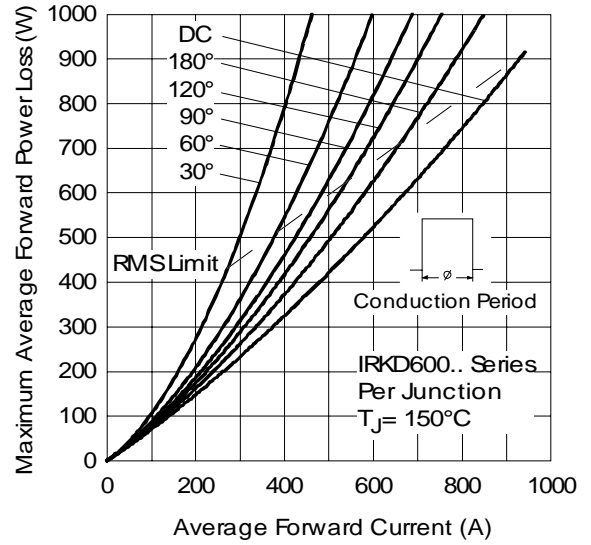


Fig. 4 - Forward Power Loss Characteristics

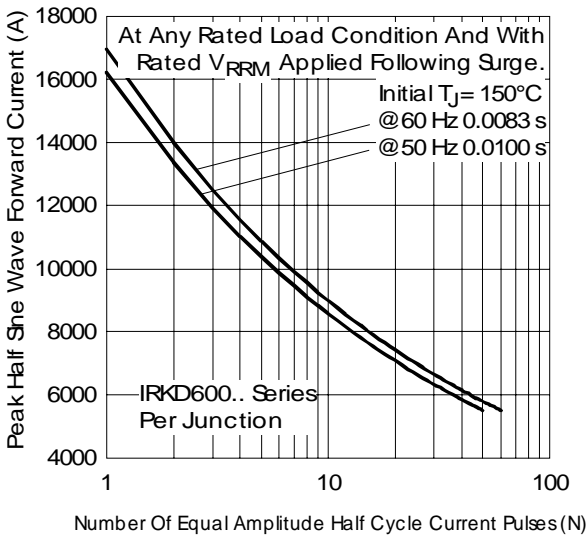


Fig. 5 - Maximum Non-Repetitive Surge Current

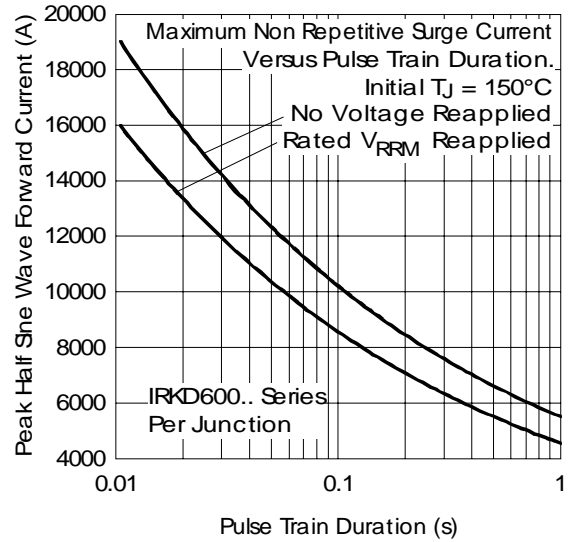


Fig. 6 - Maximum Non-Repetitive Surge Current

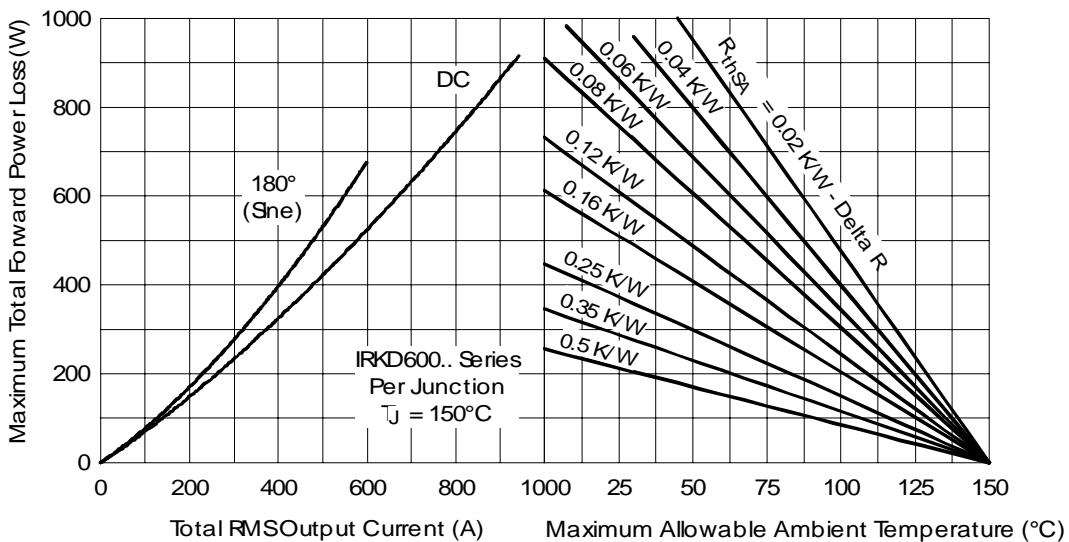


Fig. 7 - Forward Power Loss Characteristics

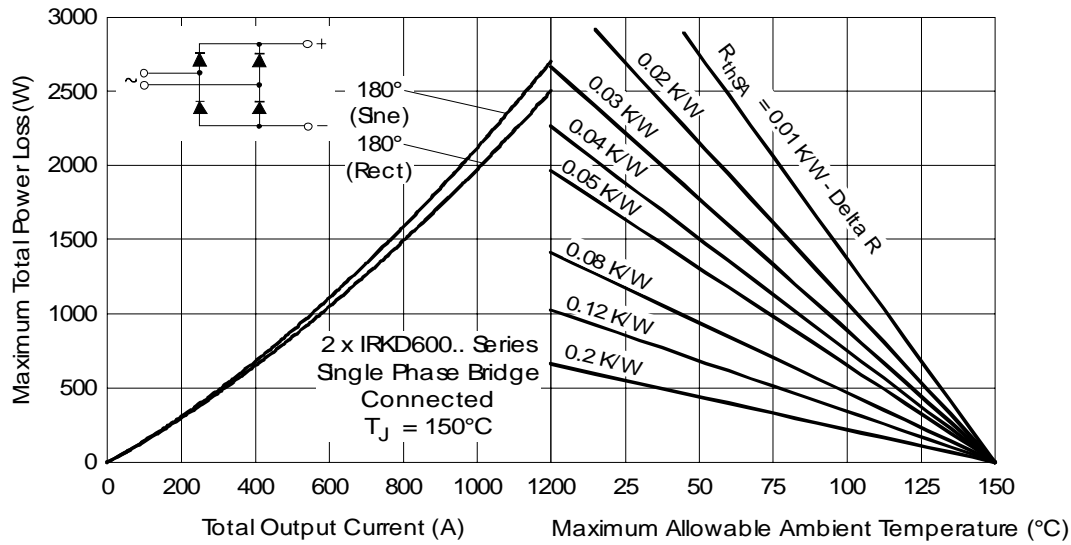


Fig. 8 - Forward Power Loss Characteristics

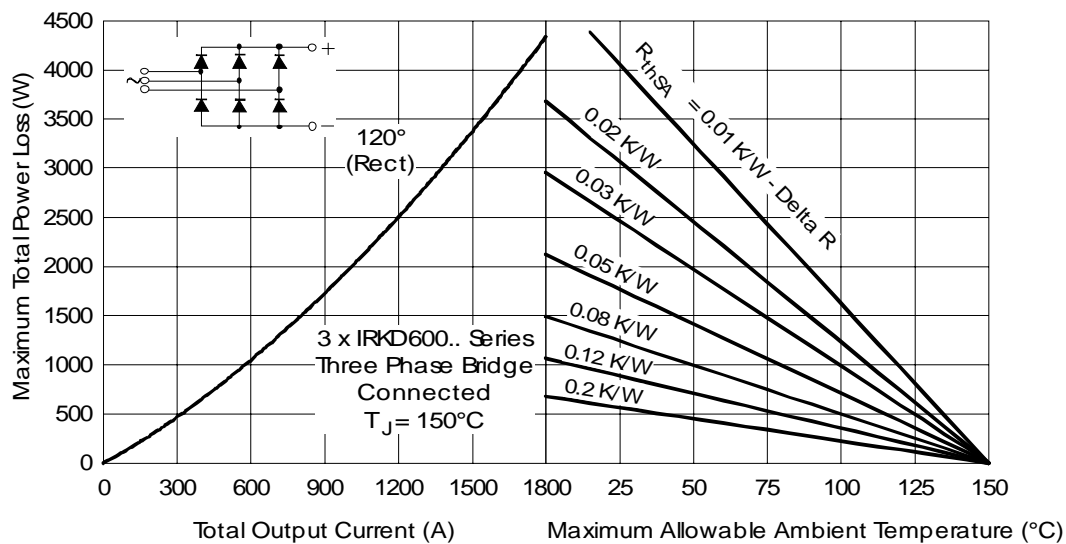


Fig. 9 - Forward Power Loss Characteristics

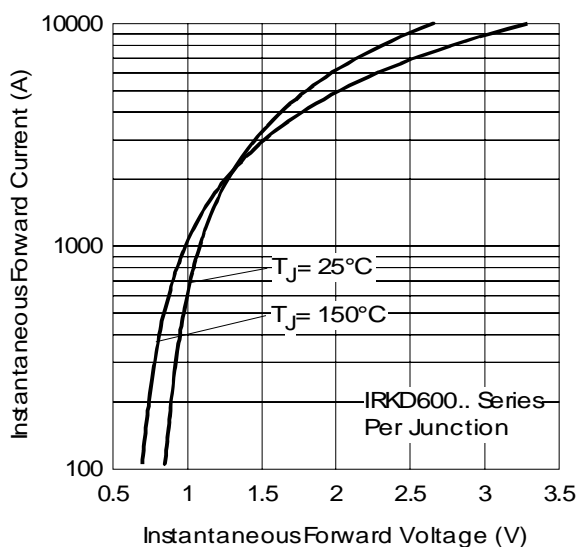


Fig. 10 - Forward Voltage Drop Characteristics

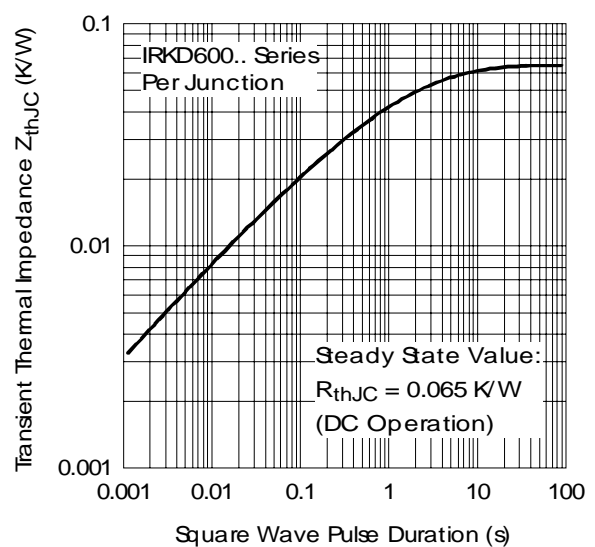


Fig. 11 - Thermal Impedance Z_{thJC} Characteristic

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

International
IOR Rectifier

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