International IR 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 recognition pending
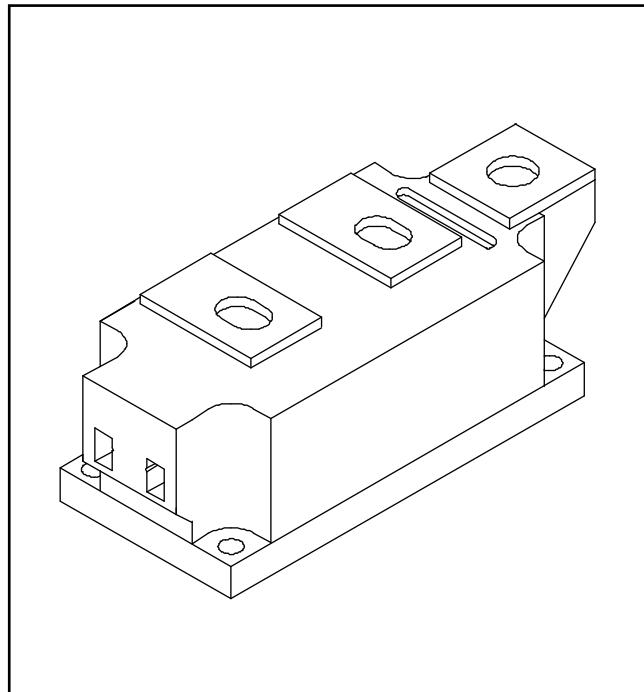
Typical Applications

■ 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	82	°C
$I_{F(RMS)}$		1120	A
	@ T_C	82	°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	82	°C			
$I_{F(RMS)}$	Maximum RMS forward current	1120	A	180° conduction, half sine wave @ T_C = 82°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^{2}s	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	1.24	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
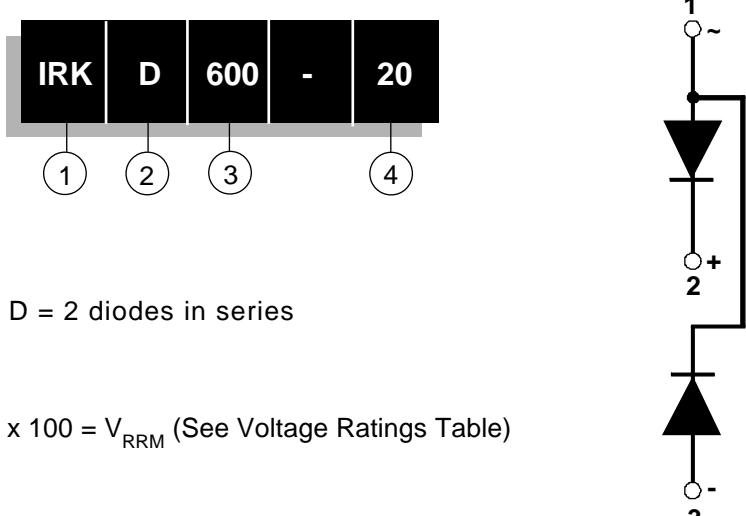
Thermal and Mechanical Specifications

	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		
120°	0.011	0.011		
90°	0.014	0.015	K/W	$T_J = T_J$ max.
60°	0.021	0.022		
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

All dimensions in millimeters (inches)

Fast-on tabs
2.8x0.8
(0.11x0.03)

M10

31.0 (1.22)   50.0 (1.97)   44.0 (1.73)

60.0 (2.36)
48.0 (1.89)
28.0 (1.10)
20.1 (0.78)

53 (2.05)

26.0 (0.98)   26.0 (0.98)
112.0 (4.41)
124.0 (4.88)
149.0 (5.67)
1.0 (0.039)

36.4 (1.14)   4.5 (0.20)

3   2   1