

**STANDARD DIODES**
**SUPER MAGN-A-PAK™ Power Modules**
**Features**

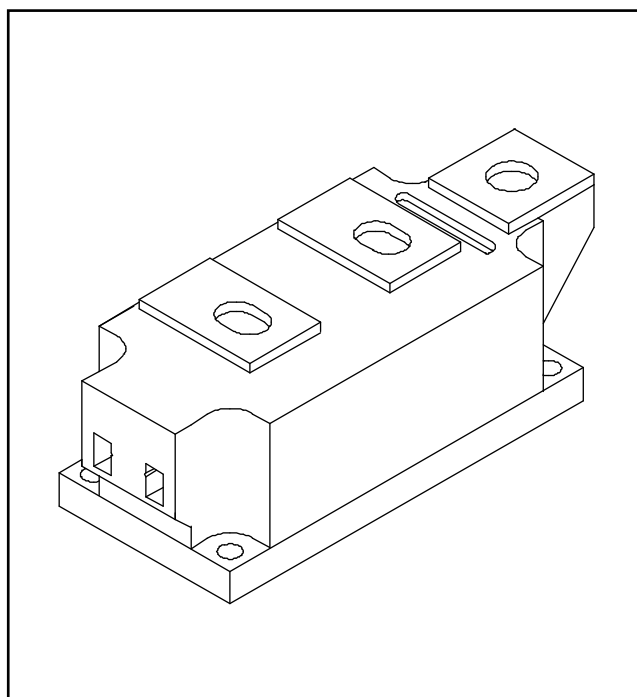
- High current capability
- 3000 V<sub>RMS</sub> isolating voltage with non-toxic substrate
- High surge capability
- High voltage ratings up to 2000V
- Industrial standard package
- UL recognition pending

**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
@ $T_C$	82	°C
$I_{F(RMS)}$	1120	A
@ $T_C$	82	°C
$I_{FSM}$ @ 50Hz	19.0	KA
@ 60Hz	20.1	KA
$I^2_t$ @ 50Hz	1805	KA <sup>2</sup> s
@ 60Hz	1683	KA <sup>2</sup> s
$I^2\sqrt{t}$	18050	KA <sup>2</sup> √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
	82	°C	
$I_{F(RMS)}$ Maximum RMS forward current	1120	A	180° conduction, half sine wave @ $T_C = 82^\circ\text{C}$
$I_{FSM}$ Maximum peak, one-cycle forward, non-repetitive surge current	19.0	KA	t = 10ms No voltage
	20.1		t = 8.3ms reappplied
	16.2		t = 10ms 100% $V_{RRM}$
	17.2		t = 8.3ms reappplied
$I^2t$ Maximum $I^2t$ for fusing	1805	KA <sup>2</sup> s	t = 10ms No voltage
	1683		t = 8.3ms reappplied
	1319		t = 10ms 100% $V_{RRM}$
	1230		t = 8.3ms reappplied
$I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing	18050	KA <sup>2</sup> $\sqrt{s}$	t = 0.1 to 10ms, no voltage reappplied
$V_{F(TO)1}$ Low level value of threshold voltage	0.70	V	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$ , $T_J = T_J \text{ max.}$
$V_{F(TO)2}$ High level value of threshold voltage	0.77		$(I > \pi \times I_{F(AV)})$ , $T_J = T_J \text{ max.}$
$r_{f1}$ Low level value of forward slope resistance	0.28	m $\Omega$	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$ , $T_J = T_J \text{ max.}$
$r_{f2}$ High level value of forward slope resistance	0.25		$(I > \pi \times I_{F(AV)})$ , $T_J = T_J \text{ max.}$
$V_{FM}$ 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	$T_J = T_J \text{ max.}$ , 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 $\pm 10\%$ SMAP to heatsink busbar to SMAP	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
	12 - 15		
wt Approximate weight	1500	g	
Case style	Super Magn-a-Pak		See outline table

 $\Delta R_{thJC}$  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	$T_J = T_J \text{ max.}$
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				
<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; padding: 5px; margin: 2px;">IRK</div> <div style="border: 1px solid black; padding: 5px; margin: 2px;">D</div> <div style="border: 1px solid black; padding: 5px; margin: 2px;">600</div> <div style="border: 1px solid black; padding: 5px; margin: 2px;">-</div> <div style="border: 1px solid black; padding: 5px; margin: 2px;">20</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <span>①</span><span>②</span><span>③</span><span>④</span> </div>				
<b>1</b>	-	Module type		
<b>2</b>	-	Circuit configuration D = 2 diodes in series		
<b>3</b>	-	Current rating		
<b>4</b>	-	Voltage code: Code x 100 = $V_{RRM}$ (See Voltage Ratings Table)		

Outline Table

