

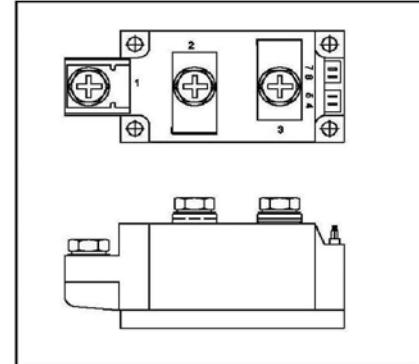
POWER MODULES IRK 330 SERIES

Dual Thyristor Module 1600V, 330A 150mA

SKU: A-D45050

FEATURES

- ❖ Electrically isolated base plate.
- ❖ 3000 V_{RMS} isolating voltage.
- ❖ Industrial standard package.
- ❖ Simplified mechanical designs, rapid assembly.
- ❖ High surge capability.
- ❖ Large creepage distances.
- ❖ Beryllium oxide substrate.



DESCRIPTION

These IRK series of Power Modules use power thyristors/diodes in four basic configurations. The semiconductors are electrically isolated from the metal base, allowing common heatsinks and compact assemblies to be built. They can be interconnected to form single phase or three phase bridges or as AC-switches when modules are connected in anti-parallel.

These modules are intended for general purpose applications such as battery chargers, welders and plating equipment.

MAJOR RATINGS & CHARACTERISTICS

Parameters	IRK.330	Units
I _{T(AV)} @ 85°C	330	A
I _{T(RMS)}	520	A
I _{TSM} @ 50 Hz	8000	A
I ² t @ 50 Hz	320	kA ² s
I ² \sqrt{t}	3200	kA ² \sqrt{s}
V _{DRM} - V _{RRM}	800 to 2400	V
T _J	-40 to 125	°C

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ELECTRICAL SPECIFICATION VOLTAGE RATINGS

Type Number	Voltage Code	V_{RRM} / V_{DRM} , max. repetitive peak reverse and off-state voltage blocking voltage V	V_{RSM} , max. non-repetitive peak reverse voltage V	I_{DRM} / I_{RRM} max. @ 125 °C mA
IRK.330	08	800	900	70
	10	1000	1100	70
	12	1200	1300	70
	14	1400	1500	70
	16	1600	1700	70
	18	1800	1900	70
	20	2000	2100	70
	22	2200	2300	70
	24	2400	2500	70

ON-STATE CONDUCTION

	Parameters	IRK.330	Units	Conditions	
$I_{T(AV)}$	Max. average on-state current @ Case temperature	330	A	180° conduction, half sine wave	
		85	°C		
$I_{T(RMS)}$	Max. RMS on-state current	520	A	as AC switch	
I_{TSM}	Max. peak, one cycle on-state, non-repetitive surge current	8000	A	$t = 10ms$	Sinusoidal half wave, Initial $T_J = T_J$ max.
I^2t	Maximum I^2t for fusing	320	kA²s	$t = 10ms$	Sinusoidal half wave, Initial $T_J = T_J$ max.
$I^2\sqrt{t}$	Maximum $I^2\sqrt{t}$ for fusing	3200	kA²/s	$t = 0.1$ to 10ms. No voltage reapplied.	
$V_{T(TO)}$	Threshold voltage	0.80	V	$T_J = T_J$ max.	
r_t	On-state slope resistance	0.60	mΩ	$T_J = T_J$ max.	
V_{TM}	Max. on-state voltage drop	1.50	V	$I_{TM} = 600Amps, 25^{\circ}C, 180^{\circ}$ conduction AV. power = $V_{T(TO)} \times I_{T(AV)} + r_t \times (I_{T(RMS)})^2$	
I_H	Maximum holding current	150 max.	mA	Anode supply = 12V, initial $I_T = 30A, T_J = 25^{\circ}C$	
I_L	Max. latching current	500 max.	mA	Anode supply = 12V, resistive load = 1Ω, gate pulse : 10V, 100μs, $T_J = 25^{\circ}C$	

SWITCING

t_d	Typical delay time	1.0	μs	$T_J = 25^{\circ}C$	Gate current = $1A \text{ d}Ig/dt = 1A/\mu s$
t_r	Typical rise time	2.0	μs	$T_J = 25^{\circ}C$	$Vd = 0.67\% V_{DRM}$
t_q	Typical turn-off time	250	μs		

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BLOCKING

	Parameter	330	Units	Conditions
dv/dt	Maximum critical rate of rise of off-state voltage	1000	V/μs	$T_J = 125^\circ\text{C}$, exponential to 60% rated V_{DRM}
$I_{\text{RRM}}/I_{\text{DRM}}$	Max. peak reverse and off-state leakage current	70	mA	$T_J = 125^\circ\text{C}$, rated $V_{\text{DRM}}/V_{\text{RRM}}$ applied
V_{INS}	RMS isolation voltage	3000	V	50Hz, Circuit to base, all terminal shorted, 25°C , 1min.

TRIGGERING

	Parameter	330	Units	Conditions
P_{GM}	Maximum peak gate power	100	W	$T_J = 125^\circ\text{C}$, $t_p \leq 5\text{ms}$
$P_{\text{G(AV)}}$	Maximum average gate power	20		$T_J = 125^\circ\text{C}$, $f = 50\text{Hz}$, $d\% = 50$
$-V_{\text{GM}}$	Max. peak negative gate voltage	5.0	V	$T_J = 125^\circ\text{C}$, $t_p \leq 5\text{ms}$
I_{GT}	DC gate current required to trigger	MAX.	mA	$T_J = 25^\circ\text{C}$ Max. required gate trigger/current / voltage are the lowest value which will trigger all units 12V anode-to-cathode applied.
		-- 200 --		
V_{GT}	DC gate voltage required to trigger	-- 2.0 --	V	$T_J = 25^\circ\text{C}$
V_{GD}	DC gate voltage not to trigger	0.20	V	$T_J = 125^\circ\text{C}$
I_{GD}	DC gate current not to trigger	10.0	mA	$T_J = 125^\circ\text{C}$ Max. gate current / voltage not to trigger the max. value which will not trigger any unit with rated V_{DRM} anode-to-cathode applied
di/dt	Maximum critical rate of rise of turned-on current	250	A/μs	$T_J = 125^\circ\text{C}$, $I_{\text{TM}}=400\text{A}$, rated V_{DRM} applied non-repetitive

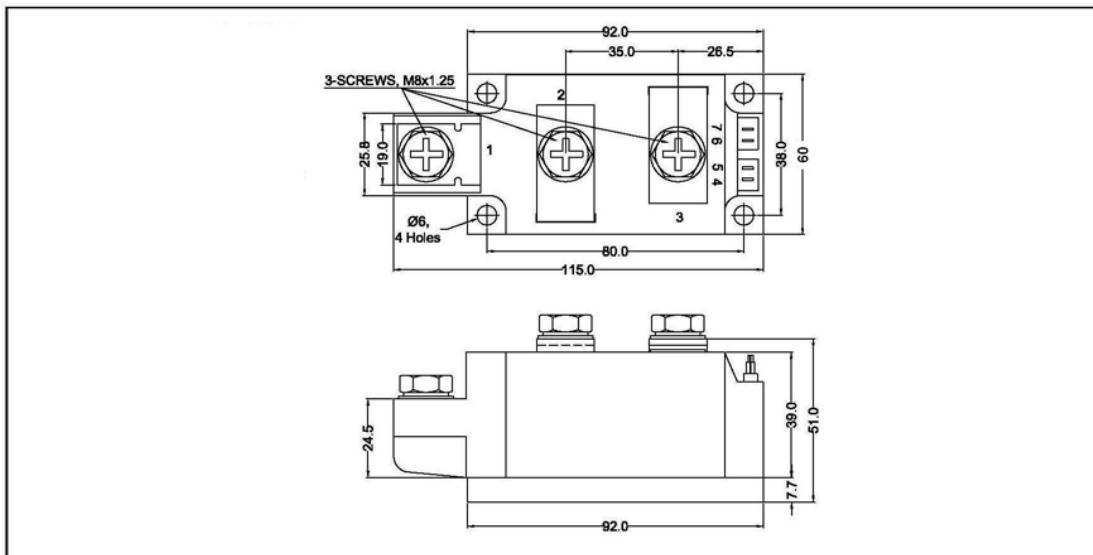
THERMAL AND MECHANICAL SPECIFICATION

	Parameter	330	Units	Conditions
T_J	Max. operating temperature range	-40 to 125	°C	
T_{stg}	Max. storage temperature range	-40 to 140		
$R_{\text{thJ-C}}$	Max. thermal resistance, junction to case	0.111	K/W	Per junction, DC operation
	Max. thermal resistance, junction to heatsink	0.02	K/W	Mountingsurfaceflat,smooth and greased
T	Mounting tourque, $\pm 10\%$	(4 to 6)	Nm	For Module to heatsink and busbar to Module
w t	Approximate weight	600	g	
	Case style	MAGN-A-PAK		

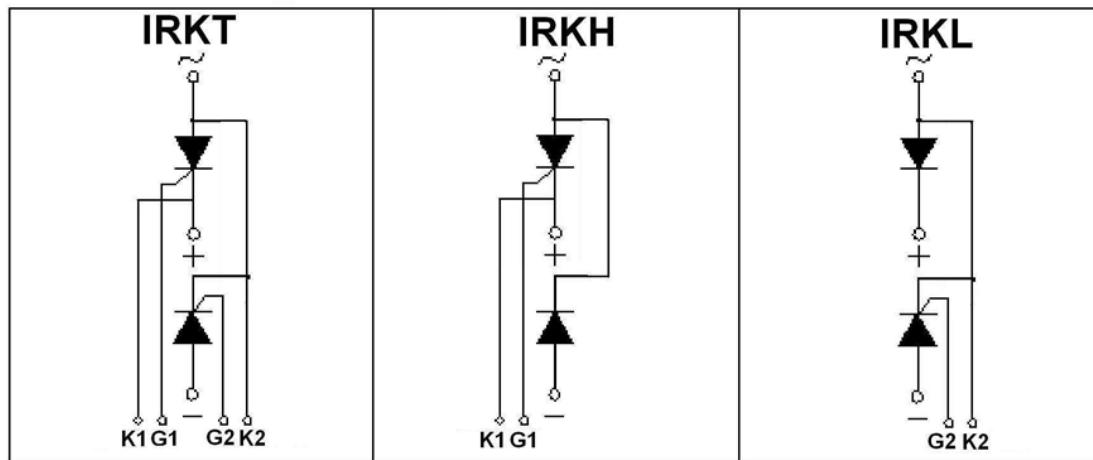
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IRK. 330 SERIES

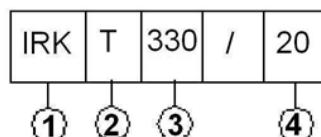
OUTLINE DIAGRAM



Circuit Configuration Table



Ordering Information Table



- ① - **Module type**
- ② - **Circuit configuration (See Circuit Configuration table)**
- ③ - **Current Code**
- ④ - **Voltage Code (See Voltage Ratings table)**