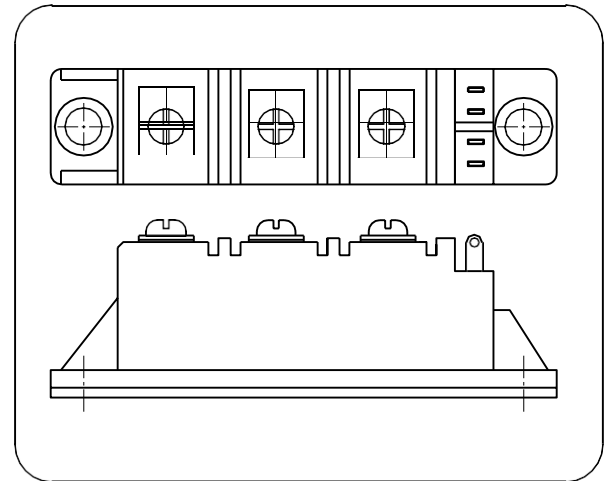


## POWER MODULES IRK. 91 Series



### FEATURES

- # Electrically isolated base plate.
- # 3500Vrms isolated voltage.
- # Simplified mechanical designs, rapid assembly.
- # Auxiliary cathode terminal for wiring convenience.
- # High surge capability.
- # Wide choice of circuit configuration.
- # Large creepage distance.

### DESCRIPTION

These IRK series of Power Modules use power diodes and thyristor in a variety of circuit configuration. The semiconductor chips are electrically isolated from the metal base, allowing common heat sinks and compact assemblies to be built. They can be interconnected to form single phase or three phase bridges or AC controller. These modules are intended for general purpose applications such as regulated power supplies, lighting circuits and temperature and motor speed control circuit.

### MAJOR RATING & CHARACTERISTICS

Parameters	IRK. 91	Units
$I_{T(AV)}$ @T <sub>c</sub> -85°C	95	A
$I_{O(RMS)}$	149	A
$I_{FSM}$ @ 50Hz	1785	A
$I^2t$ @ 50Hz	15910	A <sup>2</sup> s
$V_{RRM}$	400 to 1600	V
T <sub>STG</sub>	-40 to 125	°C
T <sub>J</sub>	-40 to 125	°C

## POWER MODULES

### IRK. 91 Series

#### ELECTRICAL SPECIFICATION

#### VOLTAGE RATINGS

Type Number	Voltage Code	$V_{RMM}$ max. repetitive peak reverse and off-state blocking voltage V	$V_{RSM}$ max. Non-repetitive peak reverse voltage V	$I_{DRM} / I_{RRM}$ max. @ 150°C Max. mA
IRK.91	04	400	500	15
	06	600	700	
	08	800	900	
	10	1000	1100	
	12	1200	1300	
	14	1400	1500	
	16	1600	1700	

#### ON-STATE CONDUCTION

	Parameter	IRK. 91	Unit	Conditions	
$I_{T(AV)}$	Max, average On-state current (Thyristors)	95	A	180°C conduction, half sine wave $T_c = 85^\circ\text{C}$	
$I_{F(AV)}$	Max, average forward current (Diode)	95	A		
$I_{O(RMS)}$	Max, continuous RMS on-state current	149	A	@ $T_c 85^\circ\text{C}$	
$I_{TSM}$ or $I_{FSM}$	Max, peak, one cycle non-repetitive on-state or forward current	1785	A	$t = 10\text{ms}$	Sinusoidal half wave initial $T_j = T_j \text{max.}$
$I^2t$	Maximum $I^2t$ for fusing	15910	$\text{A}^2\text{s}$	$t = 10\text{ms}$	
		20000	$\text{A}^2\text{s}$	$t = 10\text{ms } T_j = 25^\circ\text{C}$	
$V_{T(10)}$	Max, value of Threshold voltage	0.85	V	$T_j = T_j \text{max.}$	
$r_t$	Max, value of on-state slope resistance	4	$\text{m}\Omega$	$T_j = T_j \text{max.}$	
$V_{TM}$	Max, peak on-state or	1.58	V	$I_{TM} = \pi \times I_{T(AV)}$	$T_j = 25^\circ\text{C}$ 180° conduction
$V_{FM}$	forward voltage	1.58	V	$I_{FM} = \pi \times I_{F(AV)}$	
$di/dt$	Max, non-repetitive rate of rise of turned on current	100	$\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$ from. $0.67V_{DRM}$ $I_{TM} = \pi \times I_{T(AV)}, I_g = 500\text{mA } t_r < 0.5\mu\text{s}, t_p > 6\mu\text{s}$	
$I_H$	Maximum holding current	200	mA	$T_j = 25^\circ\text{C}$ . anode supply = 6V resistive load gate open circuit	
$I_L$	Max, latching current	400	mA	$T_j = 25^\circ\text{C}$ , anode supply = 6V. resistive load	

## POWER MODULES

### IRK. 91 Series

#### ELECTRICAL SPECIFICATION TRIGGERING

	Parameter	IRK. 91	Unit	Conditions	
$P_{GM}$	Max, peak gate power	12	W		
$P_{G(AV)}$	Maximum average gate power	3.0			
$I_{GM}$	Max, peak gate current	3.0	A		
$-V_{GM}$	Max. peak negative gate voltage	10	V		
$V_{GT}$	Max, gate voltage required to trigger	2.5	V	$T_j = 25^\circ\text{C}$	Anode supply = 6V resistive load
$I_{GT}$	Max, gate current required to trigger	150	mA	$T_j = 25^\circ\text{C}$	Anode supply = 6V resistive load
$V_{GD}$	Max, gate voltage that will not trigger	0.25	V	$T_j = 125^\circ\text{C}$ rated $V_{DRM}$ applied	
$I_{GD}$	Max, gate current that will not trigger	6.0	mA		

#### BLOCKING

	Parameter	IRK. 91	Unit	Conditions	
$I_{RRM}$ $I_{DRM}$	Max. peak reverse and off state leakage current at $V_{RRM}$ $V_{DRM}$	15	mA	$T_j = 125^\circ\text{C}$ , gate open circuit	
$V_{RS}$	RMS Isolation voltage	3500	V	50Hz, Circuit to base, all terminal shorted, $t=1$ sec.	
dv/dt	Max, critical rate of rise of off-state voltage	1000	V/ $\mu\text{s}$	$T_j = 125^\circ\text{C}$ linear to $0.67V_{DRM}$ gate open circuit	

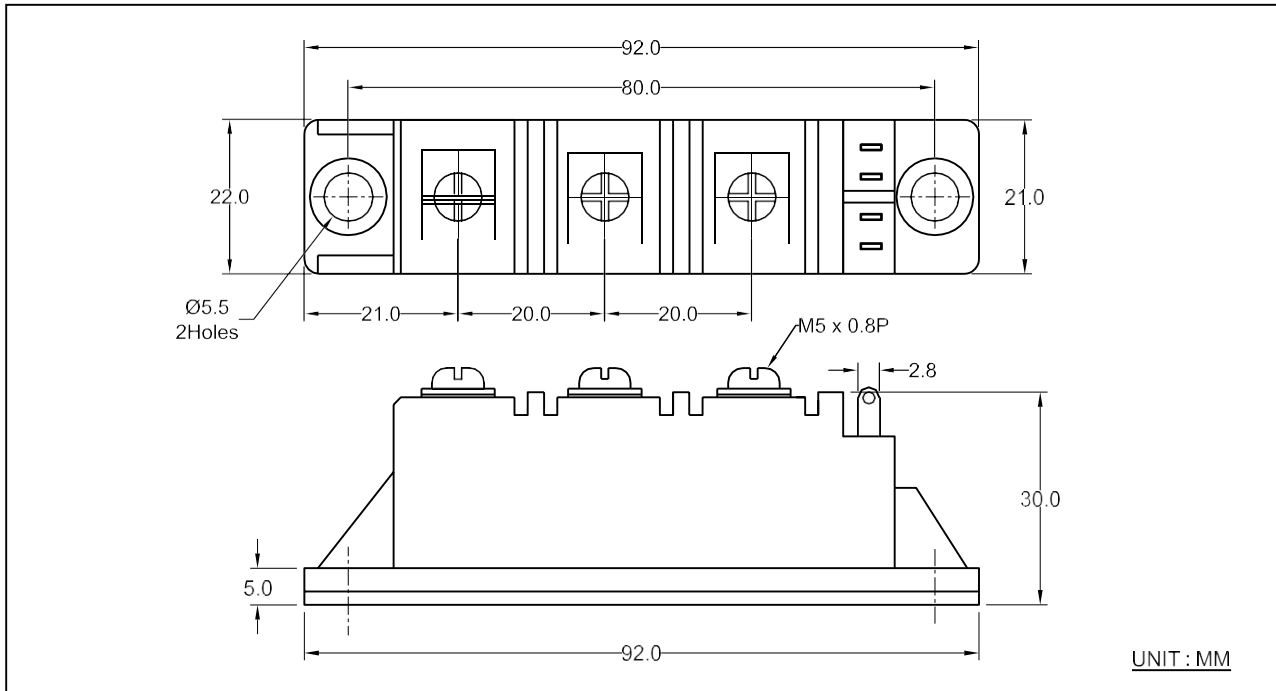
#### THERMAL AND MECHANICAL SPECIFICATION

	Parameter	IRK. 91	Unit	Conditions	
$T_j$	Junction operating temperature range	-40 to 125	$^\circ\text{C}$		
$T_{slg}$	Max, storage temperature range	-40 to 125			
$R_{thJ-C}$	Max, internal thermal resistance junction to case	0.135	$^\circ\text{C}/\text{W}$	Per module DC operation	
$R_{thCS}$	Max, thermal resistance, case to heat sink	0.10	$^\circ\text{C}/\text{W}$	Mounting surface flat smooth and greased (per Module)	
$T$	Mounting torque $\pm 10\%$ Busbar to module	5	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	115	g		
	Case style	To-240AA			

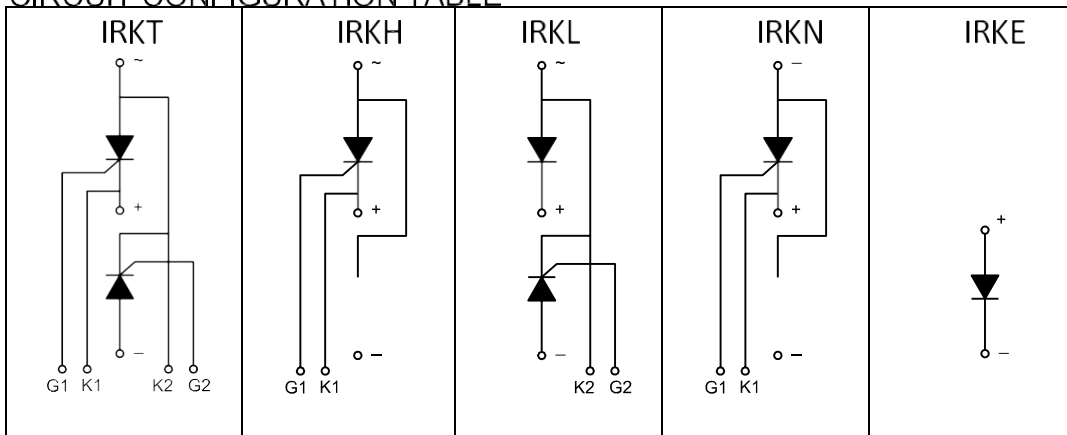
# POWER MODULES

## IRK. 91 Series

### OUTLINE DIAGRAM



### CIRCUIT CONFIGURATION TABLE



### CIRCUIT CONFIGURATION TABLE

