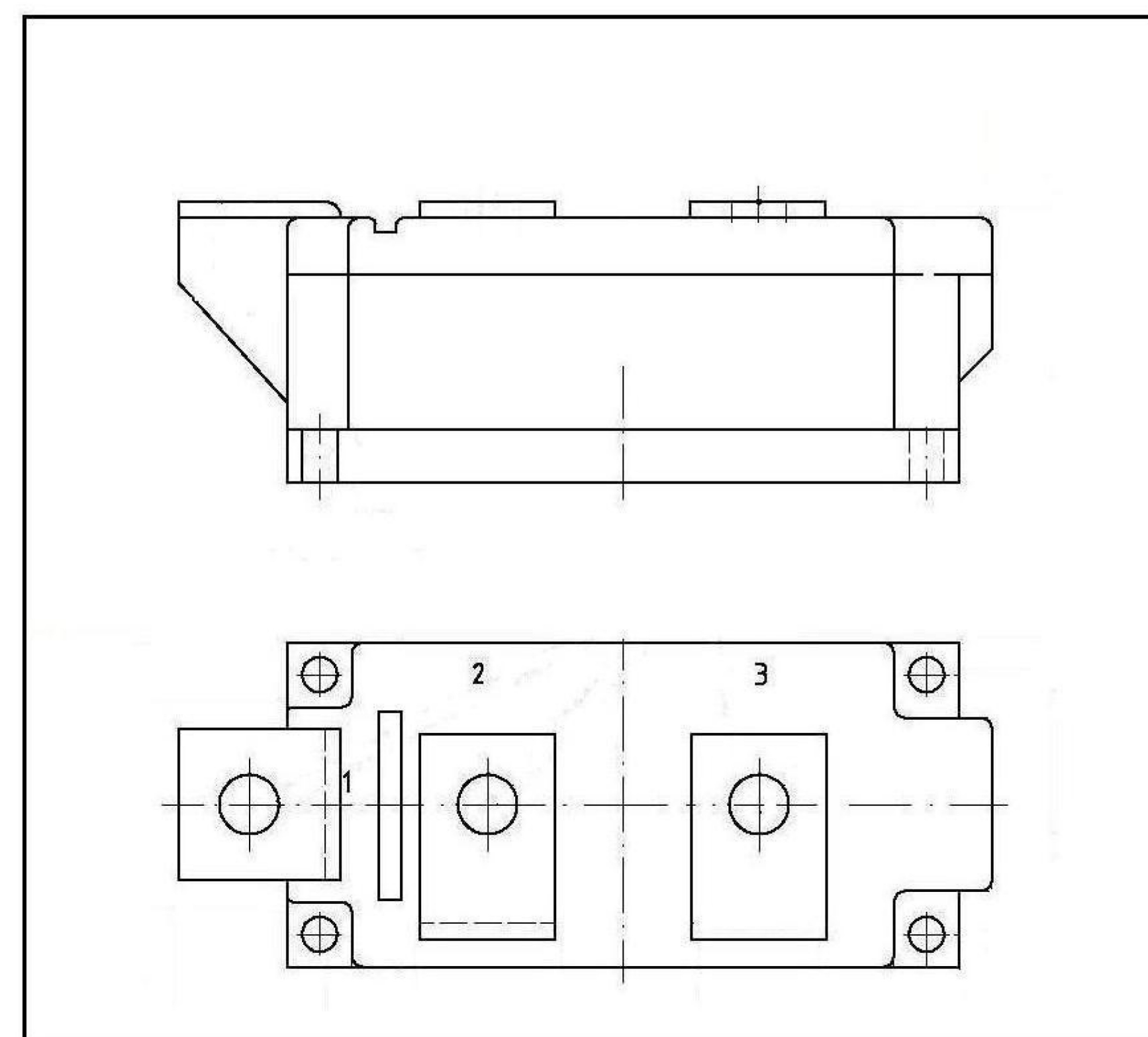


IRK. 500 SERIES

High Voltage Thyristor/Diode and Thyristor/Thyristor

FEATURES

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



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.500	Units
$I_{T(AV)}$	@ 80°C 500	A
	@ 85°C 460	
$I_{T(RMS)}$	@ 80°C 785	A
I_{TSM}	@ 50 Hz 14000	A
I^2t	@ 50 Hz 980	kA ² s
$V_{DRM} - V_{RRM}$	1800 to 2200	V
T_J	-40 to 125	°C

IRK. 500 SERIES**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. @ 130 °C mA
IRK.500	18	1800	1900	100
	20	2000	2100	
	22	2200	2300	

ON-STATE CONDUCTION

	Parameters	IRK.500	Units	Conditions	
$I_{T(AV)}$	Max. average on-state current	500	A	180° conduction, half sine wave	
	@ Case temperature	80	°C		
$I_{T(RMS)}$	Max. RMS on-state current	785	A	as AC switch	
I_{TSM}	Max. peak, one cycle on-state, non-repetitive surge current	14000	A	t = 10ms	Sinusoidal half wave, Initial $T_J = T_J \text{ max.}$
I^2t	Maximum I^2t for fusing	980	kA ² s	t = 10ms	Sinusoidal half wave, Initial $T_J = T_J \text{ max.}$
$V_{T(TO)}$	threshold voltage	0.88	V	$T_J = T_J \text{ max.}$	
r_t	on-state slope resistance	0.46	mΩ	$T_J = T_J \text{ max.}$	
V_{TM}	Max. on-state voltage drop	1.7	V	$I_T = 1700A$, 25°C	
I_H	Maximum holding current	500 max,	mA		
I_L	Max. latching current	1000 max,	mA	$T_J = 25^\circ C$ $R_G = 33\Omega$,	

SWITCHING

t _d	Delay Time	1.0	μs	T _J = 25°C	Gate current = 1A dI _g /dt = 1A/μs Vd = 0.67% V _{DRM}
t _r	Rise Time	2.0	μs	T _J = 25°C	
t _q	Turn-Off Time max,	300	μs	T _J = T _J max.	

IRK. 500 SERIES

BLOCKING

	Parameter	IRK.500		Units Conditions
dv/dt	Maximum critical rate of rise of off-state voltage	1000	V/ μ s	$T_J = 130^\circ\text{C}$, exponential to 67% rated V_{DRM}
I_{RRM} I_{DRM}	Max. peak reverse and off-state leakage current	100	mA	$T_J = 130^\circ\text{C}$, rated $V_{\text{DRM}}/V_{\text{RRM}}$ applied
V_{INS}	RMS isolation voltage	3500	V	50Hz, Circuit to base, all terminal shorted, 25°C , 1sec

TRIGGERING

	Parameter	IRK.500	Units	Conditions
I_{GT}	DC gate current required to trigger	min 200	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.
V_{GT}	DC gate voltage required to trigger	min 3.0	V	
V_{GD}	DC gate voltage not to trigger	0.25 max	V	$T_J = 130^\circ\text{C}$ Max. gate current / voltage not to trigger the max. value which will not trigger any unit with rated V_{DRM} anode-to-cathode applied
I_{GD}	DC gate current not to trigger	10.0 max	mA	
di/dt	Maximum critical rate of rise of turned-on current	200	A/ μ s	$T_J = 130^\circ\text{C}$,

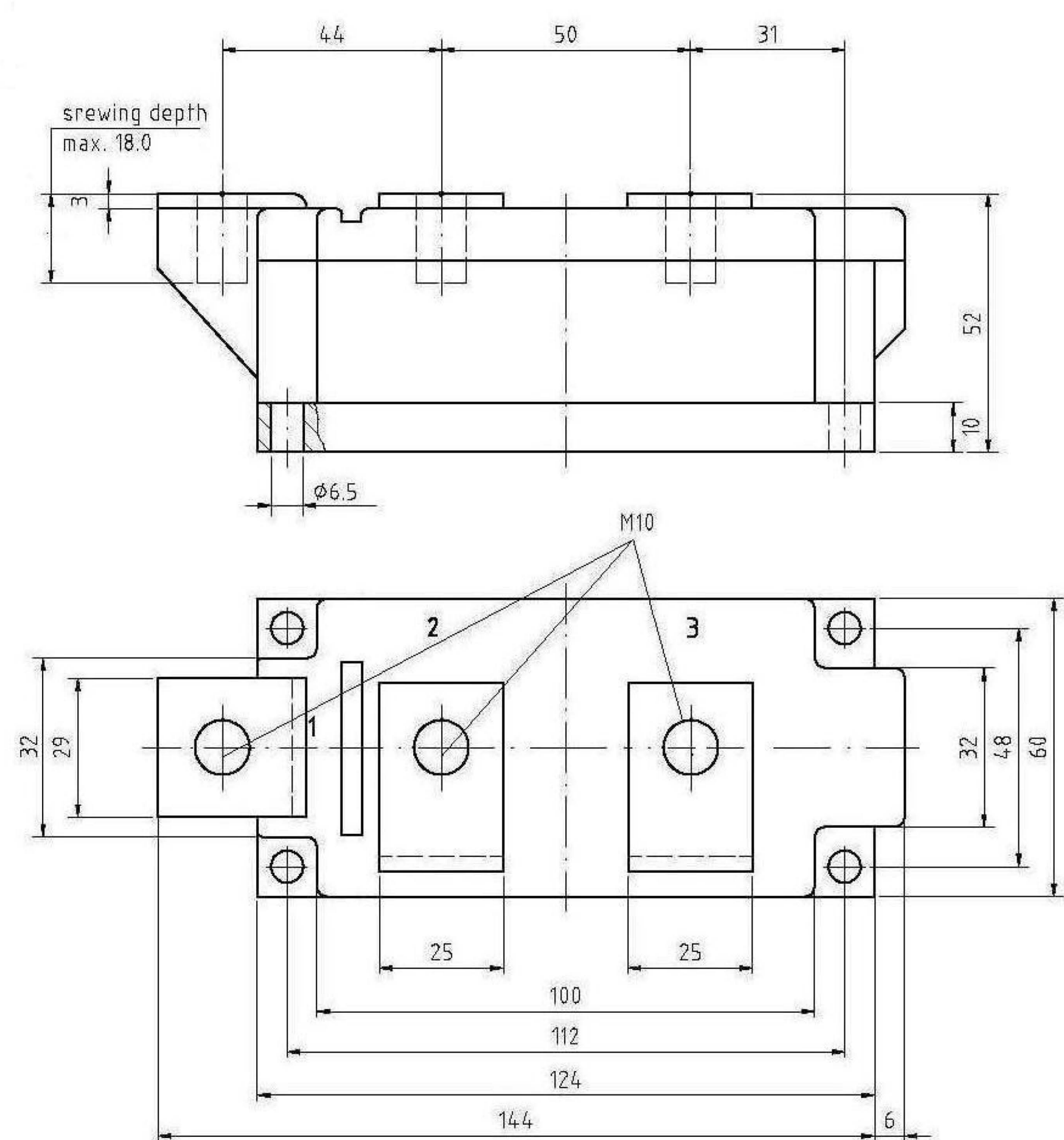
THERMAL AND MECHANICAL SPECIFICATION

	Parameter	IRK.500	Units	Conditions
T_J	Max. operating temperature range	-40 to 125	$^\circ\text{C}$	
T_{sig}	Max. storage temperature range	-40 to 125		
$R_{\text{thJ-C}}$	Max. thermal resistance, junction to case	0.062/0.031	K/W	Per thyristor / per module
$R_{\text{thJ-C}}$	Max. thermal resistance, junction to heatsink	0.02/0.01	K/W	Per thyristor / per module
T	Mounting torque, $\pm 15\%$	5 (12)	Nm	to heatsink & to (terminals)

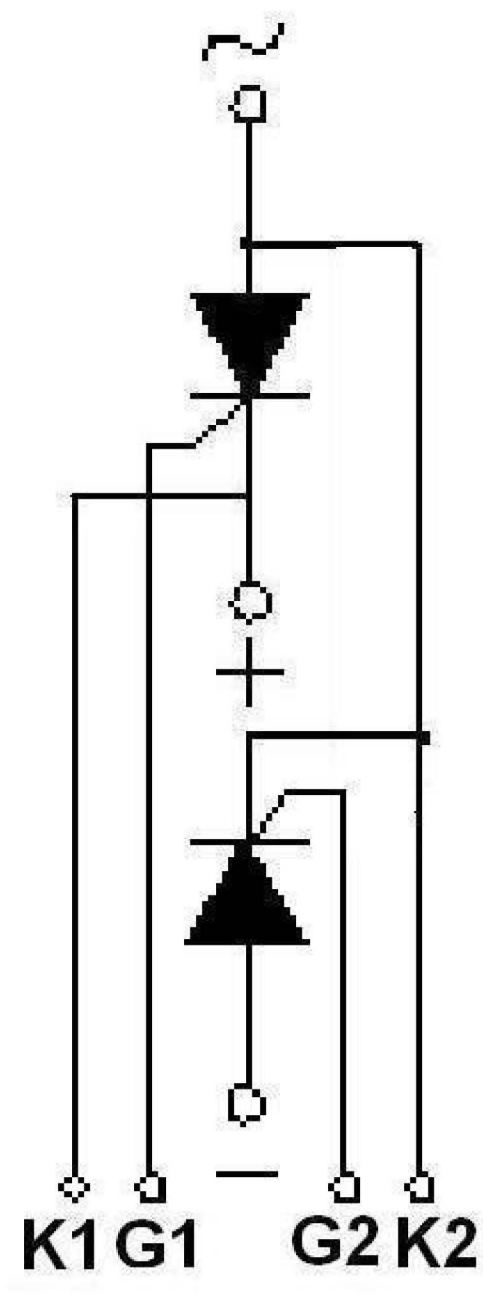
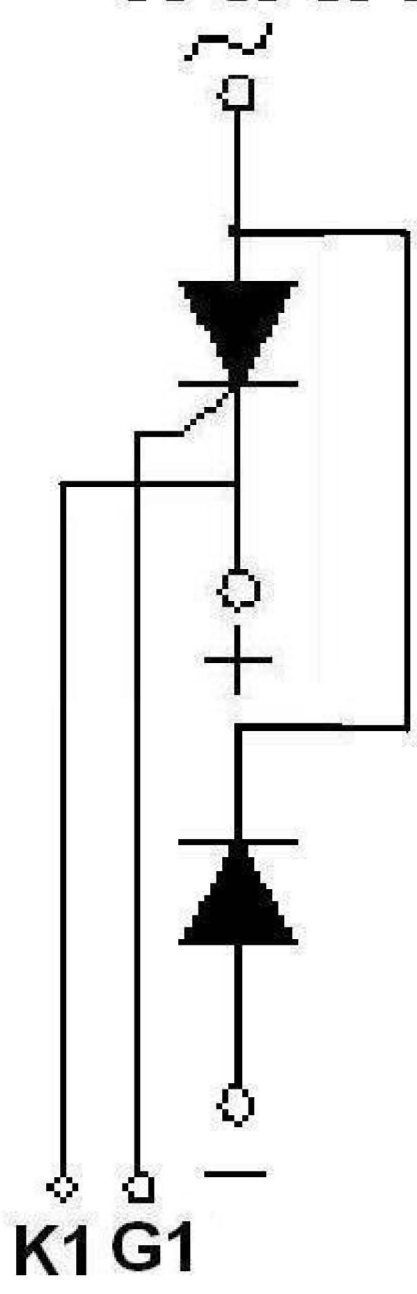
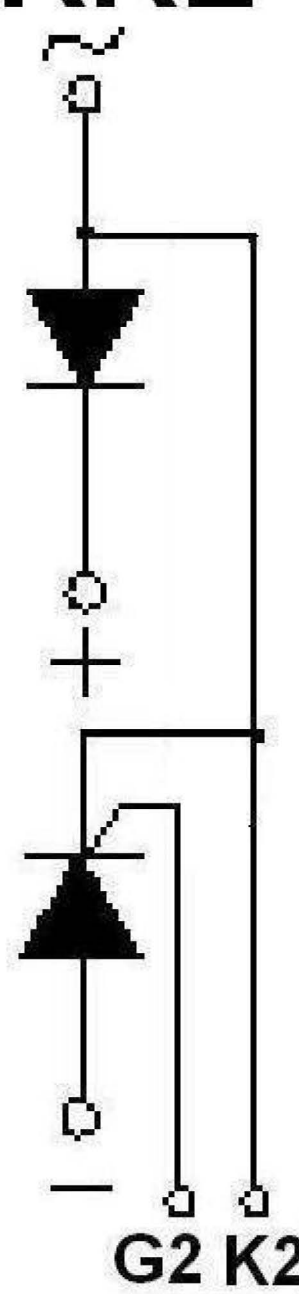
POWER MODULES

IRK. 500 SERIES

OUTLINE DIAGRAM



Circuit Configuration Table

IRKT  K1 G1 G2 K2	IRKH  K1 G1	IRKL  G2 K2
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Ordering Information Table

IRK	T	500	/	16
①	②	③		④
① - Module type	② - Circuit configuration (See Circuit Configuration table)	③ - Current Code		④ - Voltage Code (See Voltage Ratings table)