

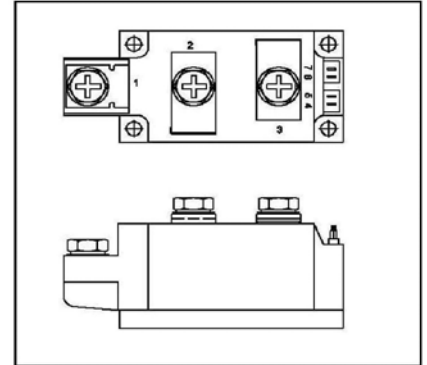
POWER MODULES IRK 330 SERIES

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^2t @ 50 Hz | 320 | kA ² s |
| $I^2\sqrt{t}$ | 3200 | kA ² √s |
| $V_{DRM} - V_{RRM}$ | 800 to 2400 | V |
| T_J | -40 to 125 | °C |

POWER MODULES

IRK. 330 SERIES

ELECTRICAL SPECIFICATION VOLTAGE RATINGS

| Type Number | Voltage Code | V_{RRM} / V_{DRM}^1 max. repetitive peak reverse and off-state voltage blocking voltage V | V_{RSM}^1 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 | 330 | A | 180° conduction, half sine wave |
| | @ Case temperature | 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 | kA ² s | t = 10ms Sinusoidal half wave, Initial $T_J = T_J$ max. |
| $I^2\sqrt{t}$ | Maximum $I^2\sqrt{t}$ for fusing | 3200 | kA ² √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 | $I_{TM} = 600$ Amps, 25°C, 180° 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 $I_T = 30$ A, $T_J = 25^\circ$ C |
| I_L | Max. latching current | 500 max. | mA | Anode supply = 12V, resistive load = 1Ω, gate pulse : 10V, 100μs, $T_J = 25^\circ$ C |

SWITCHING

| | | | | |
|-------|-----------------------|-----|----|--|
| t_d | Typical delay time | 1.0 | μs | $T_J = 25^\circ$ C Gate current = 1A $di/dt = 1$ A/μs $V_d = 0.67\% V_{DRM}$ |
| t_r | Typical rise time | 2.0 | μs | |
| t_q | Typical turn-off time | 250 | μs | |

POWER MODULES

IRK. 330 SERIES

BLOCKING

| | Parameter | 330 | | Units Conditions |
|--------------------------------------|--|------|------------|---|
| dv/dt | Maximum critical rate of rise of off-state voltage | 1000 | V/ μ s | $T_J = 125^\circ\text{C}$, exponential to 60% rated V_{DRM} |
| I_{RRM} I_{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 , 1 min. |

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 | $T_J = 125^\circ\text{C}$ 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 | mA | $T_J = 125^\circ\text{C}$ |
| di/dt | Maximum critical rate of rise of turned-on current | 250 | A/ μ s | $T_J = 125^\circ\text{C}$, $I_{\text{TM}}=400\text{A}$, rated V_{DRM} applied non-repetitive |

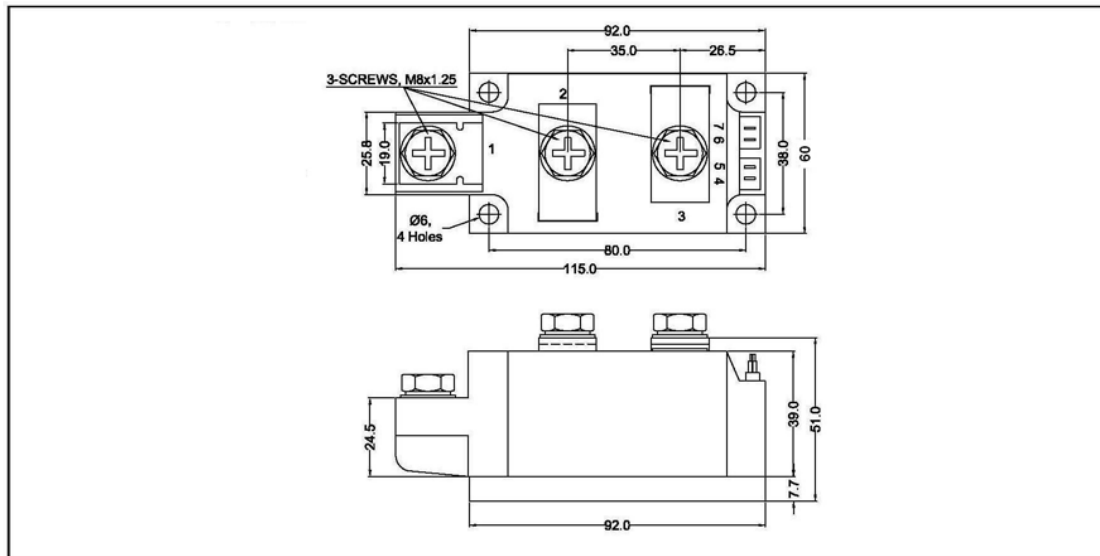
THERMAL AND MECHANICAL SPECIFICATION

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

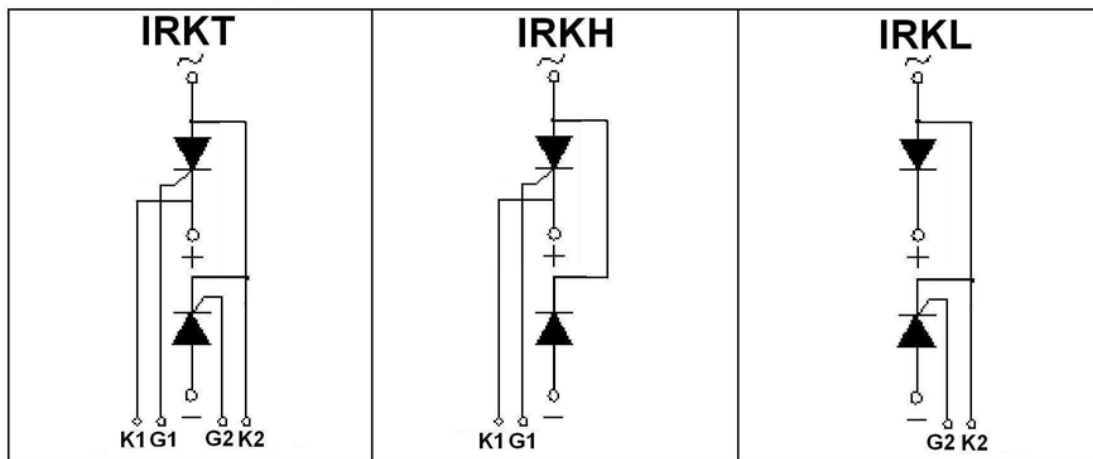
POWER MODULES

IRK. 330 SERIES

OUTLINE DIAGRAM



Circuit Configuration Table



Ordering Information Table

