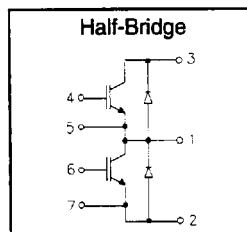


"HALF-BRIDGE" IGBT INT-A-PAK

Low conduction loss IGBT

- Rugged Design
- Simple gate-drive
- Switching-Loss Rating includes all "tail" losses
- Short circuit rated



$$V_{CE} = 600V$$

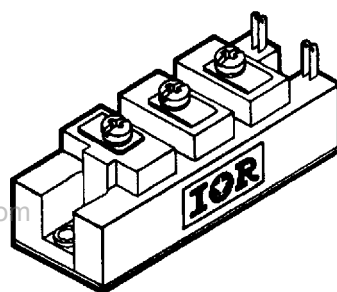
$$I_C = 75A$$

$$V_{CE(ON)} < 2.0V$$

$$t_{sc} > 10\mu s$$

## Description

IR's advanced IGBT technology is the key to this line of INT-A-PAK Power Modules. The efficient geometry and unique processing of the IGBT allow higher current densities than comparable bipolar power module transistors, while at the same time requiring the simpler gate-drive of the familiar power MOSFET. These modules are short circuit rated for applications such as motor control requiring this important feature.



INT-A-PAK case

## Absolute Maximum Ratings

| Parameter                 | Description                                                      | Value      | Units |
|---------------------------|------------------------------------------------------------------|------------|-------|
| $V_{CES}$                 | Continuous collector to emitter voltage                          | 600        | V     |
| $I_C @ T_C = 25^\circ C$  | Continuous collector current                                     | 110        | A     |
| $I_C @ T_C = 85^\circ C$  | Continuous collector current                                     | 60         |       |
| $I_C @ T_C = 100^\circ C$ | Continuous collector current                                     | 40         |       |
| $I_{LM}$                  | Peak switching current                                           | 150        |       |
| $I_{FM}$                  | Peak diode forward current (1)                                   | 150        | V     |
| $V_{GE}$                  | Gate to emitter voltage                                          | $\pm 20$   |       |
| $V_{ISOL}$                | RMS isolation voltage, any terminal to case, $t = 1 \text{ min}$ | 2500       |       |
| $P_D @ T_C = 25^\circ C$  | Power dissipation                                                | 391        | W     |
| $T_J$                     | Operating junction temperature range                             | -40 to 150 |       |
| $T_{STG}$                 | Storage temperature range                                        | -40 to 125 |       |

(1) Duration limited by max junction temperature.

## IRGTIN075M06

Target Data

Electrical Characteristics -  $T_J = 25^\circ\text{C}$ , unless otherwise stated

| Parameter         | Description                            | Min | Typ  | Max | Units | Test Conditions                                       |
|-------------------|----------------------------------------|-----|------|-----|-------|-------------------------------------------------------|
| $BV_{CES}$        | Collector-to-emitter breakdown voltage | 600 | —    | —   | V     | $V_{GE} = 0V, I_C = 1mA$                              |
| $V_{CE(ON)}$      | Collector-to-emitter voltage           | —   | —    | 2.0 |       | $V_{GE} = 15V, I_C = 75A$                             |
|                   |                                        | —   | 2.2  | —   |       | $V_{GE} = 15V, I_C = 75A, T_J = 125^\circ\text{C}$    |
| $V_{FM}$          | Diode forward voltage - maximum        | —   | 1.8  | 2.0 |       | $I_F = 75A, V_{GE} = 0V$                              |
|                   |                                        | —   | 1.75 | —   |       | $I_F = 75A, V_{GE} = 0V, T_J = 125^\circ\text{C}$     |
| $V_{GEth}$        | Gate threshold voltage                 | 3.0 | —    | 5.5 | mV/°C | $I_C = 500\mu A$                                      |
| $\Delta V_{GEth}$ | Threshold voltage temp. coefficient    | —   | -11  | —   |       | $V_{CE} = V_{GE}, I_C = 500\mu A$                     |
| $g_{fe}$          | Forward transconductance               | 52  | —    | 72  | S(Ω)  | $V_{CE} = 25V, I_C = 75A$                             |
| $I_{CES}$         | Collector-to-emitter leakage current   | —   | —    | 1   | mA    | $V_{GE} = 0V, V_{CE} = 600V$                          |
|                   |                                        | —   | —    | 10  |       | $V_{GE} = 0V, V_{CE} = 600V, T_J = 125^\circ\text{C}$ |
| $I_{GES}$         | Gate-to-emitter leakage current        | —   | —    | ±1  | μA    | $V_{GE} = \pm 20V$                                    |

Dynamic Characteristics -  $T_J = 125^\circ\text{C}$ , unless otherwise stated

| Parameter     | Description                        | Min | Typ  | Max  | Units | Test Conditions                                                            |
|---------------|------------------------------------|-----|------|------|-------|----------------------------------------------------------------------------|
| $E_{on}$      | Turn-on switching energy           | —   | 0.03 | —    | mJ/A  | $R_G = 18\Omega, V_{CC} = 300V$                                            |
| $E_{off} (1)$ | Turn-off switching energy          | —   | 0.11 | —    |       | $I_C = 75A, L_S = 100nH$                                                   |
| $E_{ts} (1)$  | Total switching energy             | —   | —    | 0.18 |       | $V_{GE} = \pm 15V$                                                         |
| $t_{d(on)}$   | Turn-on delay time                 | —   | 200  | —    | ns    | $R_G = 18\Omega, V_{CC} = 300V$                                            |
| $t_r$         | Rise time                          | —   | 400  | —    |       | $I_C = 75A$                                                                |
| $t_{d(off)}$  | Turn-off delay time                | —   | 250  | —    |       | $V_{GE} = \pm 15V$                                                         |
| $t_f$         | Fall time                          | —   | 350  | —    |       | Resistive load, $T_J = 25^\circ\text{C}$                                   |
| $I_{rr}$      | Diode peak recovery current        | —   | 27   | —    | A     | $R_G = 18\Omega, V_{CC} = 300V$                                            |
| $t_{rr}$      | Diode recovery time                | —   | 110  | —    | ns    | $I_C = 75A$                                                                |
| $Q_{rr}$      | Diode recovery charge              | —   | 1.7  | —    | μC    | $V_{GE} = \pm 15V$                                                         |
| $Q_{ge}$      | Gate-to-emitter charge (turn-on)   | 26  | —    | 42   | nC    | $V_{CC} = 480V$                                                            |
| $Q_{gc}$      | Gate-to-collector charge (turn-on) | 70  | —    | 140  |       | $I_C = 54A$                                                                |
| $Q_g$         | Total gate charge (turn-on)        | 150 | —    | 280  |       | $V_{GE} = 15V$                                                             |
| $C_{ies}$     | Input capacitance                  | —   | 5800 | —    | pF    | $V_{GE} = 0V$                                                              |
| $C_{oes}$     | Output capacitance                 | —   | 660  | —    |       | $V_{CC} = 30V$                                                             |
| $C_{res}$     | Reverse transfer capacitance       | —   | 80   | —    |       | $f = 1MHz$                                                                 |
| $t_{sc}$      | Short circuit withstand time       | 10  | —    | —    | μs    | $V_{CC} = 360V, V_{GE} = \pm 15V$<br>Min. $R_G = 18\Omega, V_{CEP} = 500V$ |

(1) Includes tail losses

## Thermal and Mechanical Characteristics

| Parameter           | Description                                      | Typ   | Max   | Units |
|---------------------|--------------------------------------------------|-------|-------|-------|
| $R_{thJC}$ (IGBT)   | Thermal resistance, junction to case, each IGBT  | —     | 0.32  | °C/W  |
| $R_{thJC}$ (Diode)  | Thermal resistance, junction to case, each diode | —     | 0.48  |       |
| $R_{thCS}$ (Module) | Thermal resistance, case to sink                 | 0.041 | 0.100 |       |
| Wt                  | Weight of module                                 | 150   | —     | g     |

Refer to Section D - page D-17 for Package Outline11 -INT-A-PAK, New -Half Bridge