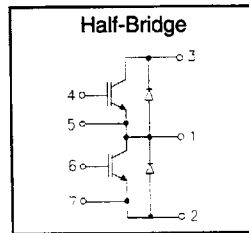


"HALF-BRIDGE" IGBT INT-A-PAK

Low conduction loss IGBT

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



$$V_{CE} = 600V$$

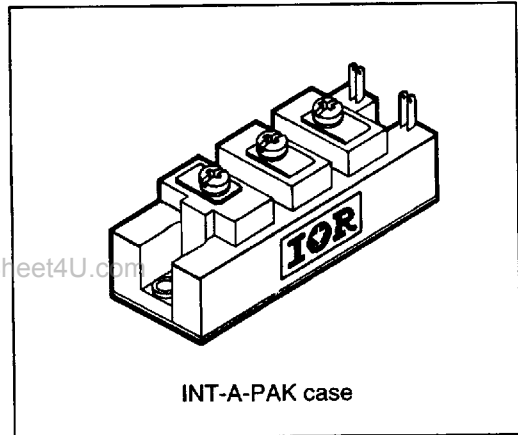
$$I_C = 50A$$

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

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

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.



DataSheet

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 Details

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	60	A
$I_C @ T_C = 85^\circ C$	Continuous collector current	35	
$I_C @ T_C = 100^\circ C$	Continuous collector current	23	
I_{LM}	Peak switching current	100	
I_{FM}	Peak diode forward current (1)	100	V
V_{GE}	Gate to emitter voltage	± 20	
V_{ISOL}	RMS isolation voltage, any terminal to case, $t = 1 \text{ min}$	2500	W
$P_D @ T_C = 25^\circ C$	Power dissipation	240	
T_J	Operating junction temperature range	-40 to 150	
T_{STG}	Storage temperature range	-40 to 125	

(1) Duration limited by max junction temperature.

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Target Data

IRGTIN050M06

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	$V_{GE} = 0\text{V}, I_C = 500\mu\text{A}$
$V_{CE(ON)}$	Collector-to-emitter voltage	—	—	2.0		$V_{GE} = 15\text{V}, I_C = 50\text{A}$
		—	2.2	—		$V_{GE} = 15\text{V}, I_C = 50\text{A}, T_J = 125^\circ\text{C}$
V_{FM}	Diode forward voltage - maximum	—	1.8	2.0		$I_F = 50\text{A}, V_{GE} = 0\text{V}$
		—	1.75	—		$I_F = 50\text{A}, V_{GE} = 0\text{V}, T_J = 125^\circ\text{C}$
V_{GEth}	Gate threshold voltage	3.0	—	5.5	$I_C = 250\mu\text{A}$	
ΔV_{GEth}	Threshold voltage temperature coefficient	—	-11	—	mV/°C	$V_{CE} = V_{GE}, I_C = 250\mu\text{A}$
g_{fe}	Forward transconductance	26	—	36	S(Ω)	$V_{CE} = 25\text{V}, I_C = 50\text{A}$
I_{CES}	Collector-to-emitter leakage current	—	—	500	μA	$V_{GE} = 0\text{V}, V_{CE} = 600\text{V}$
		—	—	5	mA	$V_{GE} = 0\text{V}, V_{CE} = 600\text{V}, T_J = 125^\circ\text{C}$
I_{GES}	Gate-to-emitter leakage current	—	—	±500	nA	$V_{GE} = \pm 20\text{V}$

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	$R_G = 18\Omega, V_{CC} = 300\text{V}$
E_{off} (1)	Turn-off switching energy	—	0.11	—		$I_C = 50\text{A}, L_S = 100\text{nH}$
E_{ts} (1)	Total switching energy	—	—	0.18		$V_{GE} = \pm 15\text{V}$
$t_{d(on)}$	Turn-on delay time	—	200	—	ns	$R_G = 18\Omega, V_{CC} = 300\text{V}$
t_r	Rise time	—	400	—		$I_C = 50\text{A}$
$t_{d(off)}$	Turn-off delay time	—	250	—		$V_{GE} = \pm 15\text{V}$
t_f	Fall time	—	350	—		Resistive load, $T_J = 25^\circ\text{C}$
I_{rr}	Diode peak recovery current	—	20	—	A	$R_G = 18\Omega, V_{CC} = 300\text{V}$
t_{rr}	Diode recovery time	—	110	—	ns	$I_C = 50\text{A}$
Q_{rr}	Diode recovery charge	—	1.2	—	μC	$V_{GE} = \pm 15\text{V}$
Q_{ge}	Gate-to-emitter charge (turn-on)	13	—	21	nC	$V_{CC} = 480\text{V}$
Q_{gc}	Gate-to-collector charge (turn-on)	35	—	70		$I_C = 27\text{A}$
Q_g	Total gate charge (turn-on)	77	—	140		$V_{GE} = 15\text{V}$
C_{ies}	Input capacitance	—	2900	—	pF	$V_{GE} = 0\text{V}$
C_{oes}	Output capacitance	—	330	—		$V_{CC} = 30\text{V}$
C_{res}	Reverse transfer capacitance	—	40	—		$f = 1\text{MHz}$
t_{sc}	Short circuit withstand time	10	—	—	μs	$V_{CC} = 360\text{V}, V_{GE} = \pm 15\text{V}$ Min. $R_G = 18\Omega, V_{CEP} = 500\text{V}$

(1) Includes tail losses

Thermal and Mechanical Characteristics

Parameter	Description	Typ	Max	Units
R_{thJC} (IGBT)	Thermal resistance, junction to case, each IGBT	—	0.52	°C/W
R_{thJC} (Diode)	Thermal resistance, junction to case, each diode	—	0.90	
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