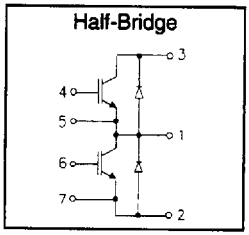
International
IOR Rectifier

Provisional Data Sheet PD-9.1191

IRGTIN050K06

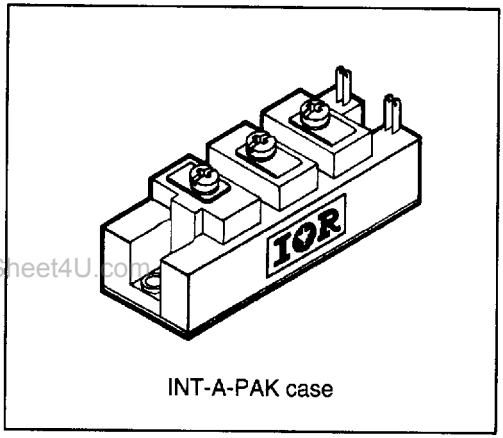
"HALF-BRIDGE" IGBT INT-A-PAK

Low conduction loss IGBT



V_{CE} = 600V
I_C = 50A
V_{CE}(ON) < 2.7V
t_{sc} > 10µs

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



INT-A-PAK case

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.

Absolute Maximum Ratings

Parameter	Description	Value	Units
V_{CES}	Continuous collector to emitter voltage	600	V
I_C @ T_C = 25°C	Continuous collector current	55	A
I_C @ T_C = 85°C	Continuous collector current	30	
I_C @ T_C = 100°C	Continuous collector current	20	
I_{LM}	Peak switching current	100	
I_{FM}	Peak diode forward current (1)	100	
V_{GE}	Gate to emitter voltage	±20	V
V_{ISOL}	RMS isolation voltage, any terminal to case, t = 1 min	2500	
P_D @ T_C = 25°C	Power dissipation	240	W
T_J	Operating junction temperature range	-40 to 150	°C
T_{STG}	Storage temperature range	-40 to 125	

(1) Duration limited by max junction temperature.

Target Data

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Target Data

IOR

Electrical Characteristics - T_J = 25°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 = 500µA
$V_{CE}(ON)$	Collector-to-emitter voltage	—	—	2.7		V_{GE} = 15V, I_C = 50A
		—	2.7	—		V_{GE}=15V, I_C=50A, T_J=125°C
V_{FM}	Diode forward voltage - maximum	—	1.8	2.0		I_F = 50A, V_{GE} = 0V
		—	1.75	—		I_F = 50A, V_{GE}=0V, T_J=125°C
V_{GEth}	Gate threshold voltage	3.0	—	5.5		I_C = 250µA
ΔV_{GEth}	Threshold voltage temp. coefficient	—	-11	—	mV/°C	V_{CE} = V_{GE}, I_C = 250µA
g_{fe}	Forward transconductance	17	—	30	S(℧)	V_{CE} = 25V, I_C = 50A
I_{CES}	Collector-to-emitter leakage current	—	—	500	µA	V_{GE} = 0V, V_{CE} = 600V
		—	—	5	mA	V_{GE}=0V, V_{CE}= 600V, T_J=125°C
I_{GES}	Gate-to-emitter leakage current	—	—	±500	nA	V_{GE} = ±20V

Dynamic Characteristics - T_J = 125°C, unless otherwise stated

Parameter	Description	Min	Typ	Max	Units	Test Conditions
E_{on}	Turn-on switching energy	—	0.04	—	mJ/A	R_G = 15Ω, V_{CC} = 300 V
E_{off} (1)	Turn-off switching energy	—	0.06	—		I_C = 50A, L_S = 100nH
E_{ts} (1)	Total switching energy	—	—	0.12		V_{GE} = ±15V
$t_{d(on)}$	Turn-on delay time	—	200	—	ns	R_G = 15Ω, V_{CC} = 300V
t_r	Rise time	—	500	—		I_C = 50A
$t_{d(off)}$	Turn-off delay time	—	250	—		V_{GE} = ±15V
t_f	Fall time	—	120	—		Resistive load, T_J = 25°C
I_{rr}	Diode peak recovery current	—	20	—	A	R_G = 15Ω, V_{CC} = 300V
t_{rr}	Diode recovery time	—	110	—	ns	I_C = 50A
Q_{rr}	Diode recovery charge	—	1.2	—	µC	V_{GE} = ±15V
Q_{ge}	Gate-to-emitter charge (turn-on)	13	—	21	nC	V_{CC} = 480V
Q_{gc}	Gate-to-collector charge (turn-on)	35	—	70		I_C = 27A
Q_g	Total gate charge (turn-on)	77	—	140		V_{GE} = 15V
C_{ies}	Input capacitance	—	2900	—	pF	V_{GE} = 0V
C_{oes}	Output capacitance	—	330	—		V_{CC} = 30V
C_{res}	Reverse transfer capacitance	—	40	—		f = 1MHz
t_{sc}	Short circuit withstand time	10	—	—	µs	V_{CC} = 360V, V_{GE} = ±15V Min. R_G = 15Ω, 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	—	0.52	°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