

**HALF-BRIDGE
IGBT MODULE**

600V, 450A

Product Summary

Part Number	V _{CE}	I _C	V _{CE(SAT)}
GHP500HHBK06P2	600V	450A	1.8V



Description

The IR HiRel INT-A-Pak Series are isolated near hermetic power modules which combine the latest IGBT and Soft Recovery Rectifier Technology. The module uses both high-speed and low V_{CE(SAT)} IGBT's of ultra low thermal resistance junction to case. The G450HHBK06P2 power module consists of six IGBTs and six FREDs in a Phase-Leg or Half-Bridge configuration.

Features

- Rugged, Lightweight near Hermetic Package with Integrated Power Terminal Cap
- Gen 4 IGBT Technology
- Soft Recovery Rectifiers
- AISiC Baseplate and AlN Substrate
- Ultra Low Thermal Resistance
- Zener Gate Protection
- Very Low Conduction and Switching Loss
- -55°C to +125°C Operating Temperature
- Screening to meet the intent of MIL-PRF-38534 Class H
- Short Circuit Capability
- 2 Ohms Series Gate Resistance
- High Altitude Operation, 85,000 Feet above Sea Level at Rated Voltage

Absolute Maximum Ratings @ T_J = 25°C (unless otherwise specified)

Parameter	Symbol	Value	Units
Collector-to-Emitter Voltage	V _{CES}	600	V
Gate-to-Emitter Voltage	V _{GE}	±20	
Continuous Collector Current @ T _C = 25°C	I _C	600	A
Continuous Collector Current @ T _C = 70°C		450	
Isolation Voltage	V _{ISOL}	2500	V _{RMS}

Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
Collector Emitter Breakdown Voltage	V_{CES}	$V_{GE} = 0V$	600	—	—	V
Zero Gate Voltage Collector Current	I_{CES}	$V_{GE} = 0V, V_{CE} = 600V$	—	—	2.0	mA
Gate Emitter Leakage Current	I_{GES}	$V_{GE} = \pm 15V, V_{CE} = 0V$	—	—	10	μA
On Characteristics						
Gate Threshold Voltage	$V_{GE(TH)}$	$V_{CE} = V_{GE}, I_C = 45\text{mA}$	4.0	—	7.5	V
Collector Emitter Saturation Voltage	$V_{CE(SAT)}$	$V_{GE} = 15V, I_C = 450A$	—	1.8	2.6	
Dynamic Characteristics						
Total Gate Charge	Q_G	$V_{CE} = 300V, I_C = 450A, V_{GE} = 15V$	—	2600	—	nC
Input Capacitance	C_{IES}	$V_{GE} = 0V, V_{CE} = 25V, f = 1.0\text{MHz}$	—	48	—	nF
Output Capacitance	C_{OES}		—	3.0	—	
Reverse Transfer Capacitance	C_{RES}		—	0.3	—	
Switching Inductive Load Characteristics						
Turn-On Delay Time	$t_{d(on)}$	$V_{CC} = 300V, I_C = 450A, V_{GE} = +15V$ $R_{G(on)} = 5\Omega, R_{G(off)} = 10\Omega, L = 200\mu\text{H}$	—	500	900	ns
Rise Time	t_r		—	280	700	
Turn-On Losses	E_{on}		—	20	—	mJ
Turn-Off Delay Time	$t_{d(off)}$		—	2600	3400	ns
Fall Time	t_f		—	500	650	
Turn-Off Losses	E_{off}		—	60	—	mJ
Diode Characteristics						
Forward Voltage	V_F	$I_F = 450A$	—	1.2	1.8	V
Reverse Recovery Charge	Q_{rr}	$V_R = 300V, I_F = 450A, di/dt = -1800A/\mu\text{s}$	—	15	36	μC
Peak Reverse Recovery Current	I_{rr}		—	160	—	A
Reverse Recovery Time	t_{rr}		—	180	260	ns

Electrical Characteristics @ $T_J = 125^\circ\text{C}$ (unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
Collector Emitter Breakdown Voltage	V_{CES}	$V_{GE} = 0V$	600	—	—	V
Zero Gate Voltage Collector Current	I_{CES}	$V_{GE} = 0V, V_{CE} = 600V$	—	—	18	mA
Gate Emitter Leakage Current	I_{GES}	$V_{GE} = \pm 15V, V_{CE} = 0V$	—	—	10	μA
On Characteristics						
Gate Threshold Voltage	$V_{GE(TH)}$	$V_{CE} = V_{GE}, I_C = 45\text{mA}$	4.0	—	7.5	V
Collector Emitter Saturation Voltage	$V_{CE(SAT)}$	$V_{GE} = 15V, I_C = 450A$	—	1.8	2.6	
Diode Characteristics						
Forward Voltage	V_F	$I_F = 450A$	—	1.2	1.8	V

Thermal-Mechanical Specifications

Parameter	Symbol	Min.	Typ.	Max.	Units
IGBT Thermal Resistance, Junction-to-Case, per Switch	R_{thJC}	—	0.05	0.07	$^\circ\text{C/W}$
Diode Thermal Resistance, Junction-to-Case, per Switch		—	0.10	0.13	
Operating Junction Temperature Range	T_J	-55	—	150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55	—	125	
Screw Torque - Mounting	T	—	—	26	in-lbs
Screw Torque - Terminals		—	—	26	
Module Weight		—	—	270	g

Module Screening

Test or Inspection	MIL-PRF-883		Comments
	Method	Condition	
Internal Visual	2017		
Temperature Cycle	1010	B	10 Cycles, -55°C to $+125^\circ\text{C}$
Mechanical Shock	2002	B	1500G, 0.5ms, 5 Times (Y1 direction only)
Burn-in	1015	A	160 Hrs @ $+125^\circ\text{C}$
Final Electrical Test			Group A, -55°C , $+25^\circ\text{C}$, $+125^\circ\text{C}$
External Visual	2009		

Schematic

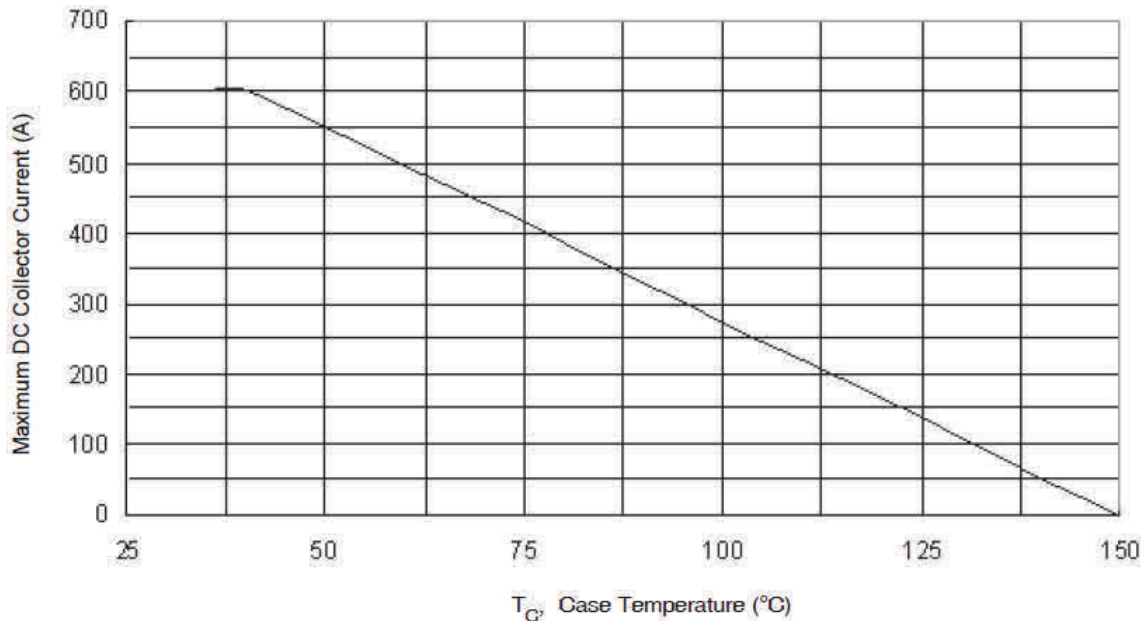
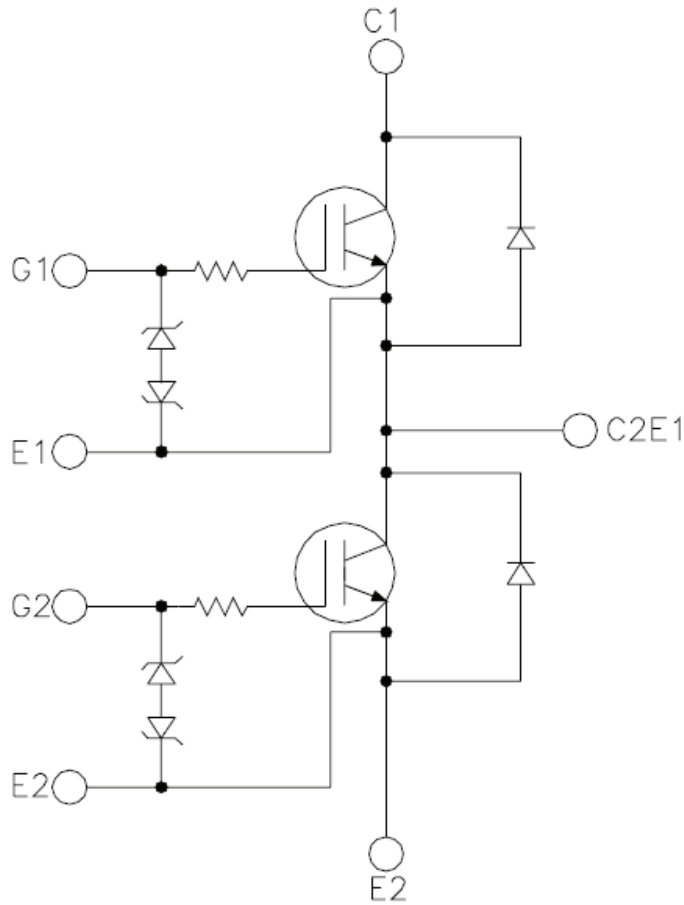


Fig 1. Maximum Collector Current Vs Case Temperature

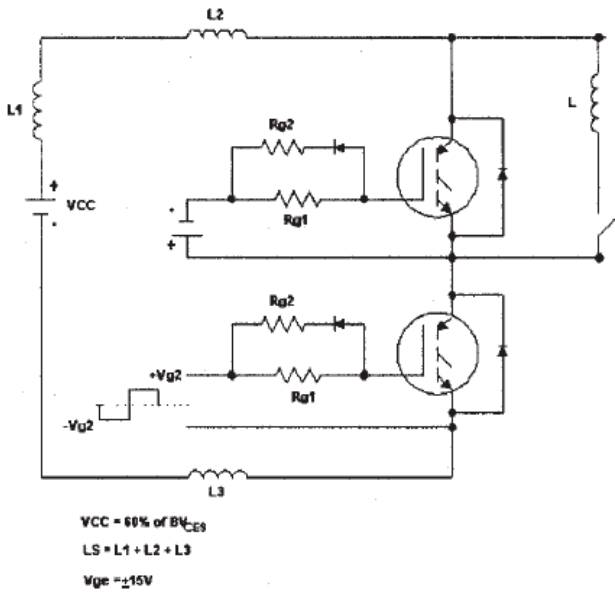


Fig 2. Test Circuit for Measurement of
 E_{on} , E_{off} , t_{rr} , Q_{rr} , I_{rr} , $t_{d(on)}$, t_r , $t_{d(off)}$, t_f

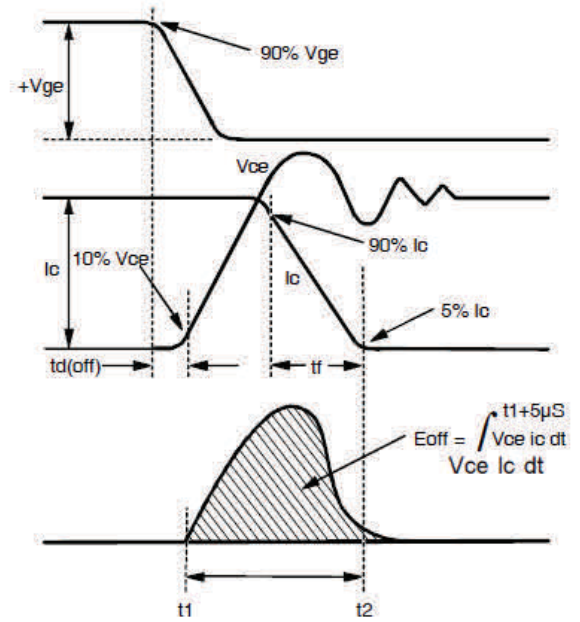


Fig 3. Test Waveforms for Circuit of Fig 2
 Defining E_{off} , $t_{d(off)}$, t_f

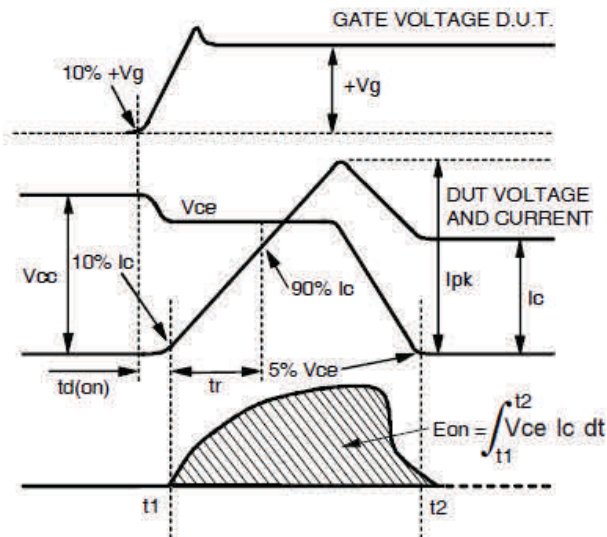


Fig 4. Test Waveforms for Circuit of Fig 2
 Defining E_{on} , $t_{d(on)}$, t_r

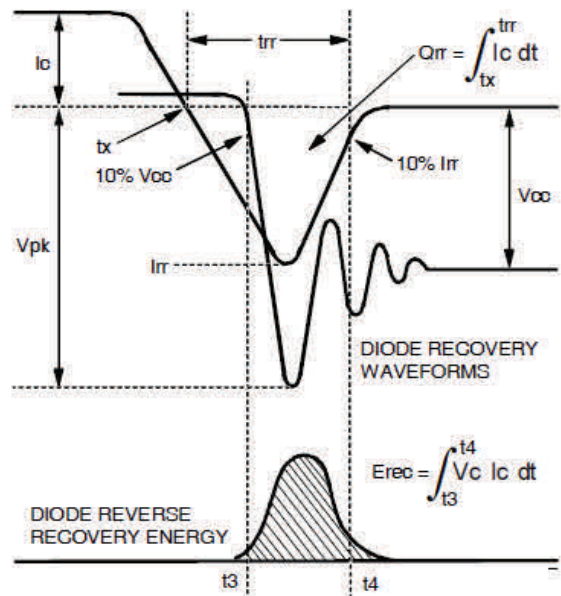
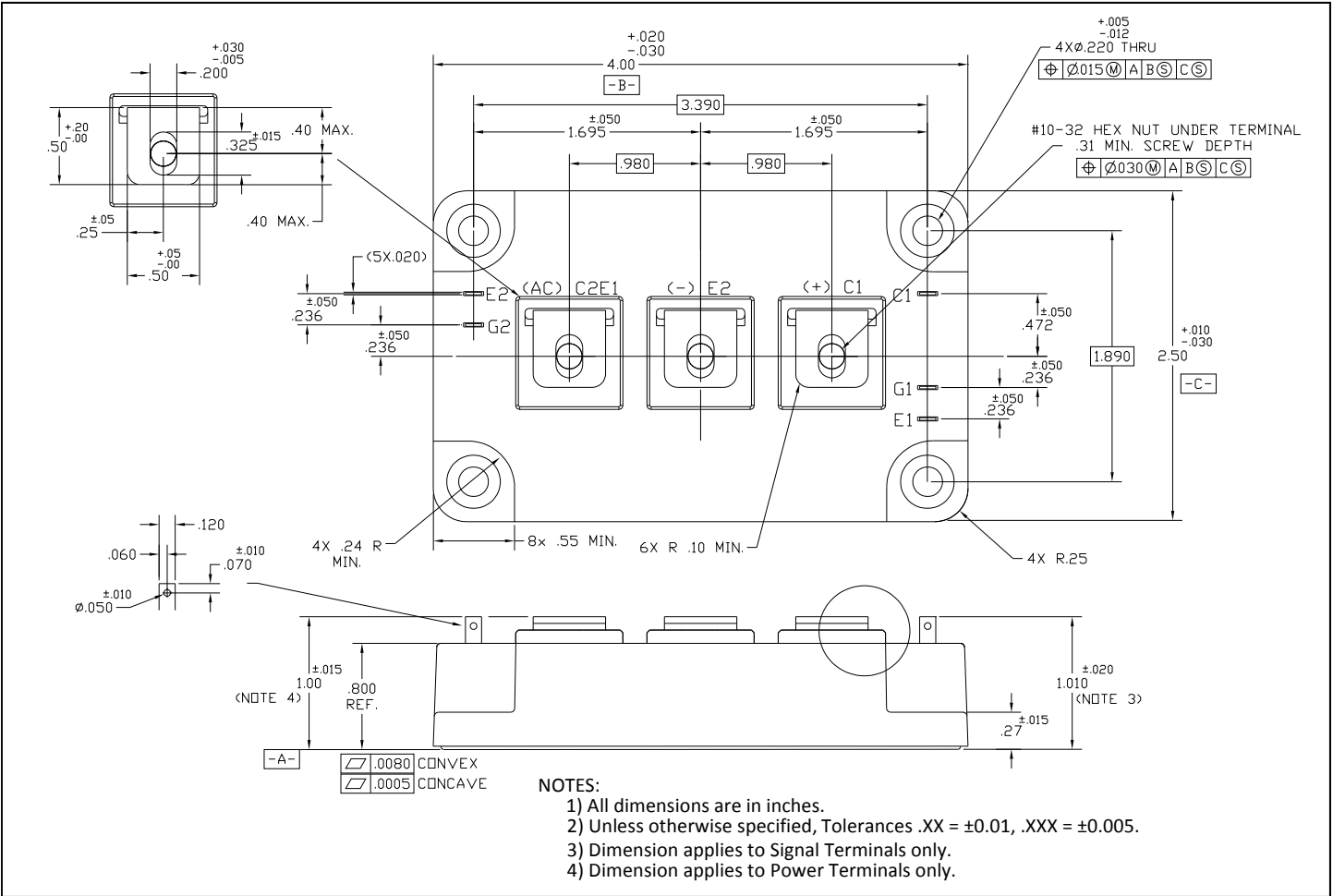
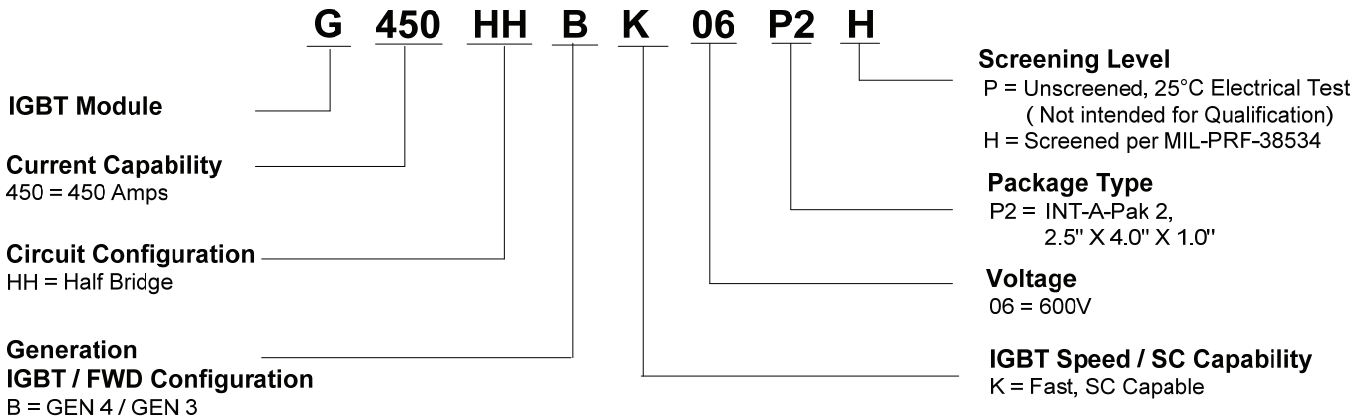


Fig 5. Test Waveforms for Circuit of Fig 2
 Defining E_{rec} , t_{rr} , Q_{rr} , I_{rr}

Case Outline and Dimensions - INT-A-Pak 2



Part Numbering Nomenclature



IMPORTANT NOTICE

The information given in this document shall be in no event regarded as guarantee of conditions or characteristic. The data contained herein is a characterization of the component based on internal standards and is intended to demonstrate and provide guidance for typical part performance. It will require further evaluation, qualification and analysis to determine suitability in the application environment to confirm compliance to your system requirements.

With respect to any example hints or any typical values stated herein and/or any information regarding the application of the product, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind including without limitation warranties on non- infringement of intellectual property rights and any third party.

In addition, any information given in this document is subject to customer's compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer's product and any use of the product of Infineon Technologies in customer's applications.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of any customer's technical departments to evaluate the suitability of the product for the intended applications and the completeness of the product information given in this document with respect to applications.

For further information on the product, technology, delivery terms and conditions and prices, please contact your local sales representative or go to (www.infineon.com/hirel).

WARNING

Due to technical requirements products may contain dangerous substances. For information on the types in question, please contact your nearest Infineon Technologies office.

单击下面可查看定价，库存，交付和生命周期等信息

[>>Infineon Technologies\(英飞凌\)](#)