

## Excellent Integrated System Limited

Stocking Distributor

Click to view price, real time Inventory, Delivery & Lifecycle Information:

[Vishay Semiconductor/Diodes Division](#)  
[VS-GA200TH60S](#)

For any questions, you can email us directly:

[sales@integrated-circuit.com](mailto:sales@integrated-circuit.com)



www.vishay.com

## VS-GA200TH60S

Vishay Semiconductors

### Molding Type Module IGBT, 2-in-1 Package, 600 V and 200 A



Double INT-A-PAK

#### FEATURES

- High short circuit capability
- 10  $\mu$ s short circuit capability
- $V_{CE(on)}$  with positive temperature coefficient
- Maximum junction temperature 150 °C
- Latch-up free
- Low inductance case
- Fast and soft reverse recovery antiparallel FWD
- Isolated copper baseplate using DCB (Direct Copper Bonding) technology
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT

#### PRODUCT SUMMARY

$V_{CES}$	600 V
$I_C$ at $T_C = 80$ °C	200 A
$V_{CE(on)}$ (typical) at $I_C = 200$ A, 25 °C	1.9 V
Speed	DC to 1 kHz
Package	Double INT-A-PAK
Circuit	Half bridge

#### TYPICAL APPLICATIONS

- UPS
- Switching mode power supplies
- Electronic welders

#### DESCRIPTION

Vishay's IGBT power module provides ultra low conduction loss as well as short circuit ruggedness. It is designed for applications such as general UPS and SMPS.

#### ABSOLUTE MAXIMUM RATINGS ( $T_C = 25$ °C unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Collector to emitter voltage	$V_{CES}$		600	V
Gate to emitter voltage	$V_{GES}$		$\pm 20$	
Collector current	$I_C$	$T_C = 25$ °C	260	A
		$T_C = 80$ °C	200	
Pulsed collector current	$I_{CM}^{(1)}$	$t_p = 1$ ms	400	
Diode continuous forward current	$I_F$	$T_C = 80$ °C	200	
Diode maximum forward current	$I_{FM}$	$t_p = 1$ ms	400	
Maximum power dissipation	$P_D$	$T_J = 150$ °C	1042	W
Short circuit withstand time	$t_{SC}$	$T_C = 125$ °C	10	$\mu$ s
RMS isolation voltage	$V_{ISOL}$	$f = 50$ Hz, $t = 1$ min	2500	V
$I^2t$ -value, diode	$I^2t$	$V_R = 0$ V, $t = 10$ ms, $T_J = 125$ °C	4900	A <sup>2</sup> s

#### Note

<sup>(1)</sup> Repetitive rating: pulse width limited by maximum junction temperature.



www.vishay.com

## VS-GA200TH60S

Vishay Semiconductors

IGBT ELECTRICAL SPECIFICATIONS ( $T_C = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Collector to emitter breakdown voltage	$V_{(BR)CES}$	$T_J = 25\text{ }^{\circ}\text{C}$	600	-	-	V
Collector to emitter voltage	$V_{CE(on)}$	$V_{GE} = 15\text{ V}, I_C = 200\text{ A}, T_J = 25\text{ }^{\circ}\text{C}$	-	1.9	-	
		$V_{GE} = 15\text{ V}, I_C = 200\text{ A}, T_J = 125\text{ }^{\circ}\text{C}$	-	2.3	-	
Gate to emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}, I_C = 0.25\text{ mA}, T_J = 25\text{ }^{\circ}\text{C}$	3.5	4.5	5.5	
Collector cut-off current	$I_{CES}$	$V_{CE} = V_{CES}, V_{GE} = 0\text{ V}, T_J = 25\text{ }^{\circ}\text{C}$	-	-	5.0	$\mu\text{A}$
Gate to emitter leakage current	$I_{GES}$	$V_{GE} = V_{GES}, V_{CE} = 0\text{ V}, T_J = 25\text{ }^{\circ}\text{C}$	-	-	400	nA

SWITCHING CHARACTERISTICS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Turn-on delay time	$t_{d(on)}$	$V_{CC} = 300\text{ V}, I_C = 200\text{ A}, R_g = 4.7\text{ }\Omega, V_{GE} = \pm 15\text{ V}, T_J = 25\text{ }^{\circ}\text{C}$	-	106	-	ns
Rise time	$t_r$		-	45	-	
Turn-off delay time	$t_{d(off)}$		-	460	-	
Fall time	$t_f$		-	51	-	mJ
Turn-on switching loss	$E_{on}$		-	4.2	-	
Turn-off switching loss	$E_{off}$		-	9.0	-	
Turn-on delay time	$t_{d(on)}$	$V_{CC} = 300\text{ V}, I_C = 200\text{ A}, R_g = 4.7\text{ }\Omega, V_{GE} = \pm 15\text{ V}, T_J = 125\text{ }^{\circ}\text{C}$	-	120	-	ns
Rise time	$t_r$		-	68	-	
Turn-off delay time	$t_{d(off)}$		-	510	-	
Fall time	$t_f$		-	70	-	mJ
Turn-on switching loss	$E_{on}$		-	5.1	-	
Turn-off switching loss	$E_{off}$		-	11.3	-	
Input capacitance	$C_{ies}$	$V_{GE} = 0\text{ V}, V_{CE} = 25\text{ V}, f = 1.0\text{ MHz}$	-	13.1	-	nF
Output capacitance	$C_{oes}$		-	0.71	-	
Reverse transfer capacitance	$C_{res}$		-	0.38	-	
SC data	$I_{SC}$	$t_{sc} \leq 10\text{ }\mu\text{s}, V_{GE} = 15\text{ V}, T_J = 125\text{ }^{\circ}\text{C}, V_{CC} = 300\text{ V}, V_{CEM} \leq 600\text{ V}$	-	650	-	A
Stray inductance	$L_{CE}$		-	-	20	nH
Module lead resistance, terminal to chip	$R_{CC'+EE'}$	$T_C = 25\text{ }^{\circ}\text{C}$	-	0.35	-	m $\Omega$

DIODE ELECTRICAL SPECIFICATIONS (T <sub>C</sub> = 25 °C unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Diode forward voltage	V <sub>F</sub>	I <sub>F</sub> = 200 A	T <sub>J</sub> = 25 °C	-	1.4	1.6	V
			T <sub>J</sub> = 125 °C	-	1.6	1.8	
Diode reverse recovery charge	Q <sub>rr</sub>	I <sub>F</sub> = 200 A, V <sub>R</sub> = 300 V, dI/dt = -6000 A/μs, V <sub>GE</sub> = -15 V	T <sub>J</sub> = 25 °C	-	9	-	μC
			T <sub>J</sub> = 125 °C	-	16	-	
Diode peak reverse recovery current	I <sub>rr</sub>		T <sub>J</sub> = 25 °C	-	140	-	A
			T <sub>J</sub> = 125 °C	-	165	-	
Diode reverse recovery energy	E <sub>rec</sub>		T <sub>J</sub> = 25 °C	-	2.4	-	mJ
			T <sub>J</sub> = 125 °C	-	4.2	-	



[www.vishay.com](http://www.vishay.com)

## VS-GA200TH60S

Vishay Semiconductors

THERMAL AND MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Operating junction temperature range	T <sub>J</sub>		-40	-	150	°C
Storage temperature range	T <sub>STG</sub>		-40	-	125	
Junction to case	IGBT Diode	R <sub>thJC</sub>	-	-	0.12	K/W
			-	-	0.27	
Case to sink	R <sub>thCS</sub>	Conductive grease applied	-	0.03	-	
Mounting torque		Power terminal screw: M6	2.5 to 5.0			Nm
		Mounting screw: M6	3.0 to 6.0			
Weight			325			g

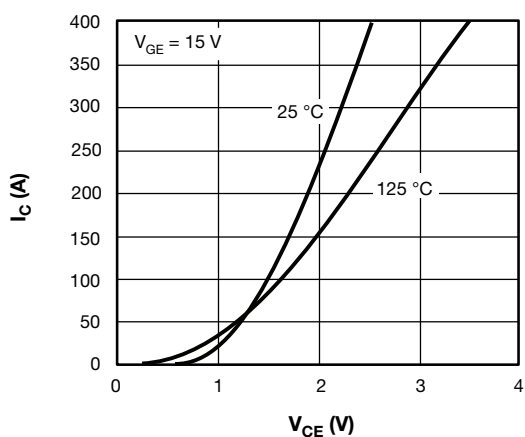


Fig. 1 - Typical Output Characteristics

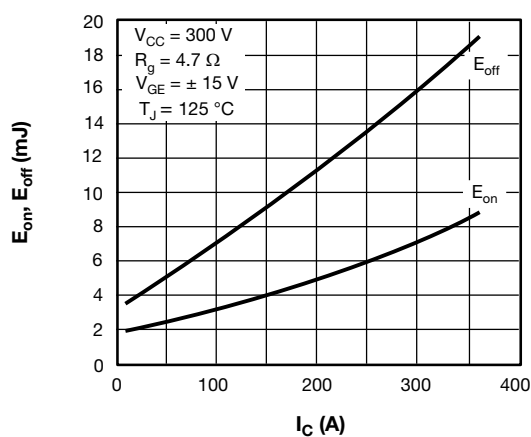


Fig. 3 - Switching Loss vs. Collector Current

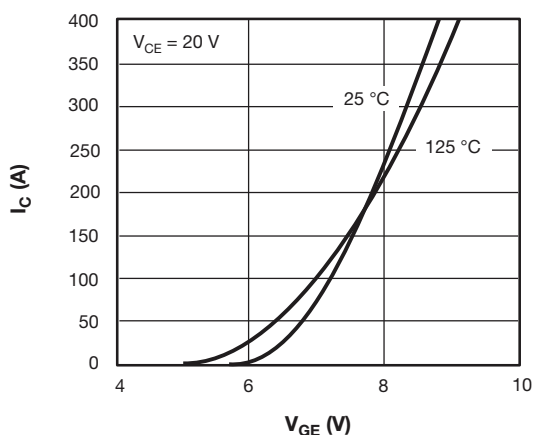


Fig. 2 - Typical Transfer Characteristics

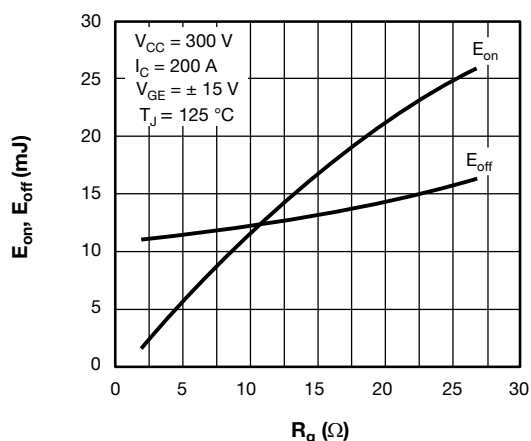


Fig. 4 - Switching Loss vs. Gate Resistor



www.vishay.com

## VS-GA200TH60S

Vishay Semiconductors

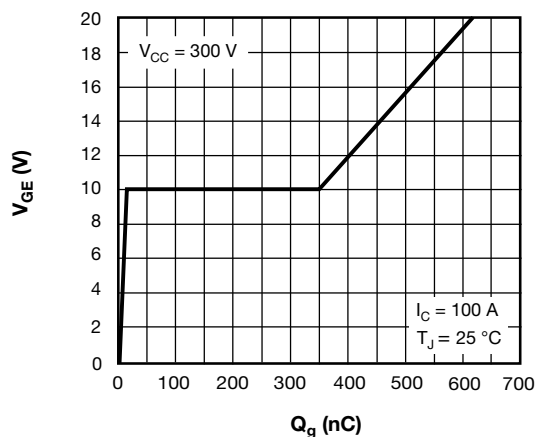


Fig. 5 - Gate Charge Characteristics

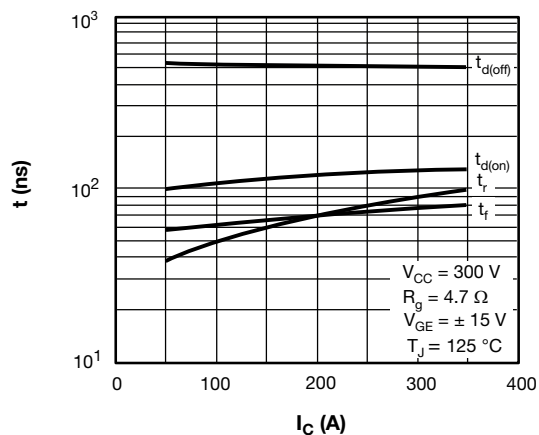


Fig. 7 - Switching Times vs.  $I_C$

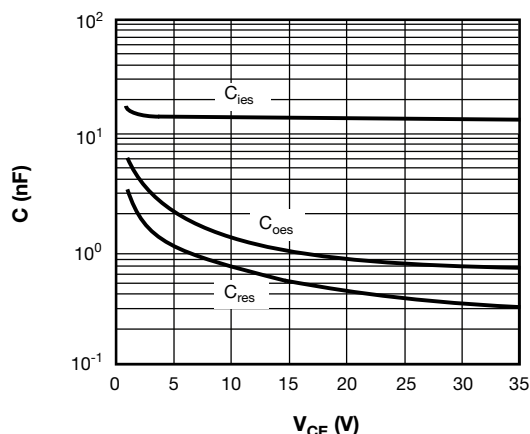


Fig. 6 - Typical Capacitance vs. Collector to Emitter Voltage

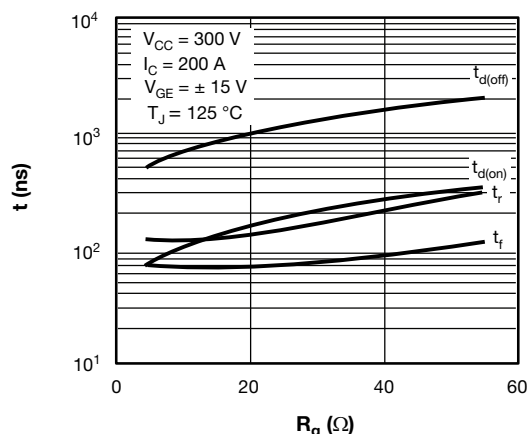


Fig. 8 - Typical Switching Times vs. Gate Resistance  $R_g$

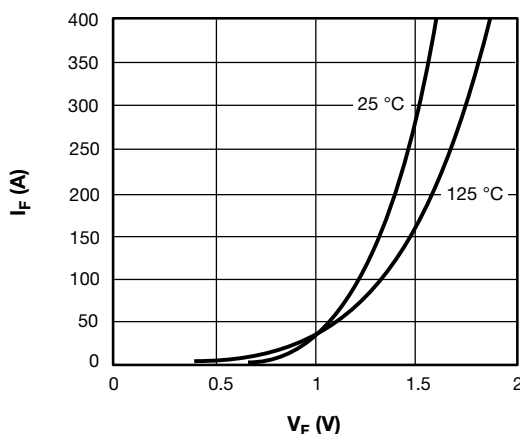


Fig. 9 - Diode Typical Forward Characteristics



[www.vishay.com](http://www.vishay.com)

## VS-GA200TH60S

Vishay Semiconductors

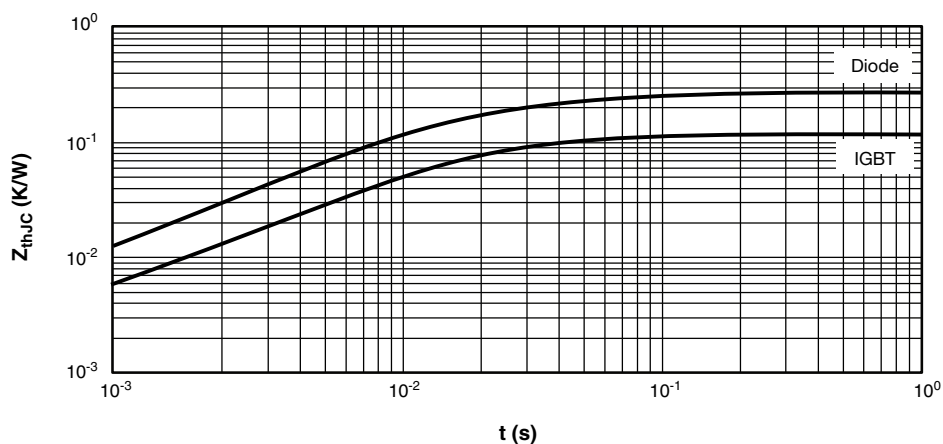
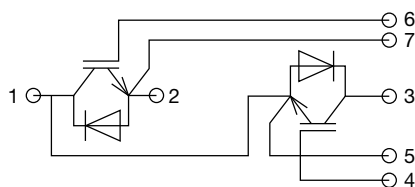


Fig. 10 - Diode Transient Thermal Impedance

### CIRCUIT CONFIGURATION



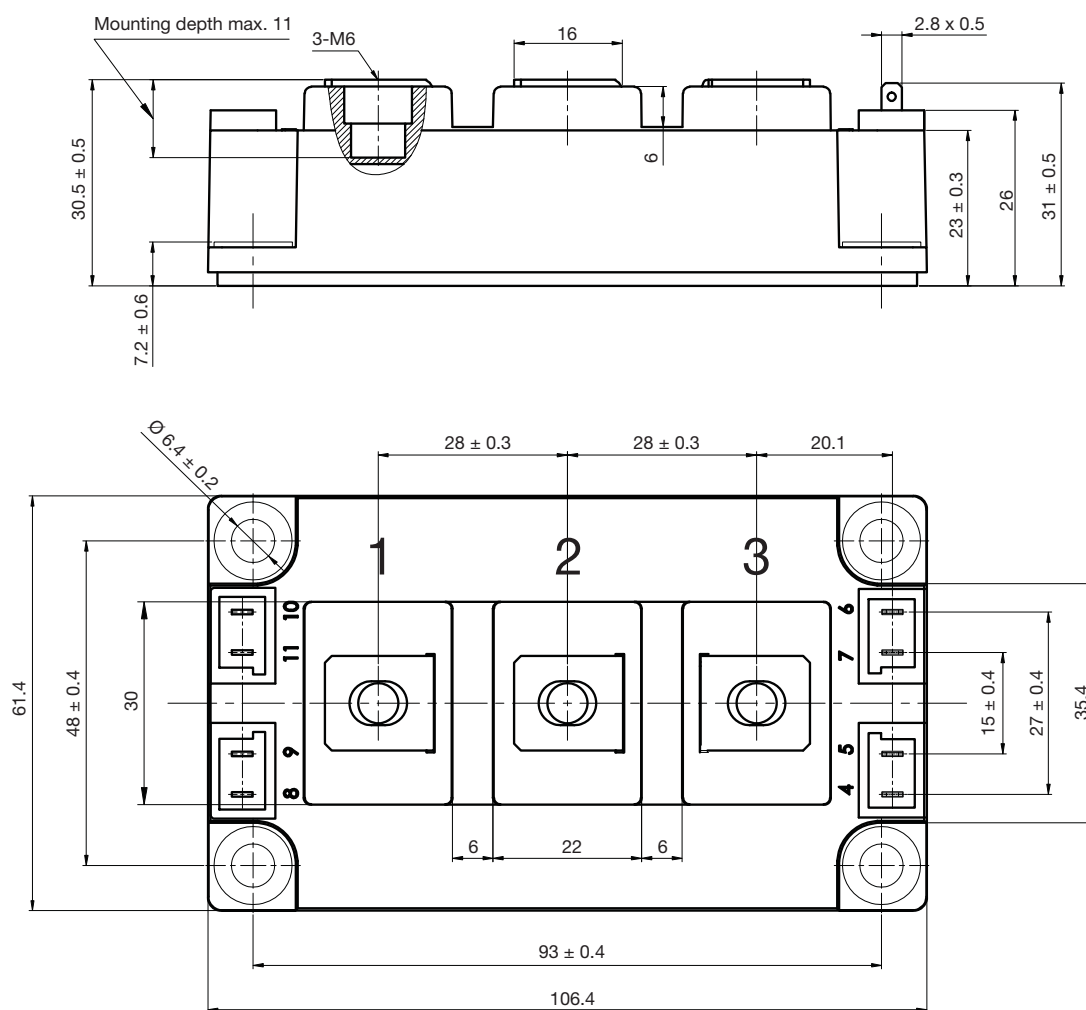
#### LINKS TO RELATED DOCUMENTS

Dimensions

[www.vishay.com/doc?95525](http://www.vishay.com/doc?95525)

## Double INT-A-PAK

**DIMENSIONS** in millimeters (inches)





## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.