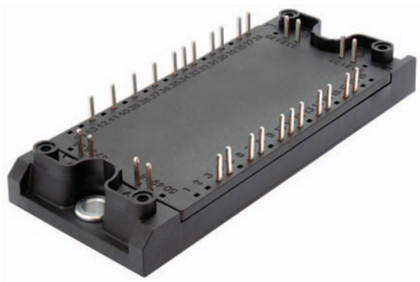
IGBT Fourpack Module, 75 A



ECONO2 4PACK

PRODUCT SUMMARY	
V_{CES}	1200 V
I_C at T_C = 67 °C	75 A
$V_{CE(on)}$ (typical)	3.4 V
Speed	8 kHz to 30 kHz
Package	ECONO2
Circuit	4 PACK

FEATURES

- Square RBSOA
- HEXFRED® low Q_{rr}, low switching energy
- Positive $V_{CE(on)}$ temperature coefficient
- Copper baseplate
- Low stray inductance design
- Designed and qualified for industrial market
- UL approved file E78996
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

RoHS COMPLIANT

BENEFITS

- Benchmark efficiency for SMPS appreciation in particular HF welding
- Rugged transient performance
- Low EMI, requires less snubbing
- Direct mounting to heatsink space saving
- PCB solderable terminals
- Low junction to case thermal resistance

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Collector to emitter voltage	V_{CES}		1200	V
Continuous collector current	I_C	T_C = 25 °C	100	A
		T_C = 80 °C	67	
Pulsed collector current See fig. C.T.5	I_{CM}		200	
Clamped inductive load current	I_{LM}		200	
Diode continuous forward current	I_F	T_C = 25 °C	40	
		T_C = 80 °C	25	
Diode maximum forward current	I_{FM}		150	
Gate to emitter voltage	V_{GE}		± 20	V
Maximum power dissipation (IGBT)	P_D	T_C = 25 °C	480	W
		T_C = 80 °C	270	
Maximum operating junction temperature	T_J		150	°C
Storage temperature range	T_{Stg}		-40 to +125	
Isolation voltage	V_{ISOL}		AC 2500 (min)	V

ELECTRICAL SPECIFICATIONS (T_J = 25 °C unless otherwise specified)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
Collector to emitter breakdown voltage	$V_{BR(CES)}$	V_{GE} = 0 V, I_C = 500 μA	1200	-	-	V
Collector to emitter voltage	$V_{CE(ON)}$	I_C = 75 A, V_{GE} = 15 V	-	3.4	4.0	
		I_C = 100 A, V_{GE} = 15 V	-	3.8	4.5	
		I_C = 75 A, V_{GE} = 15 V, T_J = 125 °C	-	4.0	4.5	
		I_C = 100 A, V_{GE} = 15 V, T_J = 125 °C	-	4.53	5.1	
Gate threshold voltage	$V_{GE(th)}$	V_{CE} = V_{GE}, I_C = 250 μA	4.0	5.0	6.0	
Threshold voltage temperature coefficient	$\Delta V_{GE(th)}/\Delta T_J$	V_{CE} = V_{GE}, I_C = 1 mA (25 °C to 125 °C)	-	-11	-	mV/°C
Zero gate voltage collector current	I_{CES}	V_{GE} = 0 V, V_{CE} = 1200 V	-	7	250	μA
		V_{GE} = 0 V, V_{CE} = 1200 V, T_J = 125 °C	-	580	2000	
Diode forward voltage drop	V_{FM}	I_F = 75 A	-	3.9	5.0	V
		I_F = 100 A	-	4.43	5.8	
		I_F = 75 A, T_J = 125 °C	-	4.37	5.4	
		I_F = 100 A, T_J = 125 °C	-	5.02	6.4	
Gate to emitter leakage current	I_{GES}	V_{GE} = ± 20 V	-	-	± 200	nA

SWITCHING CHARACTERISTICS (T_J = 25 °C unless otherwise noted)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
Total gate charge (turn-on)	Q_G	I_C = 500 A V_{CC} = 600 V V_{GE} = 15 V	-	630	-	nC
Gate to emitter charge (turn-on)	Q_{GE}		-	65	-	
Gate to collector charge (turn-on)	Q_{GC}		-	250	-	
Turn-on switching loss	E_{on}	I_C = 50 A, V_{CC} = 600 V V_{GE} = 15 V, R_G = 4.7 Ω, L = 500 μH T_J = 25 °C (1)	-	1.51	-	mJ
Turn-off switching loss	E_{off}		-	2.41	-	
Total switching loss	E_{tot}		-	3.92	-	
Turn-on switching loss	E_{on}	I_C = 50 A, V_{CC} = 600 V V_{GE} = 15 V, R_G = 4.7 Ω, L = 500 μH T_J = 125 °C (1)	-	2.25	-	
Turn-off switching loss	E_{off}		-	3.35	-	
Total switching loss	E_{tot}		-	7.60	-	
Turn-on delay time	$t_{d(on)}$	I_C = 50 A, V_{CC} = 600 V V_{GE} = 15 V, R_G = 4.7 Ω, L = 500 μH T_J = 125 °C	-	169	-	ns
Rise time	t_r		-	71	-	
Turn-off delay time	$t_{d(off)}$		-	393	-	
Fall time	t_f		-	136	-	
Reverse bias safe operating area	RBSOA	T_J = 150 °C, I_C = 150 A R_G = 10 Ω, V_{GE} = 15 V to 0 V	Fullsquare			
Short circuit safe operating area	SCSOA	T_J = 150 °C V_{CC} = 900 V, V_P = 1200 V R_G = 10 Ω, V_{GE} = 15 V to 0 V	10	-	-	μs
Diode peak reverse recovery current	I_{rr}	T_J = 25 °C; V_{CC} = 600 V, I_F = 75 A, dI/dt = 10 A/μs	-	1.45	2.5	A
		T_J = 125 °C	-	2.35	4.0	
Diode reverse recovery time	t_{rr}	T_J = 25 °C	-	0.401	0.5	μs
		T_J = 125 °C	-	0.655	0.8	
Total reverse recovery charge	Q_{rr}	T_J = 25 °C	-	0.181	0.4	μC
		T_J = 125 °C	-	0.54	1.5	

Note

(1) Energy losses include "tail" and diode reverse recovery

THERMAL AND MECHANICAL SPECIFICATIONS					
PARAMETER	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
Junction to case IGBT	R_{thJC} (IGBT)	-	-	0.26	°C/W
Junction to case DIODE	R_{thJC} (DIODE)	-	-	1.00	
Case to sink, flat, greased surface	R_{thCS} (MODULE)	-	0.05	-	
Mounting torque (M5)		2.7	-	3.3	Nm
Weight		-	170	-	g

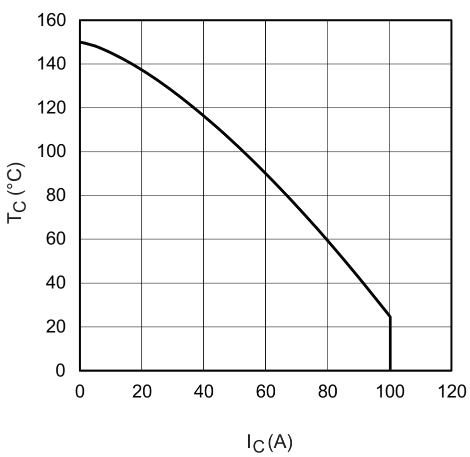


Fig. 1 - Maximum DC Collector Current vs. Case Temperature

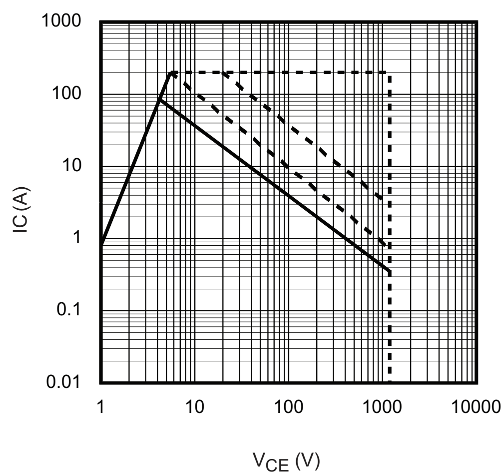


Fig. 3 - Forward SOA
T_C = 25 °C; $T_J \leq$ 150 °C

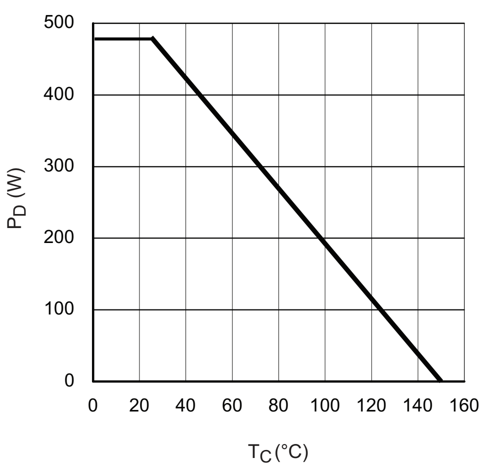


Fig. 2 - Power Dissipation vs. Case Temperature

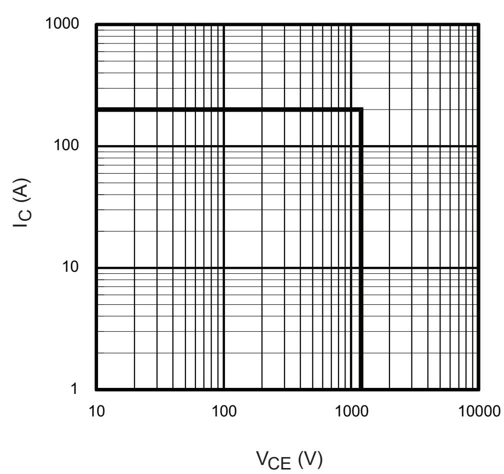


Fig. 4 - Reverse Bias SOA
T_J = 150 °C; V_{GE} = 15 V

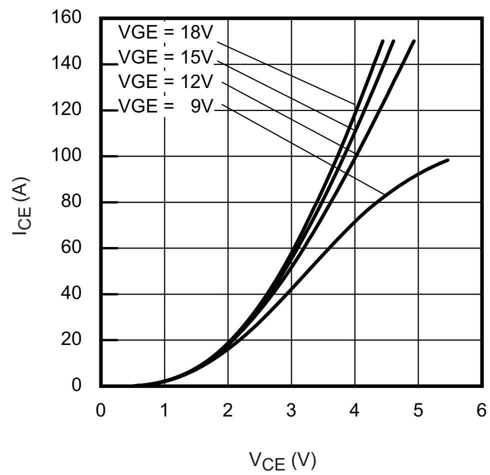


Fig. 5 - Typical IGBT Output Characteristics
$T_J = 25\ °C$; $t_p = 500\ \mu s$

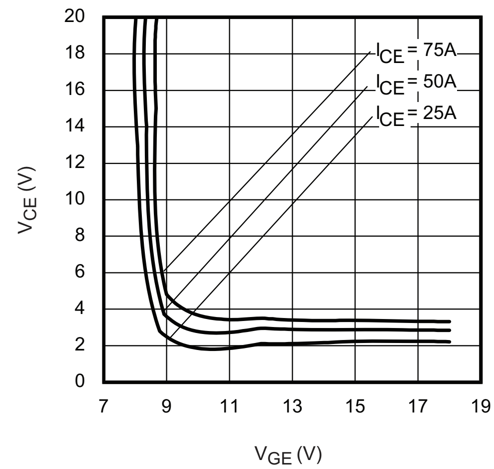


Fig. 8 - Typical V_{CE} vs. V_{GE}
$T_J = 25\ °C$

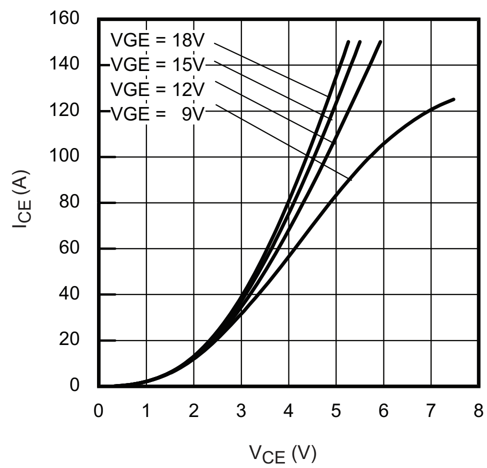


Fig. 6 - Typical IGBT Output Characteristics
$T_J = 125\ °C$; $t_p = 500\ \mu s$

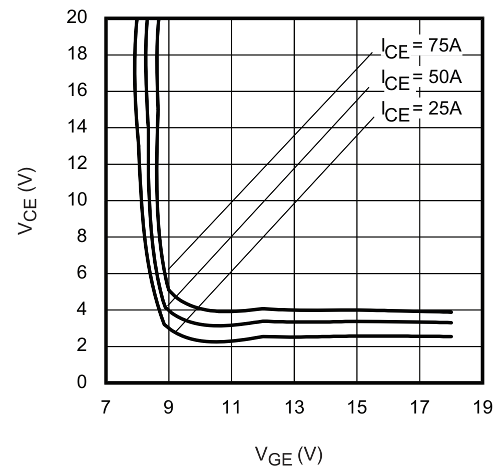


Fig. 9 - Typical V_{CE} vs. V_{GE}
$T_J = 125\ °C$

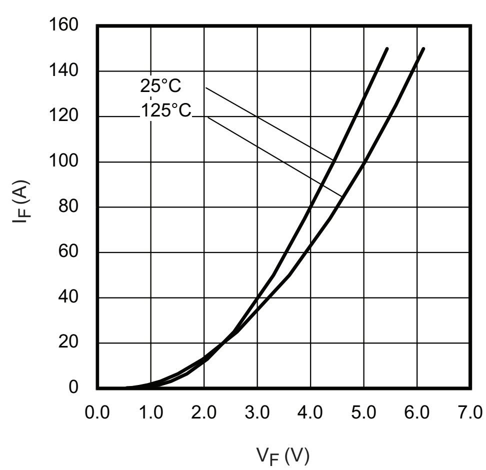


Fig. 7 - Typical Diode Forward Characteristics
$t_p = 500\ \mu s$

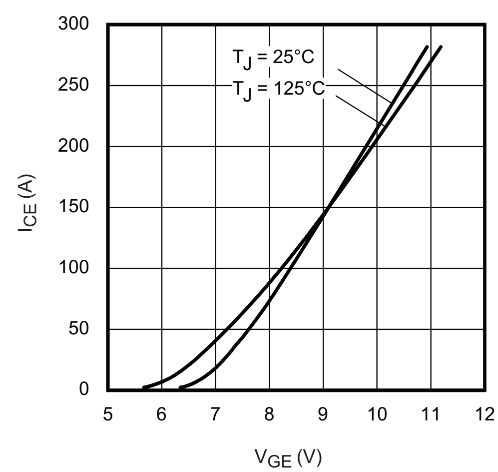


Fig. 10 - Typical Transfer Characteristics
$V_{CE} = 20\ V$; $t_p = 500\ \mu s$

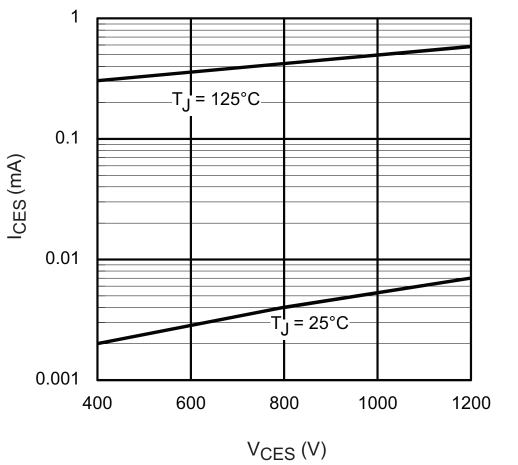


Fig. 11 - Typical Zero Gate Voltage Collector Current

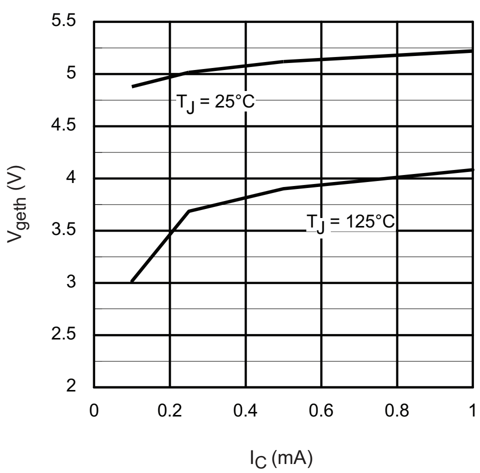


Fig. 12 - Typical Threshold Voltage

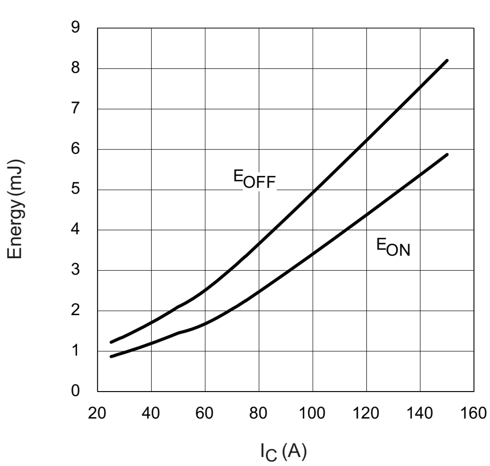


Fig. 13 - Typical Energy Loss vs. I_C
T_J = 125 °C; L = 200 µH; V_{CE} = 600 V, R_G = 5 Ω; V_{GE} = 15 V

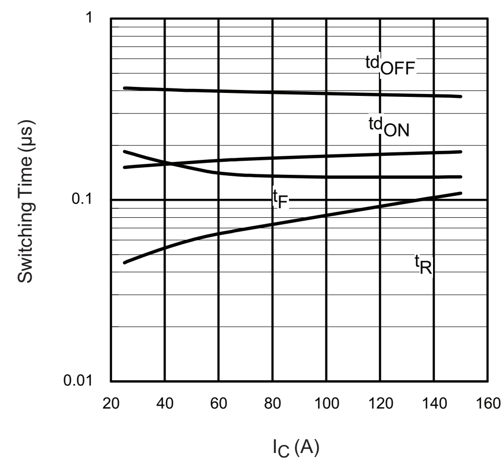


Fig. 14 - Typical Switching Time vs. I_C
T_J = 125 °C; L = 200 µH; V_{CE} = 600 V, R_G = 5 Ω; V_{GE} = 15 V

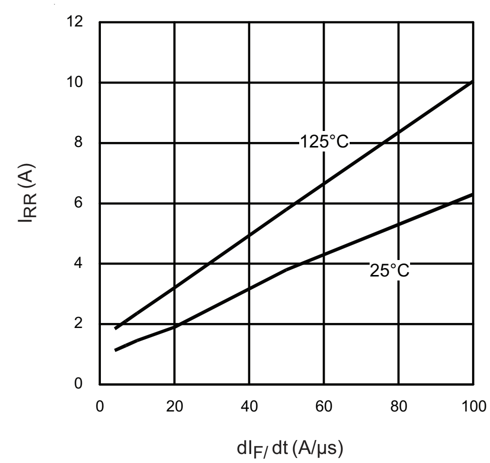


Fig. 15 - Typical Diode I_{REC} vs. dI_F/dt
V_{CC} = 600 V; I_F = 50 A

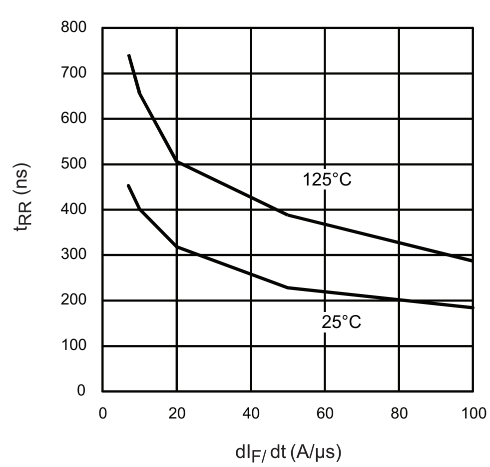


Fig. 16 - Typical Diode t_{rr} vs. dI_F/dt
V_{CC} = 600 V; I_F = 50 A

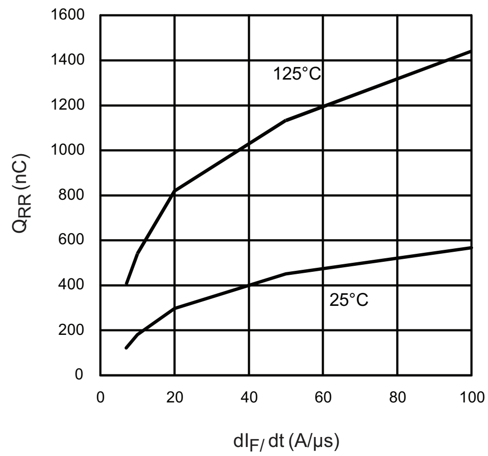


Fig. 17 - Typical Diode Q_{rr} vs. dI_F/dt
V_{CC} = 600 V; I_F = 50 A

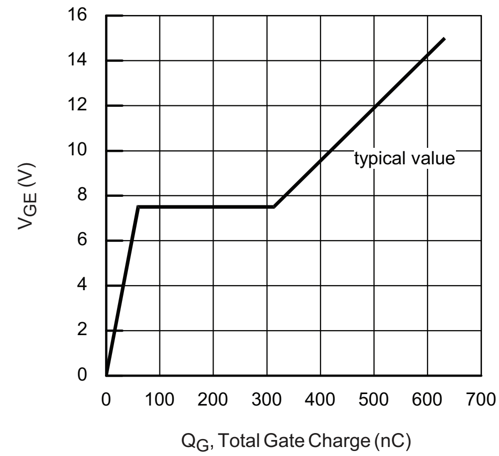


Fig. 18 - Typical Gate Charge vs. V_{GE}
I_{CE} = 5.0 A; L = 600 µH

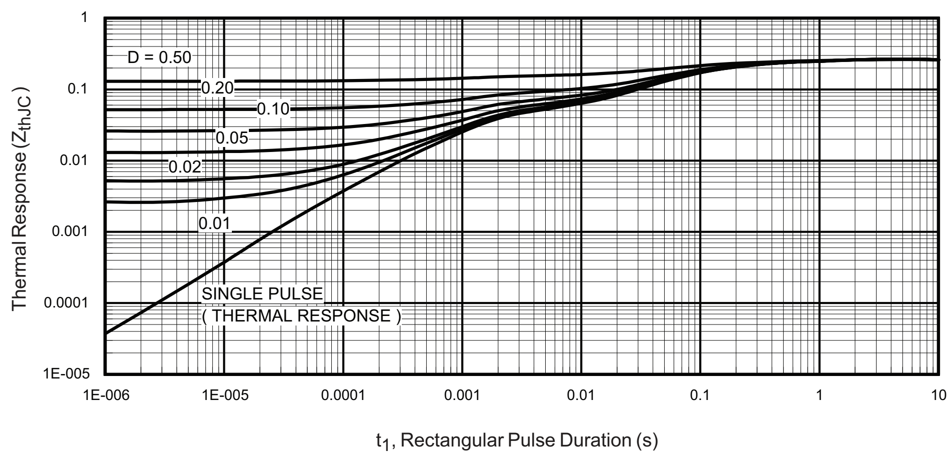


Fig. 19 - Maximum Transient Thermal Impedance, Junction to Case (IGBT)

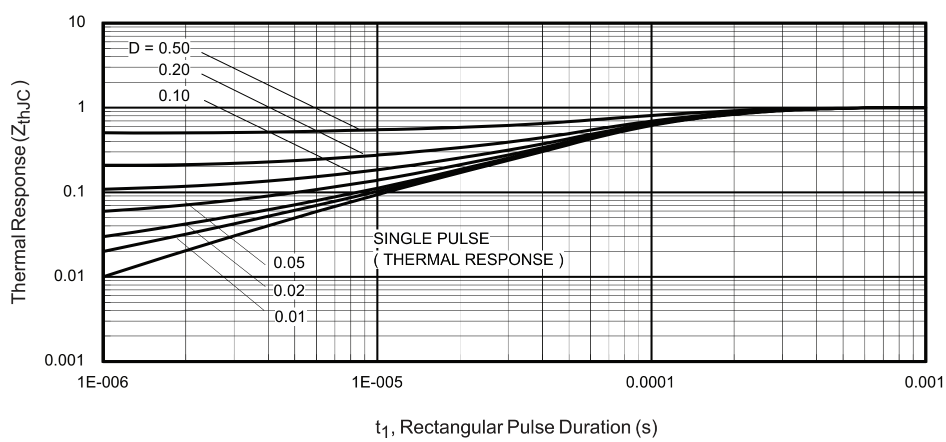


Fig. 20 - Maximum Transient Thermal Impedance, Junction to Case (DIODE)

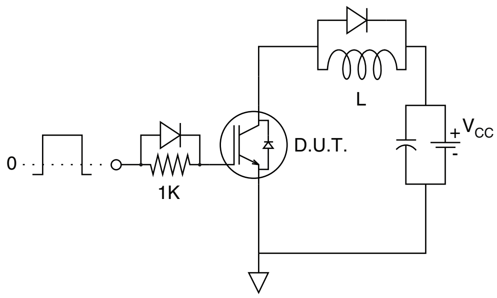


Fig. 21 - Gate Charge Circuit (Turn-Off)

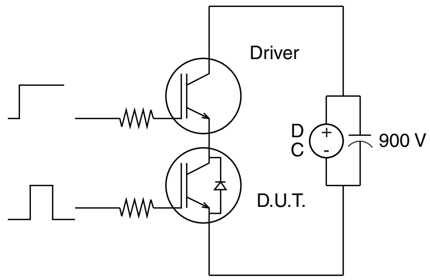


Fig. 23 - S.C. SOA Circuit

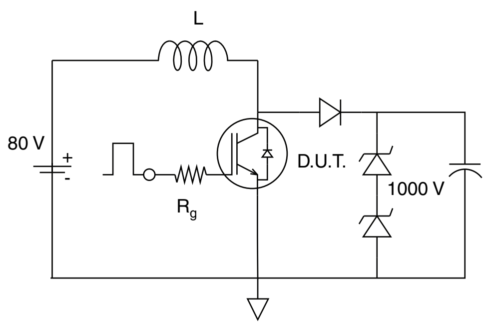


Fig. 22 - RBSOA Circuit

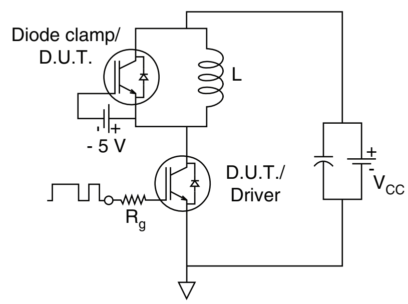


Fig. 24 - Switching Loss Circuit

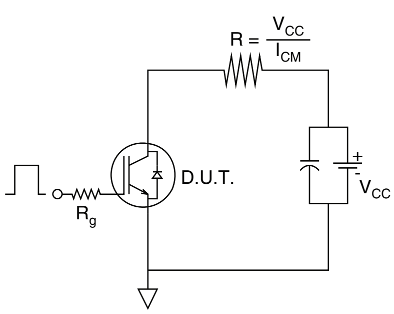


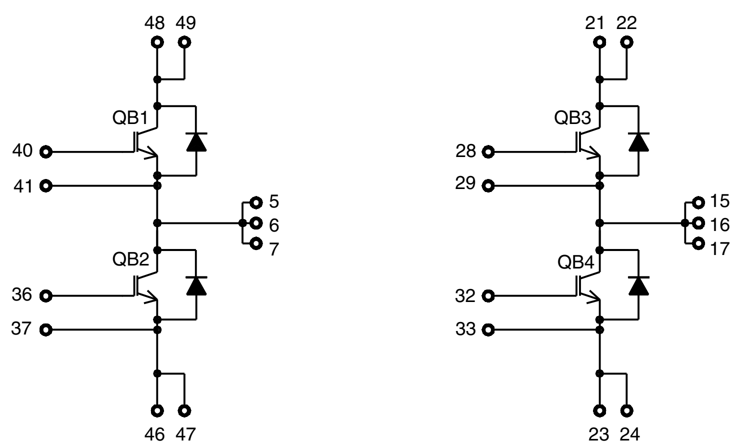
Fig. 25 - Resistive Load Circuit

ORDERING INFORMATION TABLE

Device code	VS-	G	B	75	Y	F	120	N
	1	2	3	4	5	6	7	8

1	-	Vishay Semiconductors product
2	-	Insulated gate bipolar transistor (IGBT)
3	-	B = IGBT Generation 5 NPT
4	-	Current rating (75 = 75 A)
5	-	Circuit configuration (Y = Fourpack)
6	-	Package indicator (F = ECONO2)
7	-	Voltage rating (120 = 1200 V)
8	-	Speed/type (N = Ultrafast with reduced diode, speed 8 kHz to 60 kHz)

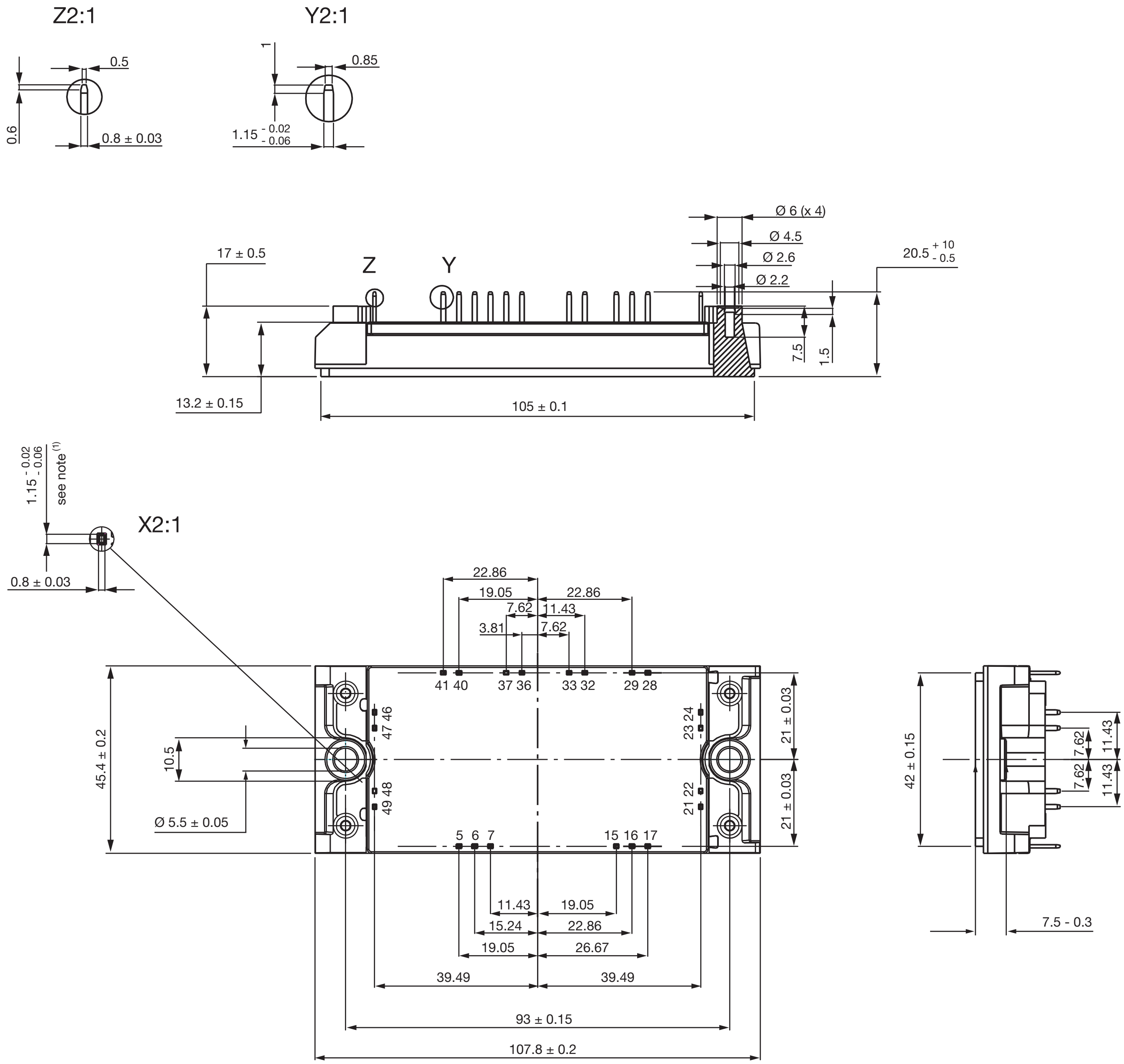
CIRCUIT CONFIGURATION



LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95539

ECONO2 4PACK N Series

DIMENSIONS in millimeters



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.

Material Category Policy

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.

OCEAN CHIPS
Океан Электроники
Поставка электронных компонентов

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения **«JONHON»**, а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов **«FORSTAR»**.

AVIC JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).

FORSTAR®

Телефон: 8 (812) 309-75-97 (многоканальный)
Факс: 8 (812) 320-03-32
Электронная почта: ocean@oceanchips.ru
Web: http://oceanchips.ru/
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А