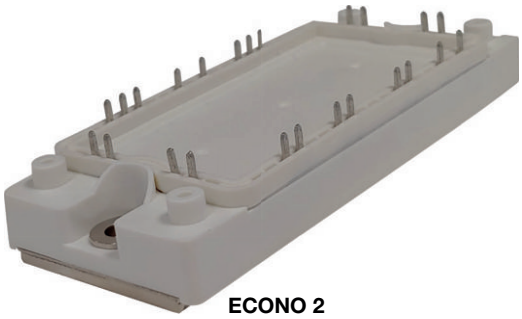
IGBT Fourpack Module, 50 A



ECONO 2
(Package example)

FEATURES

- Trench gate field stop IGBT
- 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

PRIMARY CHARACTERISTICS	
V_{CES}	1200 V
I_C at T_C = 66 °C	50 A
$V_{CE(on)}$ (typical)	2.34 V
Speed	8 kHz to 30 kHz
Package	ECONO 2
Circuit configuration	4 pack

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	64	A
		T_C = 80 °C	44	
Pulsed collector current, see fig. C.T.5	I_{CM}	T_J = 150 °C, t_p = 6 ms, V_{GE} = 15 V	180	
Clamped inductive load current	I_{LM}		150	
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	231	W
		T_C = 80 °C	130	
Isolation voltage	V_{ISOL}		AC 2500 (min)	V

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ELECTRICAL SPECIFICATIONS (T_J = 25 °C unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Collector to emitter breakdown voltage	$BV_{(CES)}$	V_{GE} = 0 V, I_C = 2 mA	1200	-	-	V
Collector to emitter voltage	$V_{CE(ON)}$	I_C = 50 A, V_{GE} = 15 V	-	2.34	2.80	
		I_C = 50 A, V_{GE} = 15 V, T_J = 125 °C	-	2.66	-	
Gate threshold voltage	$V_{GE(th)}$	V_{CE} = V_{GE}, I_C = 2 mA	4.6	5.9	7.6	
Threshold voltage temperature coefficient	$\Delta V_{GE(th)}/\Delta T_J$	V_{CE} = V_{GE}, I_C = 2 mA (25 °C to 125 °C)	-	-13	-	mV/°C
Zero gate voltage collector current	I_{CES}	V_{GE} = 0 V, V_{CE} = 1200 V	-	1	50	µA
		V_{GE} = 0 V, V_{CE} = 1200 V, T_J = 125 °C	-	670	-	
Diode forward voltage drop	V_{FM}	I_F = 50 A	-	3.30	4.5	V
		I_F = 50 A, T_J = 125 °C	-	3.60	-	
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 = 50 A V_{CC} = 960 V V_{GE} = 15 V	-	154	-	nC
Gate to emitter charge (turn-on)	Q_{GE}		-	17	-	
Gate to collector charge (turn-on)	Q_{GC}		-	79	-	
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)	-	1.17	-	mJ
Turn-off switching loss	E_{off}		-	1.50	-	
Total switching loss	E_{tot}		-	2.67	-	
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)	-	1.58	-	
Turn-off switching loss	E_{off}		-	2.52	-	
Total switching loss	E_{tot}		-	4.10	-	
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	-	44	-	ns
Rise time	t_r		-	11	-	
Turn-off delay time	$t_{d(off)}$		-	96	-	
Fall time	t_f		-	187	-	
Reverse bias safe operating area	RBSOA	T_J = 150 °C, I_C = 150 A, V_{CC} = 800 V, V_P = 1200 V, R_g = 4.7 Ω, V_{GE} = 15 V to 0 V	Fullsquare			
Short circuit safe operating area	SCSOA	T_J = 150 °C V_{CC} = 600 V, V_P = 1200 V R_G = 10 Ω, V_{GE} = 15 V to 0 V	5	-	-	µs
Diode peak reverse recovery current	I_{rr}	T_J = 25 °C; V_{CC} = 600 V, I_F = 50 A, dI/dt = 7 A/µs	-	1.3	-	A
		T_J = 125 °C	-	2.0	-	
Diode reverse recovery time	t_{rr}	T_J = 25 °C	-	0.453	-	µs
		T_J = 125 °C	-	0.74	-	
Total reverse recovery charge	Q_{rr}	T_J = 25 °C	-	0.12	-	µC
		T_J = 125 °C	-	0.4	-	

Note

(1) Energy losses include “tail” and diode reverse recovery

INTERNAL NTC - THERMISTOR SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	TYP.	UNITS
Resistance	R_{25}	T_C= 25 °C	5000	Ω
	R_{100}	T_C= 100 °C	493 ± 5 %	
B-value	$B_{25/50}$	$R_2 = R_{25} \exp. [B_{25/50} (1/T_2 - 1/(298.15K))]$	3375 ± 5 %	K
Maximum operating temperature			220	°C
Dissipation constant			2	mW/°C
Thermal time constant			8	s

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THERMAL AND MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Junction and storage temperature range	T_J, T_{Stg}		-40	-	150	°C
Junction to case IGBT	R_{thJC}		-	-	0.54	°C/W
Junction to case DIODE	R_{thJC}		-	-	1	
Case to sink per module	R_{thCS}		-	0.05	-	
Mounting torque (M5)			2.7	-	3.3	Nm
Weight			-	170	-	g

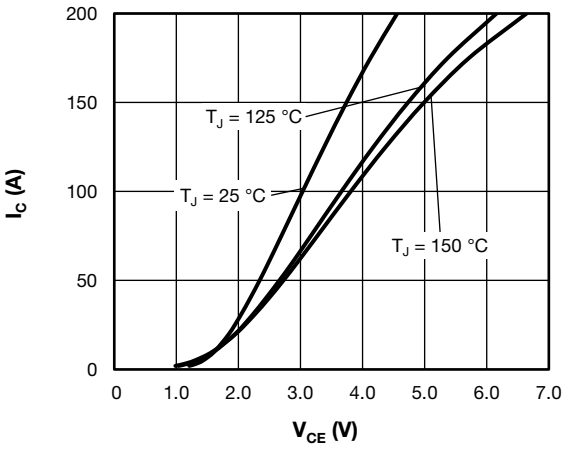


Fig. 1 - Typical Trench IGBT Output Characteristics, V_{GE} = 15 V

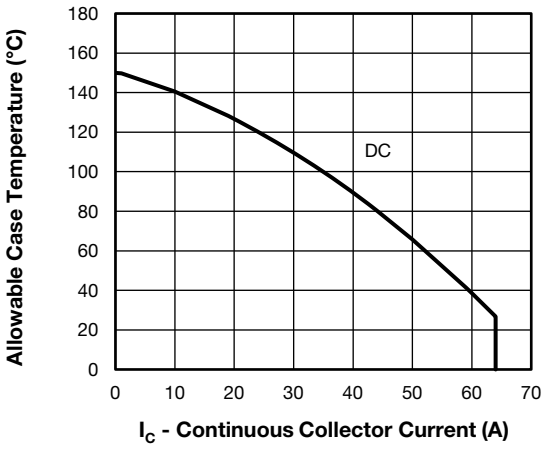


Fig. 3 - Maximum Trench IGBT Continuous Collector Current vs. Case Temperature

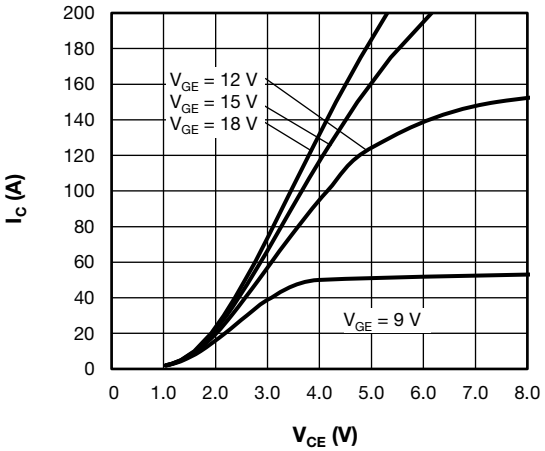


Fig. 2 - Typical Trench IGBT Output Characteristics, T_J = 125 °C

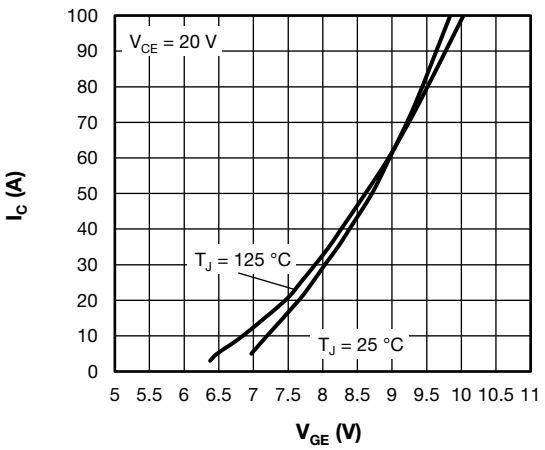


Fig. 4 - Typical Trench IGBT Transfer Characteristics

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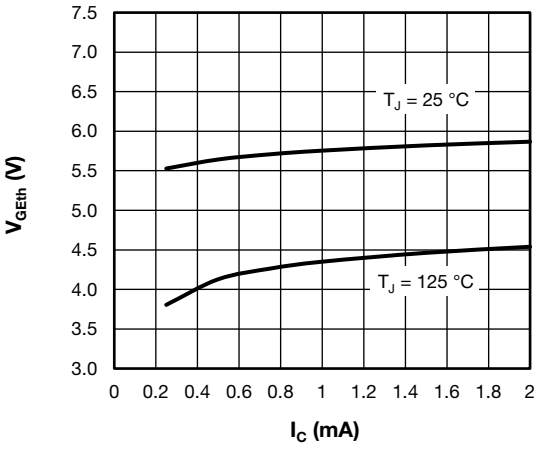


Fig. 5 - Typical Trench IGBT Gate Threshold Voltage

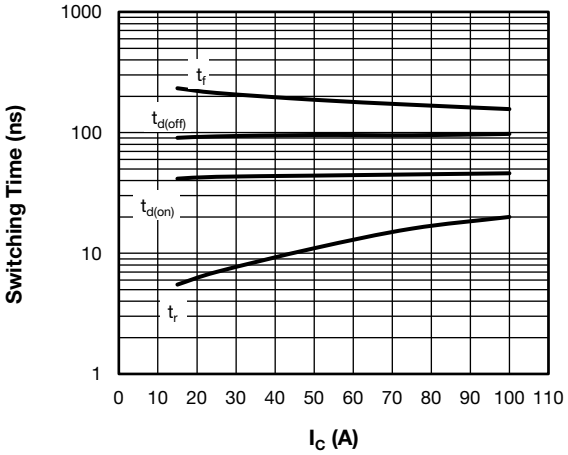


Fig. 8 - Typical Trench IGBT Switching Time vs. I_C
(with Antiparallel Diode)
T_J = 125 °C, V_{CC} = 600 V, R_g = 4.7 Ω, V_{GE} = +15 V/-15 V, L = 500 µH

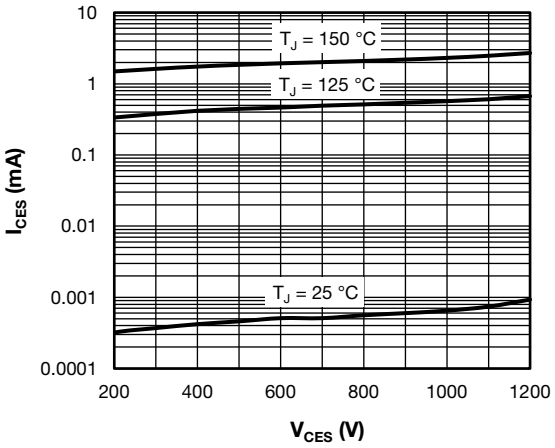


Fig. 6 - Typical Trench IGBT Zero Gate Voltage Collector Current

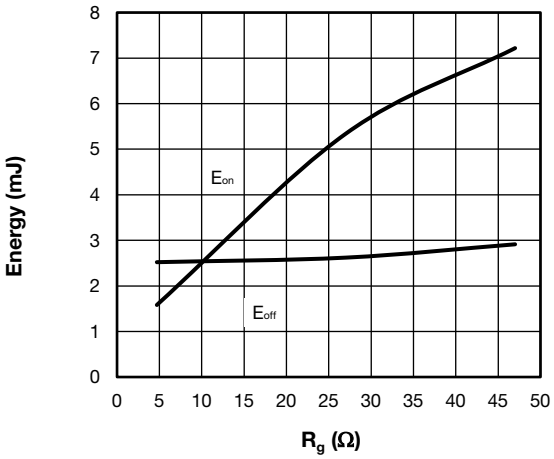


Fig. 9 - Typical Trench IGBT Energy Loss vs. R_g
(with Antiparallel Diode)
T_J = 125 °C, V_{CC} = 600 V, I_C = 40 A, V_{GE} = +15 V/-15 V, L = 500 µH

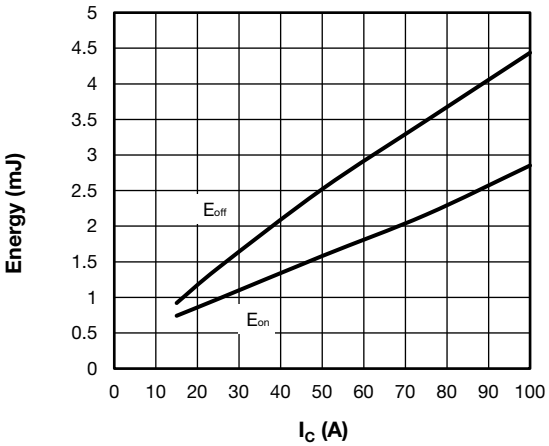


Fig. 7 - Typical Trench IGBT Energy Loss vs. I_C
(with Antiparallel Diode)
T_J = 125 °C, V_{CC} = 600 V, R_g = 4.7 Ω, V_{GE} = +15 V/-15 V, L = 500 µH

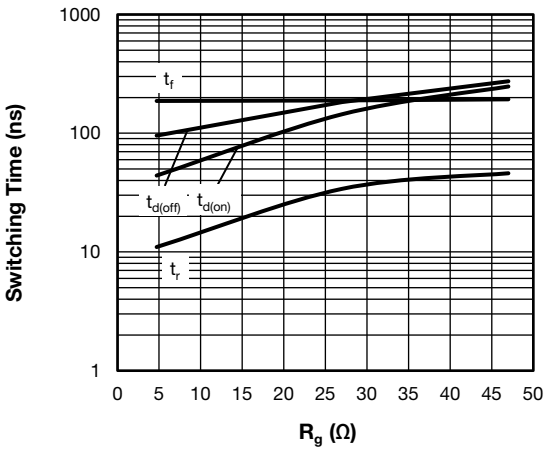


Fig. 10 - Typical Trench IGBT Switching Time vs. R_g
(with Antiparallel Diode)

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T_J = 125 °C, V_{CC} = 600 V, I_C = 50 A, V_{GE} = +15 V/-15 V, L = 500 µH

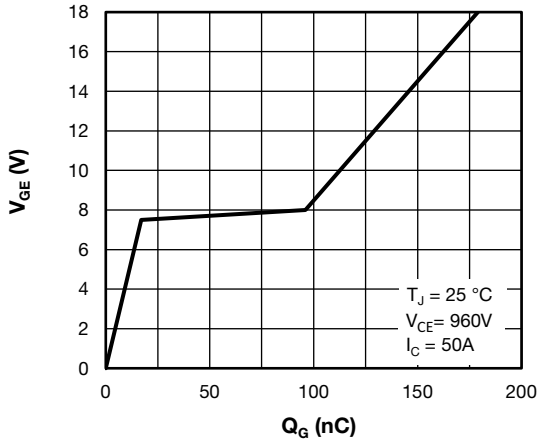


Fig. 11 - Typical Trench IGBT Gate Charge vs. Gate to Emitter Voltage

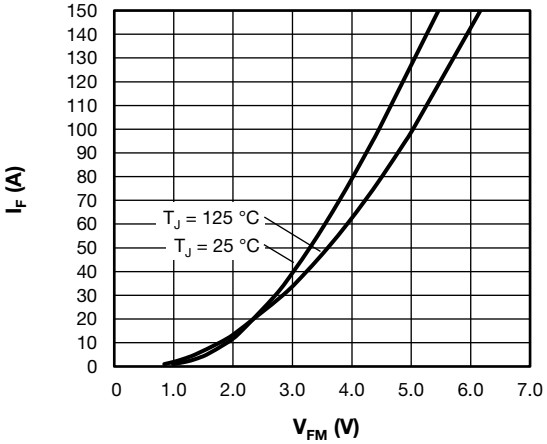


Fig. 12 - Typical Diode Forward Characteristics

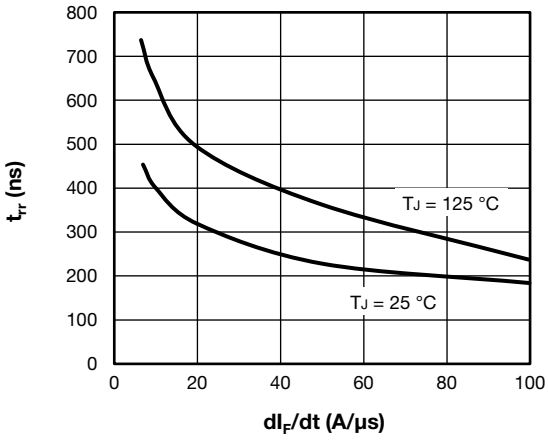


Fig. 13 - Typical Diode Reverse Recovery Time vs. dI_F/dt

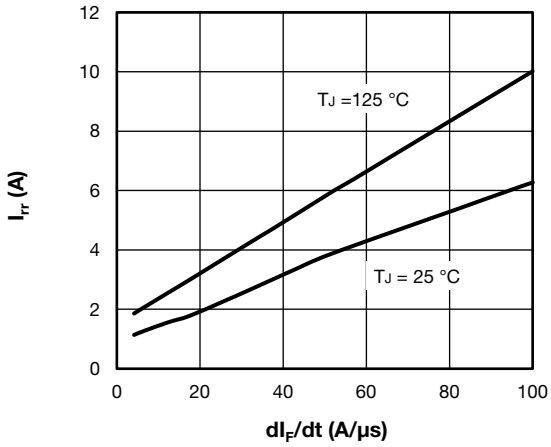


Fig. 14 - Typical Diode Reverse Recovery Current vs. dI_F/dt

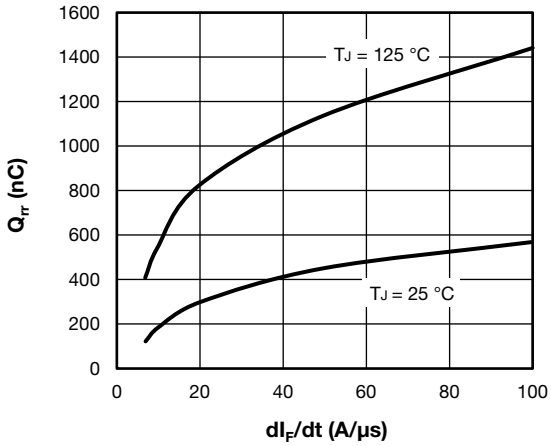


Fig. 15 - Typical Diode Reverse Recovery Charge vs. dI_F/dt

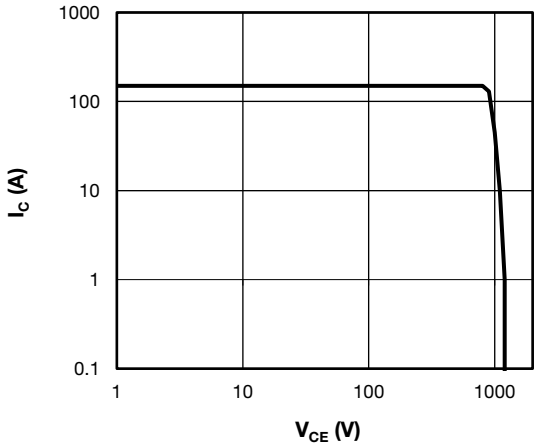


Fig. 16 - Trench IGBT Reverse BIAS SOA
T_J = 150 °C, I_C = 150 A, R_g = 4.7 Ω, V_{GE} = +15 V / 0 V, V_{CC} = 800 V, V_p = 1200 V

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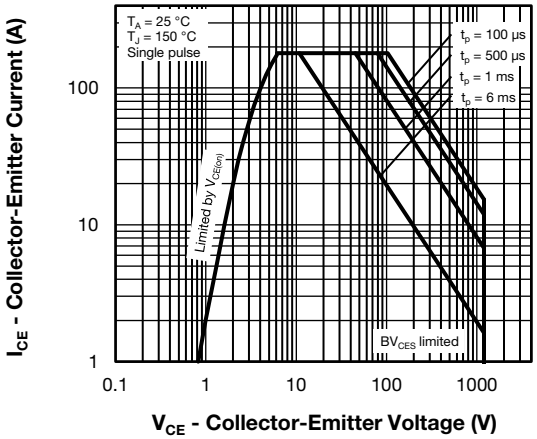


Fig. 17 - Trench IGBT Safe Operating Area

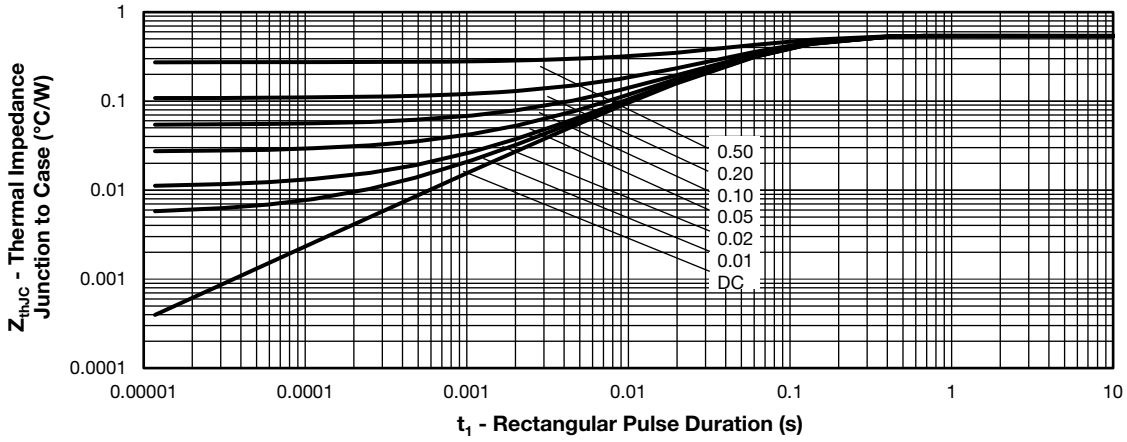


Fig. 18 - Maximum Trench IGBT Thermal Impedance Z_{thJC} Characteristics

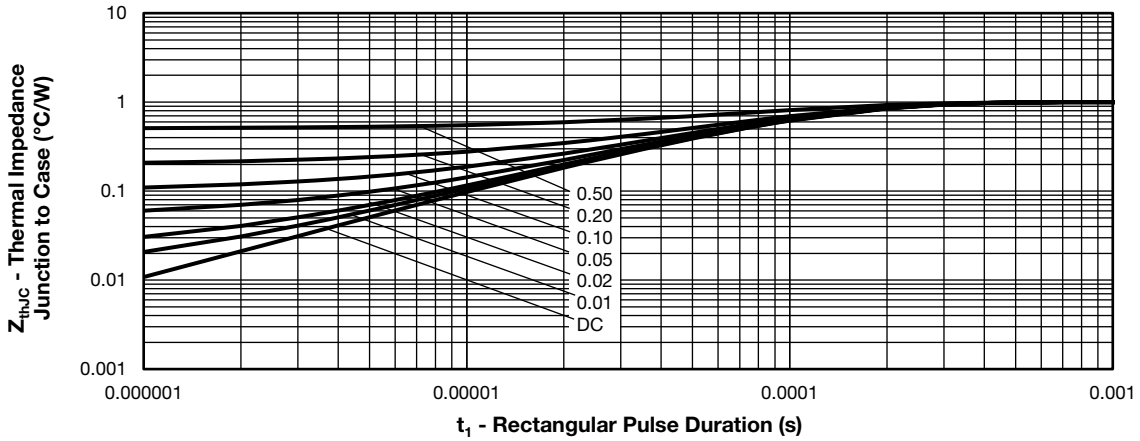


Fig. 19 - Maximum Diode Thermal Impedance Z_{thJC} Characteristics

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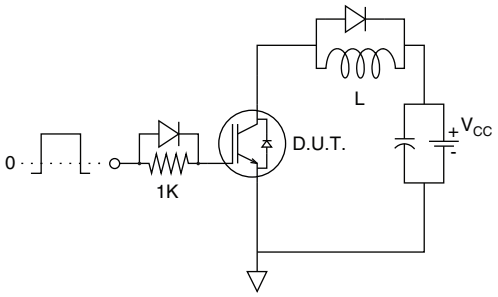


Fig. 20 - Gate Charge Circuit (Turn-Off)

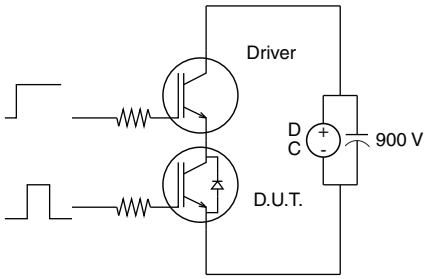


Fig. 22 - S.C. SOA Circuit

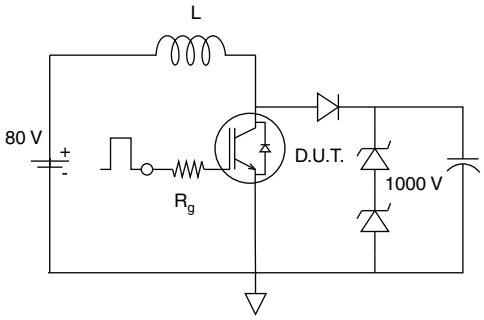


Fig. 21 - RBSOA Circuit

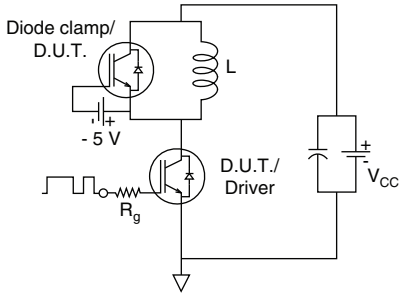


Fig. 23 - Switching Loss Circuit

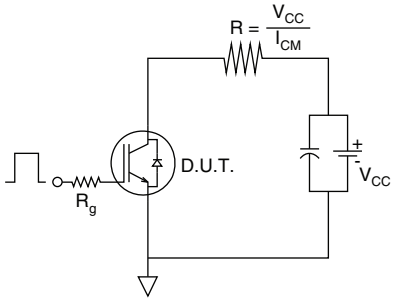


Fig. 24 - Resistive Load Circuit

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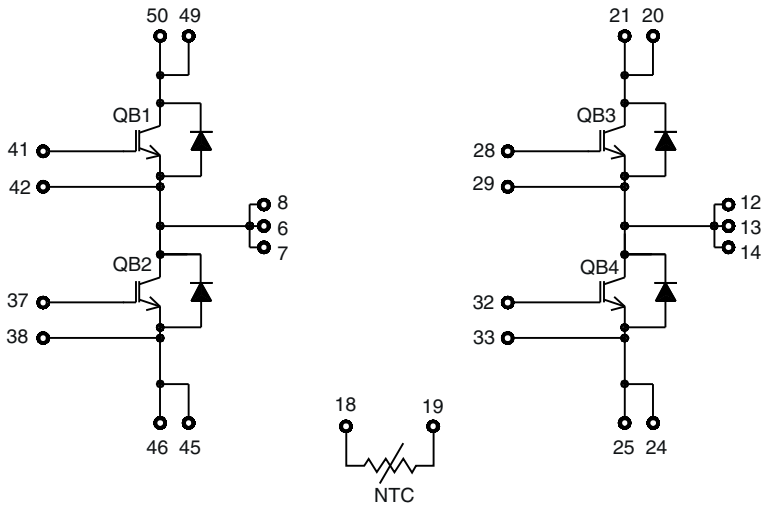
ORDERING INFORMATION TABLE

Device code

VS-	G	T	50	Y	F	120	N	T
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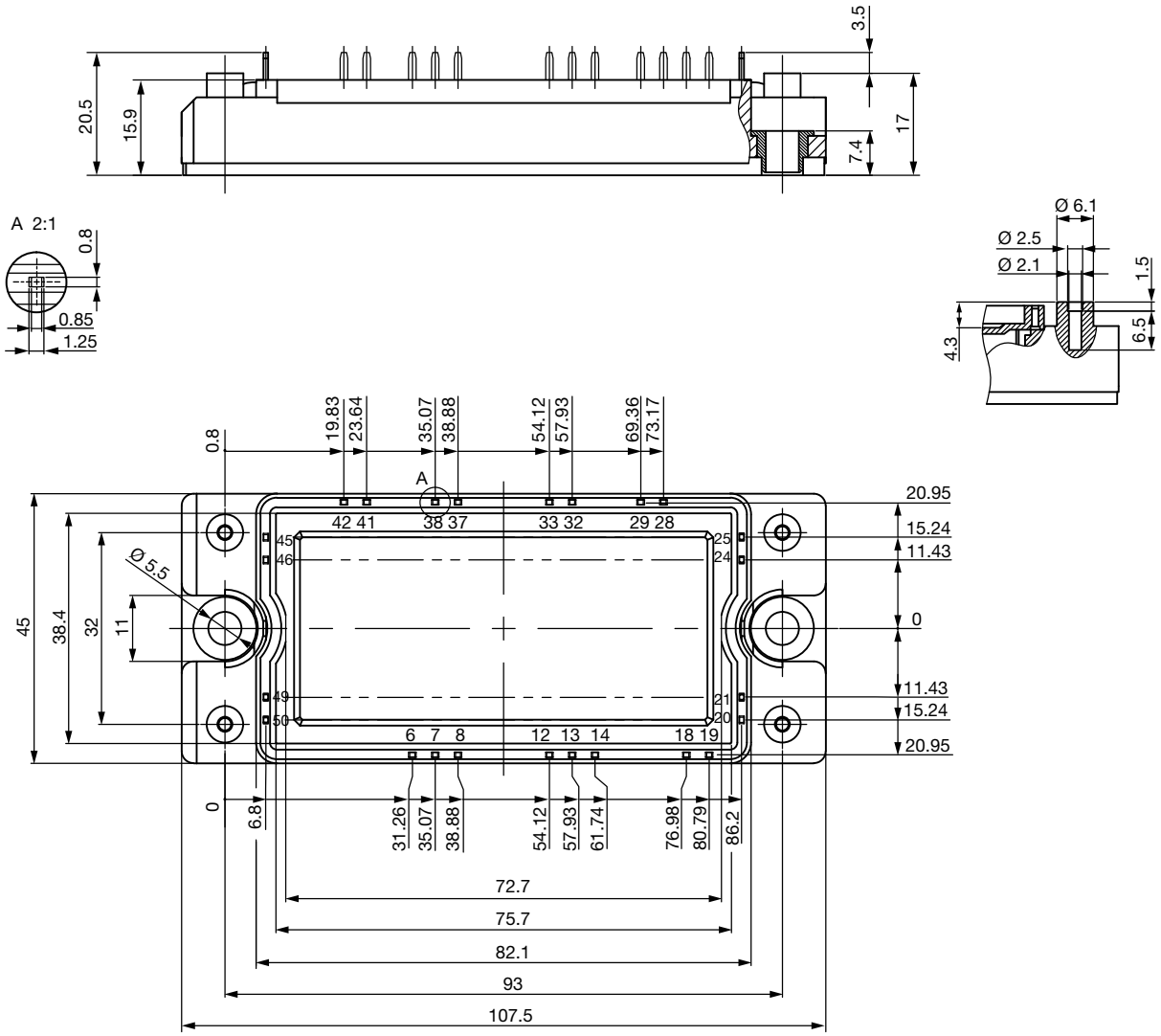
1	-	Vishay Semiconductors product
2	-	Insulated gate bipolar transistor (IGBT)
3	-	T = Trench gate field stop IGBT
4	-	Current rating (50 = 50 A)
5	-	Circuit configuration (Y = 4 pack)
6	-	Package indicator (F = ECONO 2)
7	-	Voltage rating (120 = 1200 V)
8	-	Speed/type (N = ultrafast with reduced diode, speed 8 kHz to 60 kHz)
9	-	NTC Thermistor

CIRCUIT CONFIGURATION



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DIMENSIONS in millimeters



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Entegreci, Eskişehir merkezli, Türkiye geneline satış yapan bir elektronik komponent mağazasıdır. Entegreler (IC), mikrodenetleyiciler, transistörler, diyotlar, pasif elemanlar, konnektörler, modüller ve geliştirme kartları tek adetten seri üretim adetlerine kadar satılır. Ürün sayfalarında güncel stok durumunu, fiyatı ve datasheet bağlantısını bulabilirsiniz.

Parça koduyla arama

Üretici parça numarasını yazın; stok ve fiyatı hemen görün.

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Ürün kategorileri

Entegreden kapasitöre tüm elektronik komponent kategorileri.

Kategorilere göz atın

Üreticiler

Aradığınız üreticinin ürünlerini tek sayfada inceleyin.

Üreticileri görün

Toplu alım ve teklif

Listede olmayan ya da yüksek adetli parçalar için teklif isteyin.

Teklif isteyin

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Entegreci is an online electronic components store based in Türkiye. Search by manufacturer part number to see stock, prices and datasheets for integrated circuits, microcontrollers, transistors, passive components and connectors, or request a quote for parts that are not listed.

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