

GF50HF120T1VH

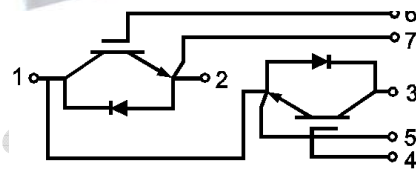
IGBT Module

Features:

- Short Circuit Rated 10 μ s
- Low Switching Loss
- High Speed NPT IGBT
- Low Stray Inductance
- HI-REL Power Terminals
- Lead Free, Compliant With RoHS Requirement
- UL NO:E338085

Applications:

- Welding Machine/ Cutting Machine
- Induction Heating
- SMPS



Internal Circuit Diagram

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

Symbol	Description	Value	Units	
V _{CES}	Collector-Emitter Blocking Voltage	1200	V	
V _{GES}	Gate-Emitter Voltage	±20	V	
I _C	Continuous Collector Current	T _c = 80°C	50	A
		T _c = 25°C	85	A
I _{CM}	Repetitive Peak Collector Current	T _J = 150°C	100	A
I _F	Diode Continuous Forward Current	T _J = 125°C	50	A
I _{FM}	Diode maximum Forward Current		100	A
t _{SC}	Short Circuit Withstand Time	T _J = 150°C	>10	μs
P _D	Maximum Power Dissipation Per Leg	T _c = 25°C T _{Jmax} = 150°C	390	W
T _J	Maximum Junction Temperature		150	°C
T _{JOP}	Maximum Operating Junction Temperature Range		-40 +150	°C
T _{stg}	Storage Temperature		-40 +125	°C
V _{iso}	Isolation Voltage(All Terminals Shorted)	f = 50Hz, 1minute	2500	V
Mounting Torque	Power Terminals Screw:M5		5.0	N·m
	Mounting Screw:M6		6.0	N·m

Electrical Characteristics of IGBT ($T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Description	Test Conditions	Min.	Typ.	Max.	Units	
Static Characteristics							
I_{CES}	Collector-Emitter Leakage Current	$V_{GE} = 0V$, $V_{CE} = V_{CES}$	$T_J = 25^\circ\text{C}$		1	mA	
I_{GES}	Gate-Emitter Leakage Current	$V_{GE} = V_{GES}$, $V_{CE} = 0V$	$T_J = 25^\circ\text{C}$		200	nA	
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C = 1\text{ mA}$, $V_{CE} = V_{GE}$		4.6	5.1	5.6	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 50\text{ A}$, $V_{GE} = 15V$	$T_J = 25^\circ\text{C}$		3.30	3.50	V
			$T_J = 125^\circ\text{C}$		3.90		V
C_{ies}	Input Capacitance	$V_{CE} = 25V$, $V_{GE} = 0V$, $f = 1\text{MHz}$		6.0		nF	
C_{oes}	Output Capacitance			0.48		nF	
Switching Characteristics							
$t_{d(on)}$	Turn-on Delay Time	$V_{CC} = 600V$, $I_C = 50\text{ A}$, $R_G = 15\Omega$, $V_{GE} = \pm 15V$, Inductive Load, $T_J = 25^\circ\text{C}$		115		ns	
t_r	Rise Time			70		ns	
$t_{d(off)}$	Turn-off Delay Time			305		ns	
t_f	Fall Time			125		ns	
E_{on}	Turn-on Switching Loss			3.6		mJ	
E_{off}	Turn-off Switching Loss			1.0		mJ	
$t_{d(on)}$	Turn-on Delay Time	$V_{CC} = 600V$, $I_C = 50\text{ A}$, $R_G = 15\Omega$, $V_{GE} = \pm 15V$, Inductive Load, $T_J = 125^\circ\text{C}$		110		ns	
t_r	Rise Time			70		ns	
$t_{d(off)}$	Turn-off Delay Time			325		ns	
t_f	Fall Time			160		ns	
E_{on}	Turn-on Switching Loss			4.6		mJ	
E_{off}	Turn-off Switching Loss			2.0		mJ	
Q_g	Total Gate Charge	$V_{CE} = 600V$, $I_C = 50\text{ A}$, $R_G = 15\Omega$, $V_{GE} = \pm 15V$, Inductive Load, $T_J = 25^\circ\text{C}$		630		nC	
RBSOA	Reverse Bias Safe Operating Area	$I_C = 100\text{ A}$, $V_{CC} = 960V$, $V_p = 1200V$, $R_g = 4.7\Omega$, $V_{GE} = +15V$ to $0V$, $T_J = 150^\circ\text{C}$	Trapezoid				
SCSOA	Short Circuit Safe Operating Area	$V_{CC} = 600V$, $V_{GE} = 15V$, $T_J = 150^\circ\text{C}$	10			μs	

Electrical Characteristics of FWD

Symbol	Description	Test conditions		Min.	Typ.	Max.	Units
V _{FM}	Forward Voltage	I _F =50A, V _{GE} = 0V	T _J = 25°C		2.25	2.5	V
			T _J = 125°C		2.42		
I _{rr}	Peak Reverse Recovery Current		T _J = 25°C		40		A
			T _J = 125°C		47		
Q _{rr}	Reverse Recovery Charge	I _F =50A, di/dt = 849A/μs, V _{rr} = 600V, V _{GE} = -15V	T _J = 25°C		3.1		μC
			T _J = 125°C		5.6		
E _{rec}	Reverse Recovery Energy		T _J = 25°C		1.42		mJ
			T _J = 125°C		2.04		

Thermal Resistance Characteristics

Symbol	Description	Typ.	Max.	Units
R _{θJC}	IGBT Thermal Resistance: Junction-To-Case		0.33	°C/W
R _{θJC}	Diode Thermal Resistance: Junction-To-Case		0.78	°C/W
R _{θCS}	Case-To-Sink (Conductive Grease Applied)		0.10	°C/W
Mounting Torque	Power Terminals Screw:M5	3.0	5.0	N·m
	Mounting Screw:M6	4.0	6.0	N·m
Weight	Weight Of Module		180	g

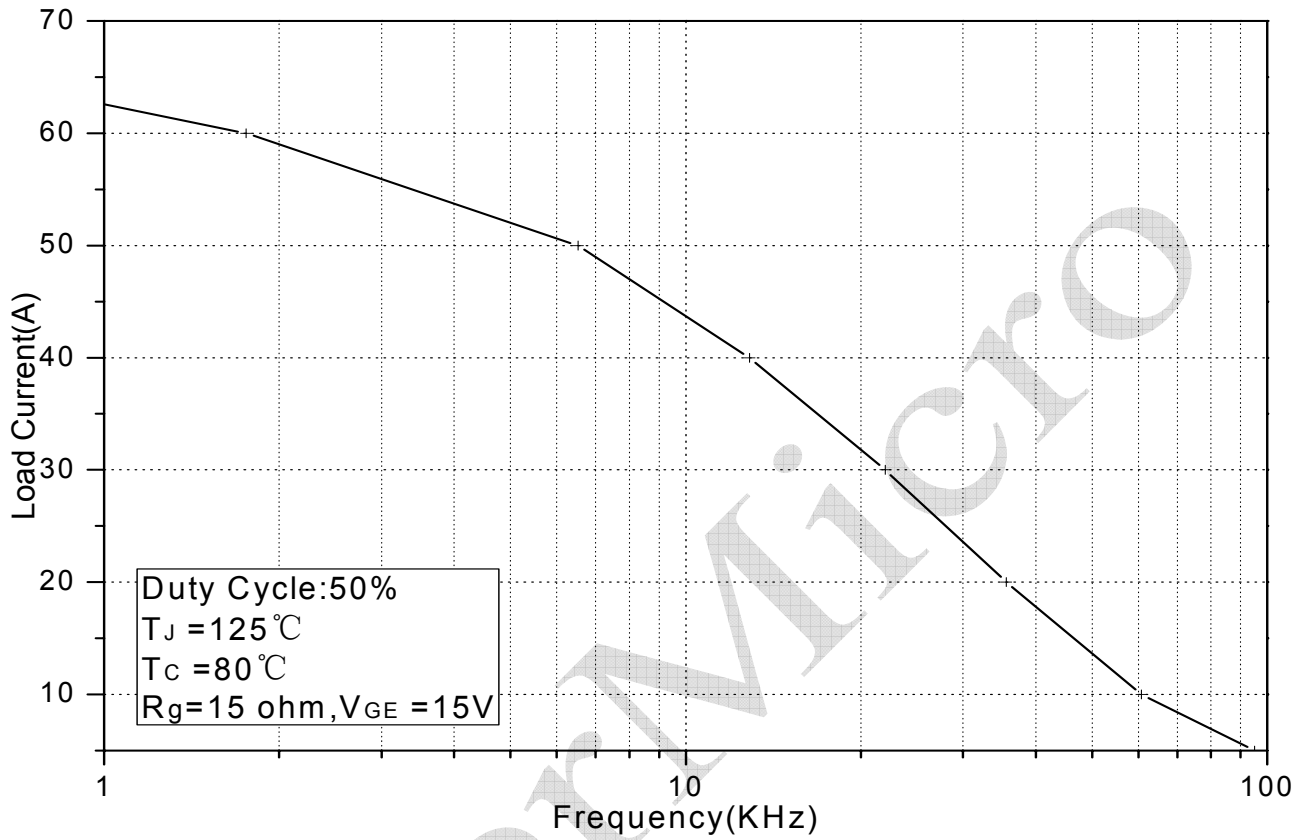


Fig.1 Typical Load Current vs. Frequency

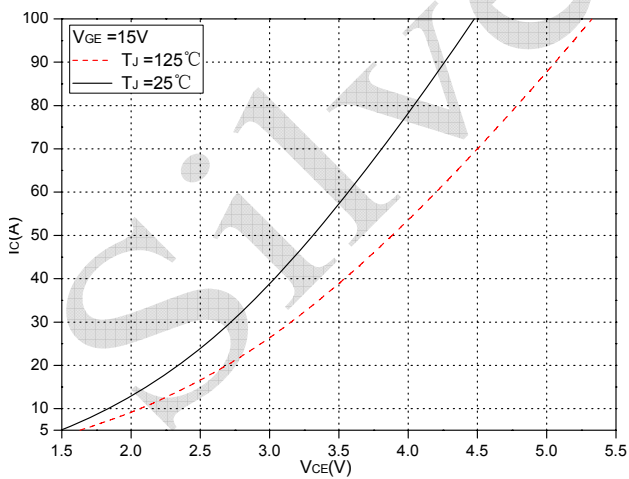


Fig.2 Typical Saturation Voltage Characteristics

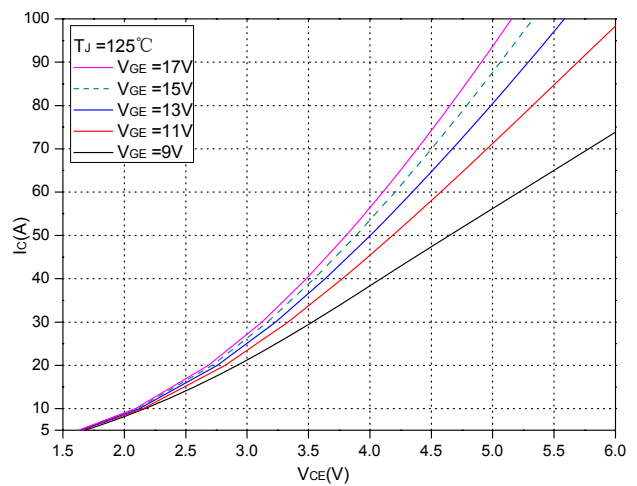


Fig.3 Typical Output Characteristics

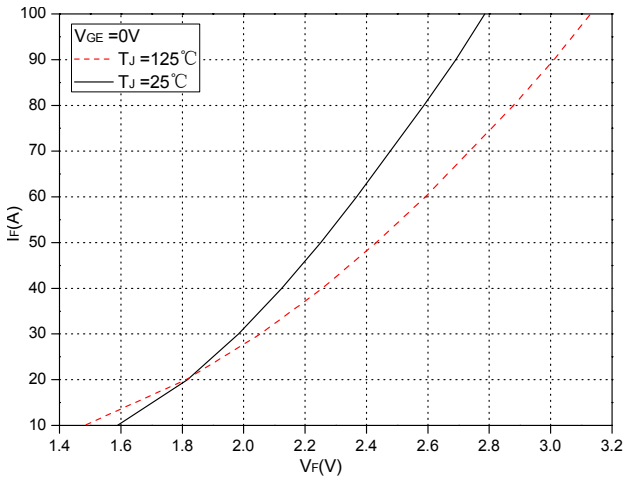


Fig.4 Forward Characteristics of FWD

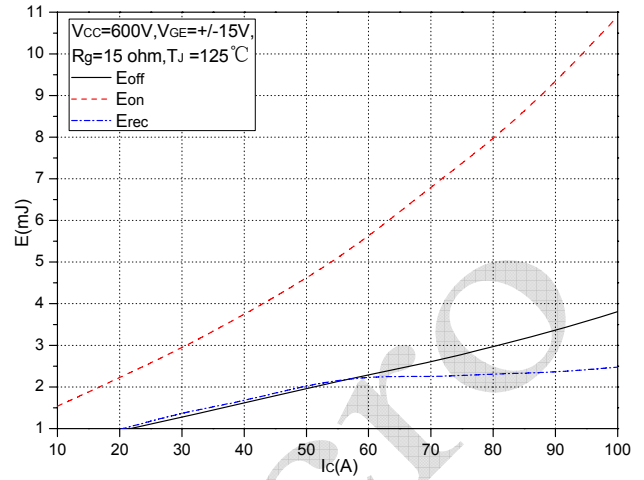


Fig.5 Typical Switching Loss vs. Collector Current

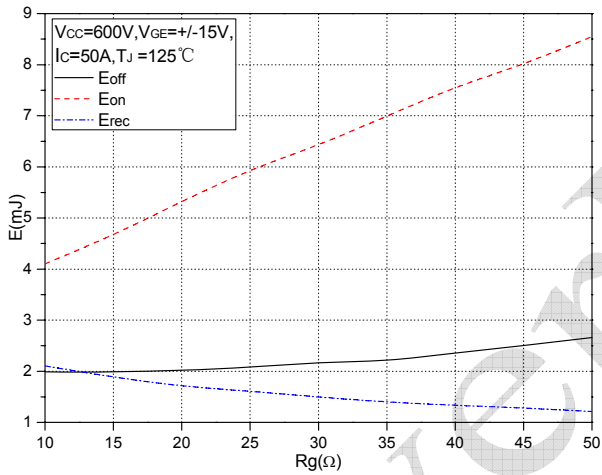


Fig.6 Typical Switching Loss vs. Gate Resistance

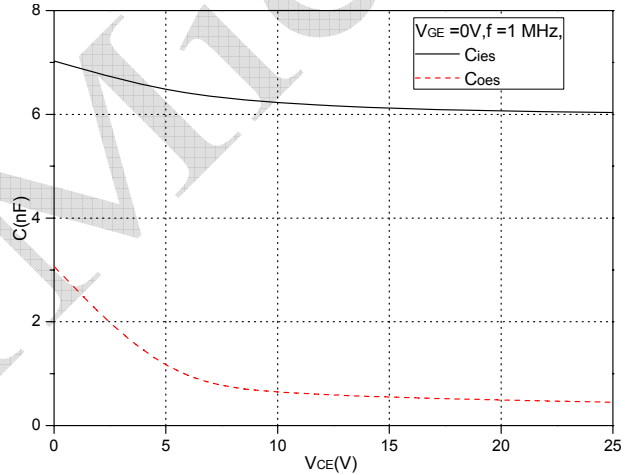


Fig.7 Capacitance Characteristics

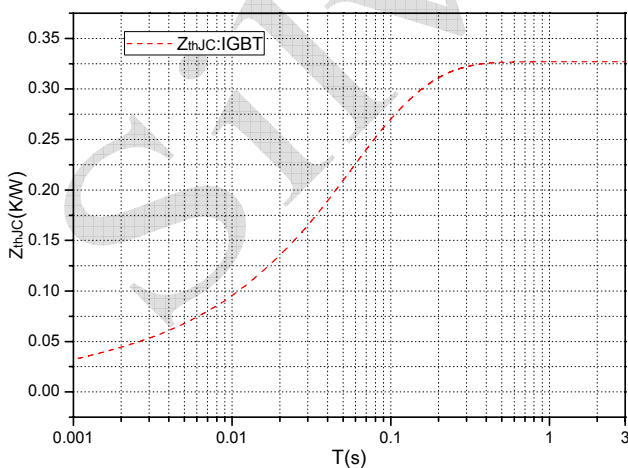


Fig.8 Transient thermal impedance (IGBT)

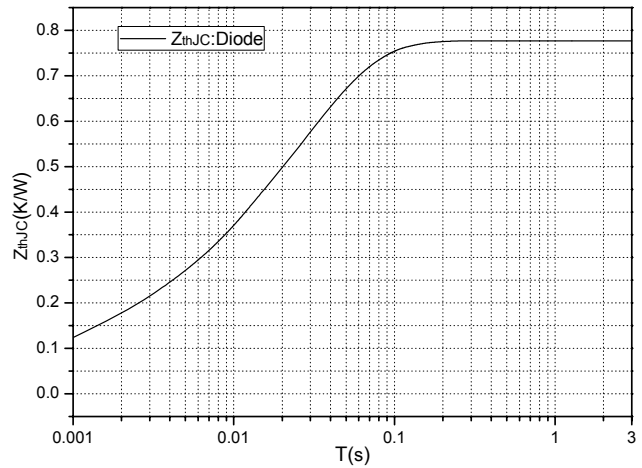


Fig.9 Transient thermal impedance (Diode)

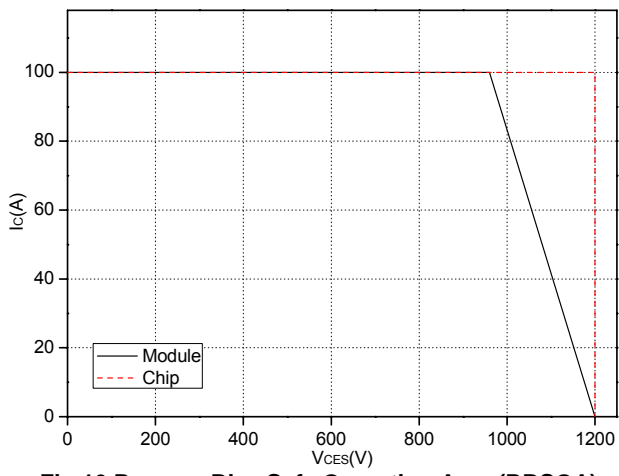
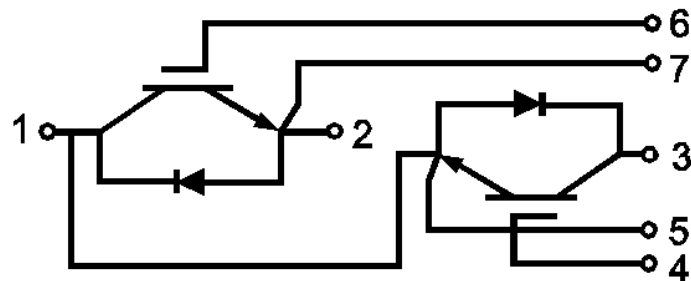


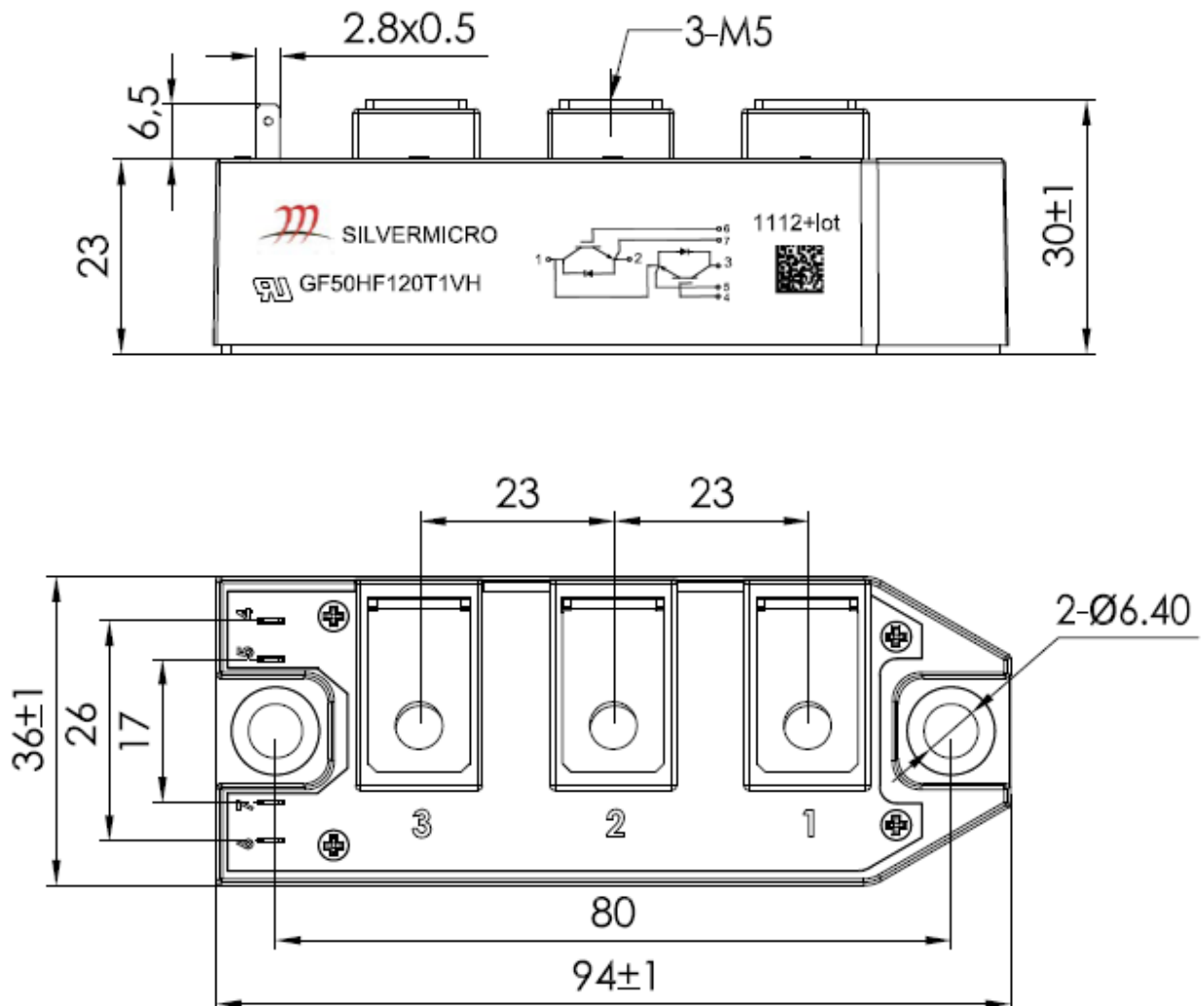
Fig.10 Reverse Bias Safe Operation Area (RBSOA)

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Internal Circuit Diagram:



Package Outline (Unit: mm):



Announcement

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