

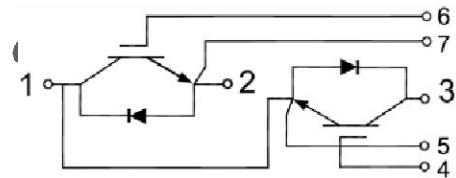
JGT450HF120G2VH

IGBT Module

Preliminary Data

Features:

- Trench & Field Stop IGBT
- Short Circuit Rated > 10 μ s
- Low Switching Loss
- 100% RBSOA Tested (2xIc)
- Low Stray Inductance
- Copper Wire Bonding on Power Terminal
- Lead Free, Compliant with RoHS Requirement



Applications:

- Welding
- HEV Inverter
- Industrial Motor Drives
- UPS

IGBT, Inverter

Maximum Rated Values($T_C=25^{\circ}\text{C}$ unless otherwise specified)

V_{CES}	Collector-Emitter Blocking Voltage		1200	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_C	Continuous Collector Current	$T_C=100^{\circ}\text{C}$	450	A
		$T_C=25^{\circ}\text{C}$	870	A
I_{CM}	Peak Collector Current Repetitive	$T_J=175^{\circ}\text{C}$	900	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation (IGBT)	$T_C=25^{\circ}\text{C}$ $T_{Jmax}=175^{\circ}\text{C}$	2940	W

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

Symbol	Description	Conditions	Min	Typ	Max	Unit
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=6\text{mA}, V_{CE}=V_{GE}$	5.0	5.5	6.6	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=45\text{A}, V_{GE}=1\text{V}, V_{CE}=5\text{V}$	$T_J=25^\circ\text{C}$	1.70	1.90	V
			$T_J=125^\circ\text{C}$	1.90		V
			$T_J=150^\circ\text{C}$	1.90		V
I_{CES}	Collector-Emitter Leakage Current	$V_{GE}=0\text{V}, V_{CE}=V_{CES}, T_J=25^\circ\text{C}$			1	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=\pm 20\text{V}, V_{CE}=0\text{V}, T_J=25^\circ\text{C}$			800	nA
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		35.8		nF
C_{oes}	Output Capacitance			2.63		nF
C_{res}	Reverse Transfer Capacitance			1.29		nF

Static Characteristics

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600\text{V}, I_C=450\text{A}, R_{Gon}=1\Omega, V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$	0.45		μs
			$T_J=125^\circ\text{C}$	0.46		
			$T_J=150^\circ\text{C}$	0.47		
t_r	Rise Time		$T_J=25^\circ\text{C}$	0.15		μs
			$T_J=125^\circ\text{C}$	0.15		
			$T_J=150^\circ\text{C}$	0.16		
$t_{d(off)}$	Turn-off Delay Time		$T_J=25^\circ\text{C}$	0.46		μs
			$T_J=125^\circ\text{C}$	0.47		
			$T_J=150^\circ\text{C}$	0.48		
t_f	Fall Time	$T_J=25^\circ\text{C}$	0.12		μs	
		$T_J=125^\circ\text{C}$	0.15			
		$T_J=150^\circ\text{C}$	0.18			
E_{on}	Turn-on Switching Loss	$V_{CC}=600\text{V}, I_C=450\text{A}, R_{Gon}=1\Omega, V_{GE}=\pm 15\text{V},$ $di/dt=2420\text{A}/\mu\text{s} (T_J=150^\circ\text{C})$ Inductive Load	$T_J=25^\circ\text{C}$	16.7		mJ
		$T_J=125^\circ\text{C}$	22.1			
		$T_J=150^\circ\text{C}$	24.8			

E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =450A, R _{Goff} =1Ω, V _{GE} = ±15V, du/dt=3120V/μs (T _J =150 °C) Inductive Load	T _J =25 °C	44.1	mJ
			T _J =125 °C	56.1	
			T _J =150 °C	61.1	
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25 °C	2.41	μC
R _{g internal}	Internal Gate Resistance		T _J =25 °C	1.67	Ω
RBSOA	I _C =900A, V _{CC} =1050V, V _p =1200V, R _{Goff} =1Ω, V _{GE} =+15V to 0V, T _J =150 °C			Trapezoid	
I _{sc}	SC Data	V _{CC} = 600V, V _{GE} = ± 15V, tp=10us R _{G on} =6.8Ω, R _{Goff} = 6.8Ω, T _J = 150 °C		2391	A
R _{θJC}	IGBT Thermal Resistance: Junction-To-Case(per leg)			0.051	°C/W

Maximum Rated Values of Diode (T_C=25 °C unless otherwise specified)

V _{RRM}	Repetitive Peak Reverse Voltage	1200	V
I _F	Diode Continuous Forward Current	450	A
I _{FM}	Diode Maximum Forward Current	900	A

Electrical Characteristics of Diode (T_C=25 °C unless otherwise specified)

Symbol	Description	Conditions	Min	Typ	Max	Unit
V _{FM}	Forward Voltage	I _F =450A	T _J =25 °C	2.00		V
			T _J =125 °C	2.00		
			T _J =150 °C	1.90		
t _{rr}	Reverse Recovery Time	I _F =450A, -diF/dt=2680A/μs(T _J =150 °C), V _R =600V, V _{GE} =-15V	T _J =25 °C	0.23		μs
			T _J =125 °C	0.42		
			T _J =150 °C	0.46		
I _{rr}	Peak Reverse Recovery Current	I _F =450A, -diF/dt=2680A/μs(T _J =150 °C), V _R =600V, V _{GE} =-15V	T _J =25 °C	234		A
			T _J =125 °C	277		
			T _J =150 °C	291		

Q _{rr}	Reverse Recovery Charge	I _F =450A, -diF/dt=2680A/μs(T _J =150℃), V _R =600V, V _{GE} =-15V	T _J =25℃		32		μC
			T _J =125℃		57		
			T _J =150℃		67		
E _{rec}	Reverse Recovery Energy		T _J =25℃		15.4		mJ
			T _J =125℃		25.8		
			T _J =150℃		31.1		
R _{θJC}	Diode Thermal Resistance: Junction-To-Case (per leg)				0.086		℃/W

Module

Symbol	Description	Min	Typ	Max	Unit
V _{iso}	Isolation Voltage (All Terminals Shorted)	f =50Hz, 1minute 2500			V
L _{sCE}	Stray Inductance Module		15		nH
T _J	Maximum Junction Temperature			175	℃
T _{JOP}	Maximum Operating Junction Temperature Range	-40		+150	℃
T _{stg}	Storage Temperature	-40		+125	℃
CTI	Comparative Tracking Index	200			
R _{θCS}	Case-To-Sink Thermally (Conductive Grease Applied)		0.03		℃/W
M	Power Terminals Screw:M6	3.0		5.0	N·m
M	Mounting Screw:M6	4.0		6.0	N·m
G	Weight		290		g

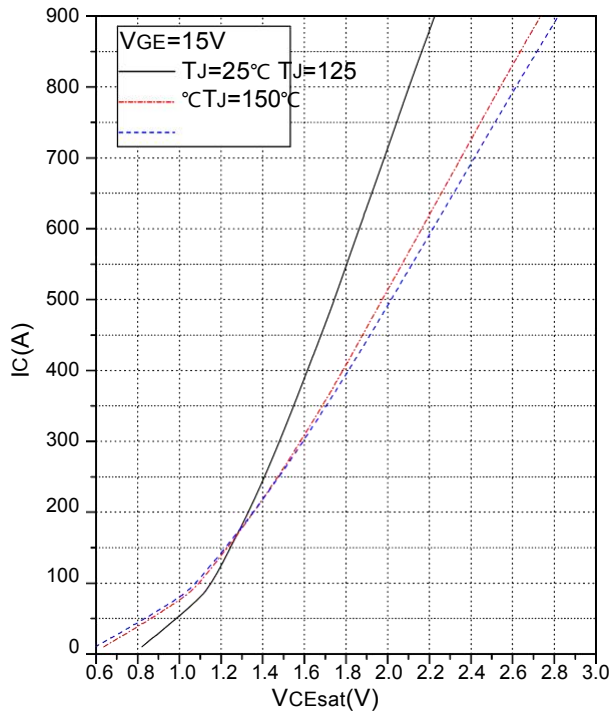


Fig.1 Typical Saturation Voltage Characteristics

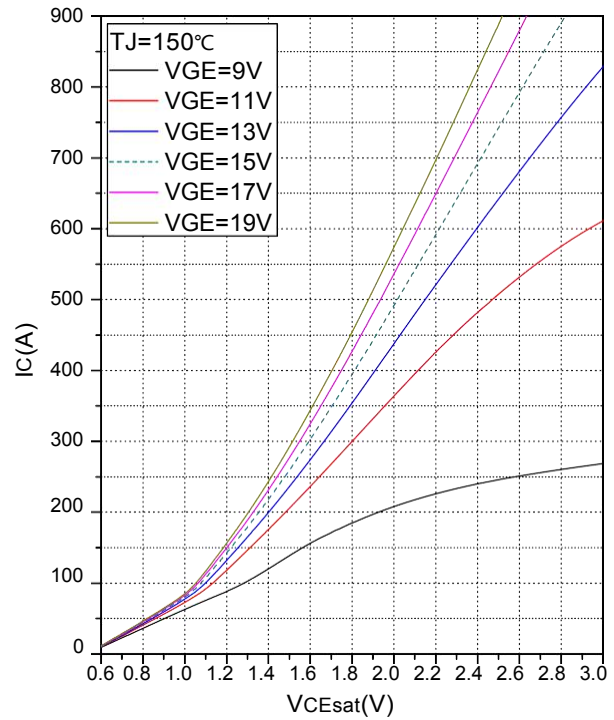


Fig.2 Typical Output Characteristics

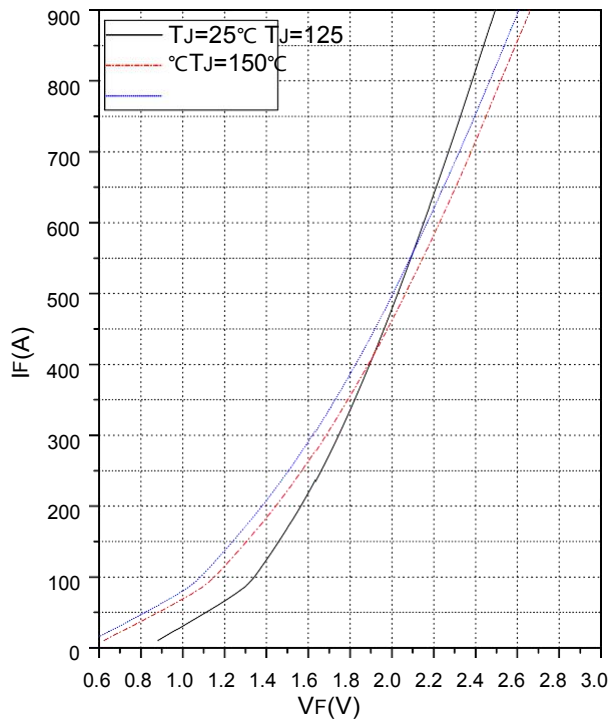


Fig.3 Forward Characteristics of Diode

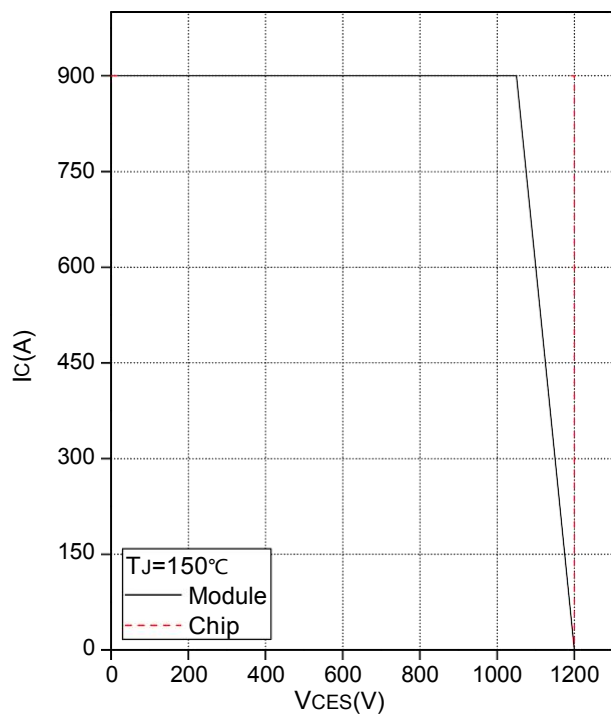


Fig.4 Reverse Bias Safe Operation Area (RBSOA)

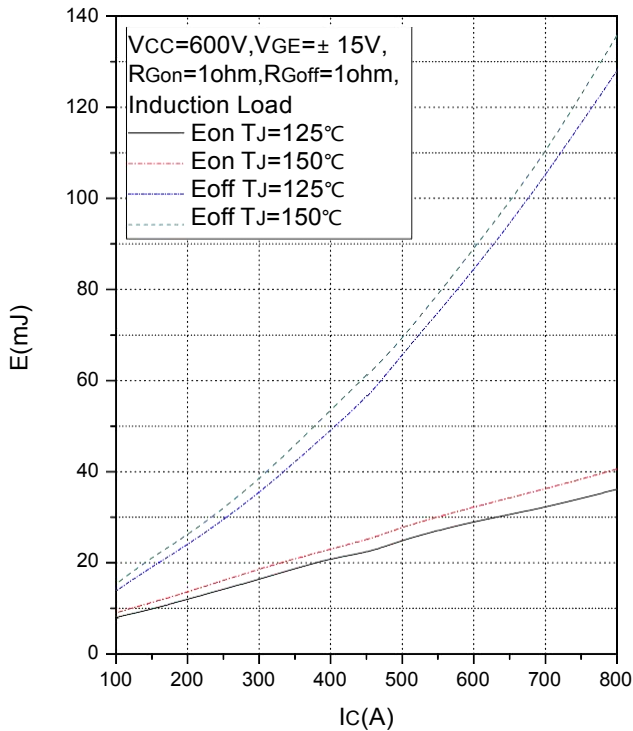


Fig.5 Typical Switching Loss vs. Collector Current

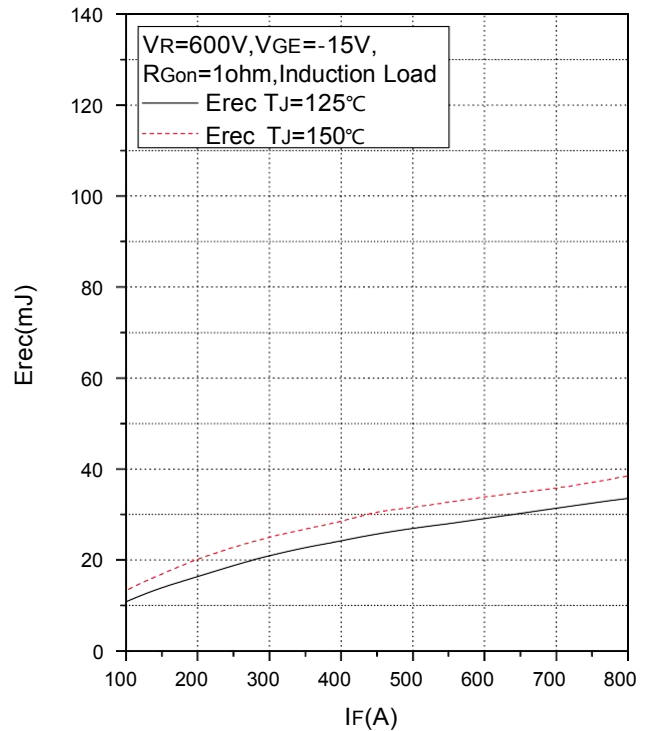


Fig.6 Typical Switching Loss vs. Forward Current

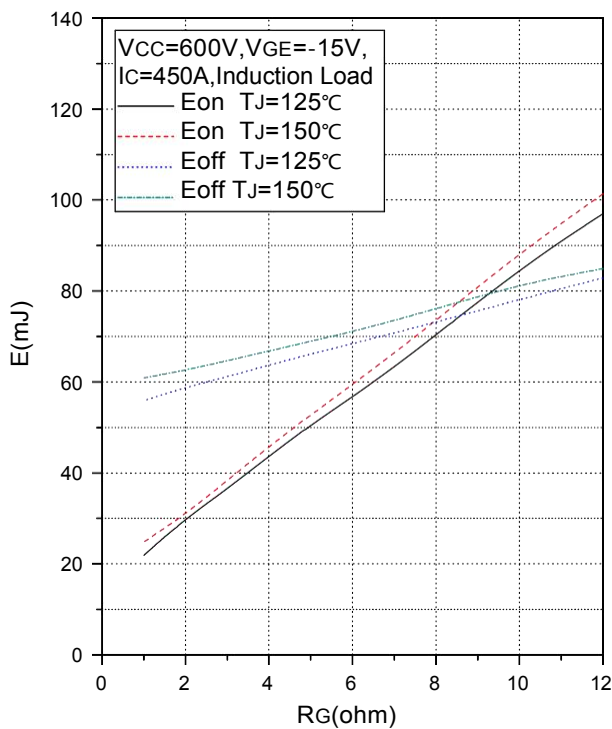


Fig.7 Typical Switching Loss vs. Gate Resistance

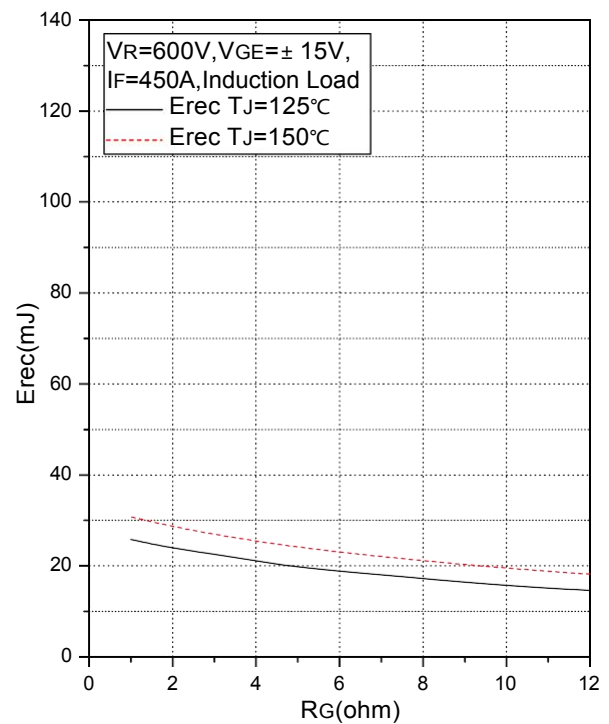


Fig.8 Typical Switching Loss vs. Gate Resistance

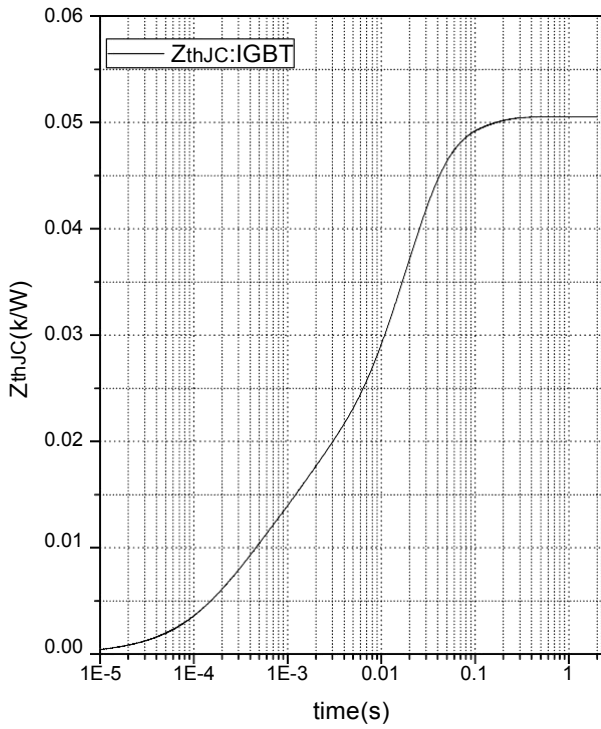


Fig.9 Transient Thermal Impedance (IGBT)

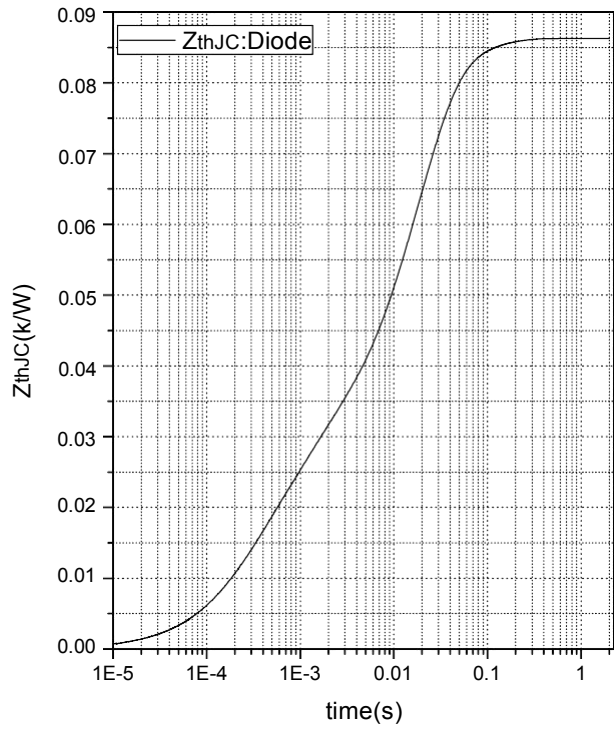


Fig.10 Transient Thermal Impedance

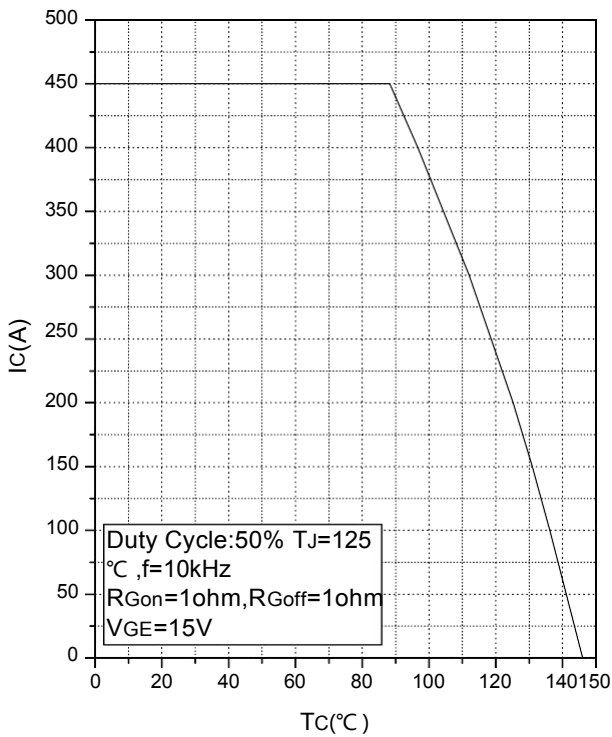


Fig.11 Rated Current vs. Temperature

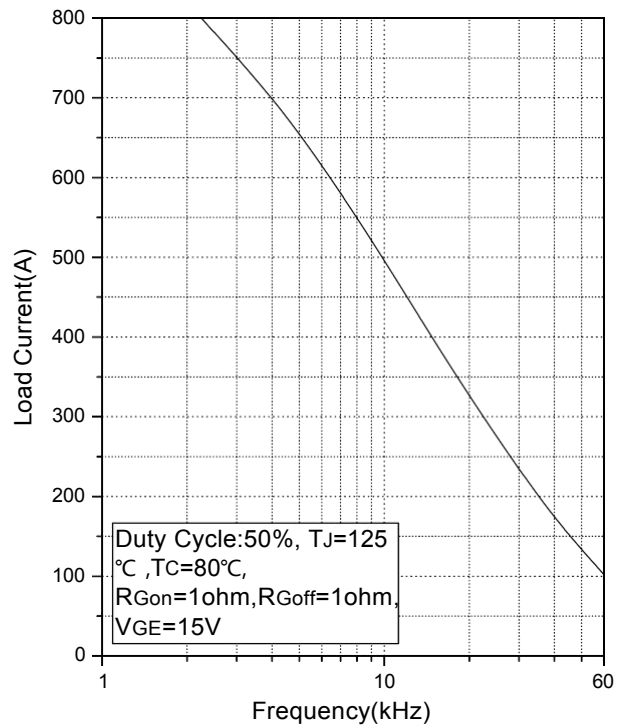


Fig.12 Typical Load Current vs. Frequency

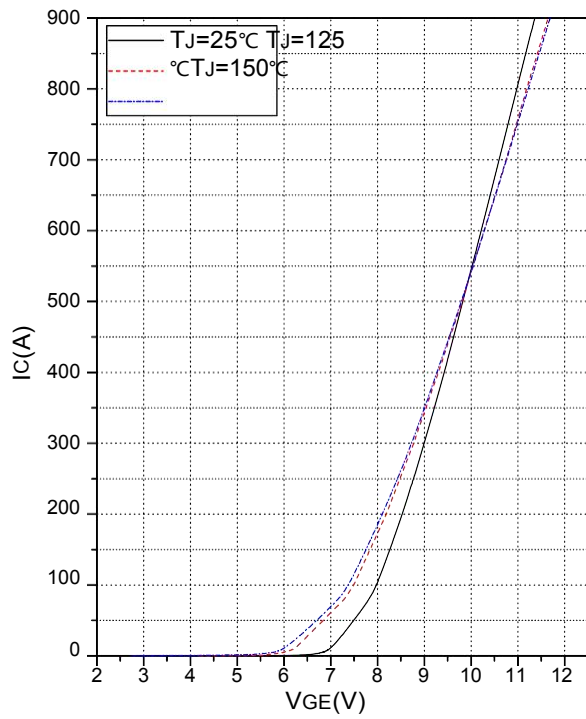


Fig.13 Transfer Characteristics

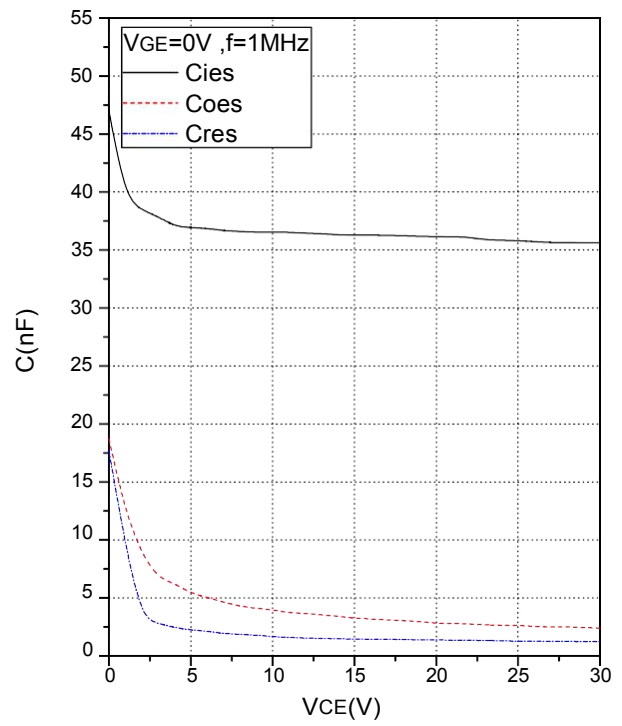
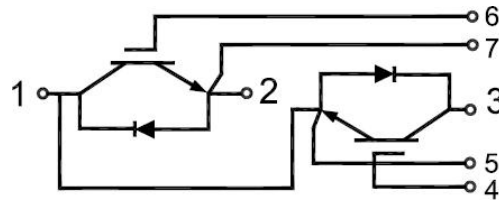
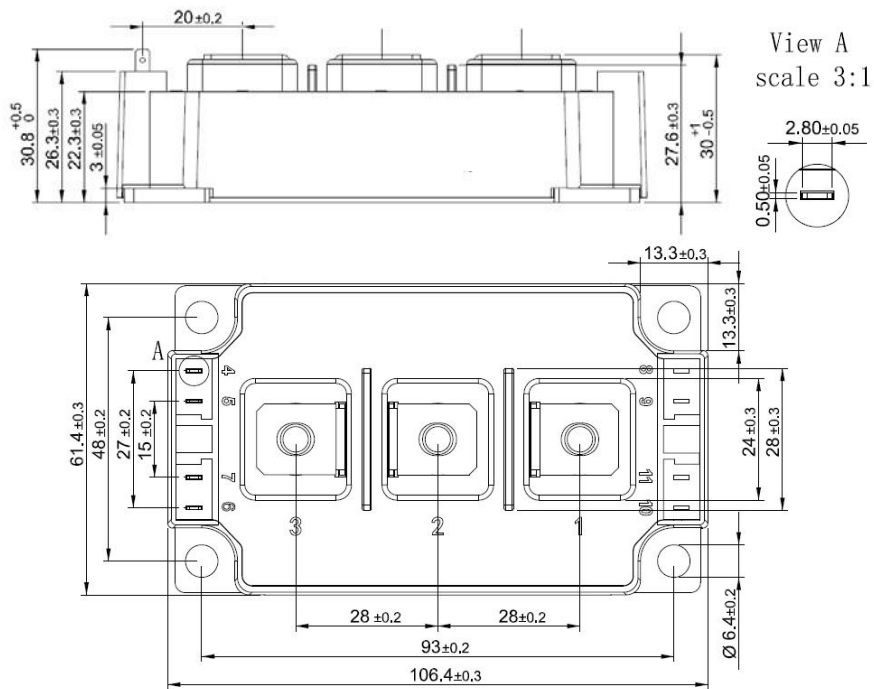


Fig.14 Capacitance Characteristics

Internal Circuit:



Package Outline (Unit: mm):





Date	Revision	Notes
04/18/2022	01	Initial Release