



GK30FF60B3H

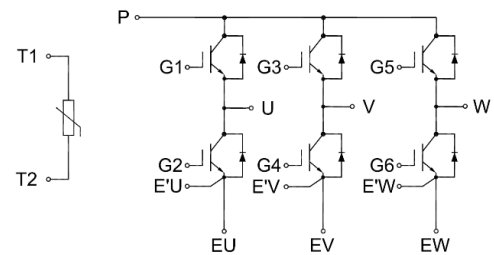
IGBT Module

Preliminary Data

Features:

- Non Punch Through (NPT) Technology
- Short Circuit Rated $>10\mu\text{s}$
- Low Saturation Voltage
- Low Switching Loss
- 100% RBSOA Tested($2\times I_c$)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement

Circuit Diagram



Applications:

- Industrial Inverters

IGBT, Inverter

Maximum Rated Values

V_{CES}	Collector-Emitter Blocking Voltage	$T_J=150^{\circ}\text{C}$	600	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_C	Continuous Collector Current	$T_C=80^{\circ}\text{C}$	30	A
		$T_C=25^{\circ}\text{C}$	60	A
I_{CM}	Repetitive Peak Collector Current	$t_p=1\text{ms}$	60	A
P_D	Maximum Power Dissipation per IGBT	$T_C=25^{\circ}\text{C}$ $T_{Jmax}=150^{\circ}\text{C}$	230	W



Electrical Characteristics of IGBT

Static Characteristics

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=0.3mA$, $V_{CE}=V_{GE}$, $T_J=25^{\circ}C$	4.0	4.5	5.3	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=30A$, $V_{GE}=15V$	$T_J=25^{\circ}C$	1.90	2.30	V
			$T_J=125^{\circ}C$	2.20		V
I_{CES}	Collector-Emitter Leakage Current	$V_{GE}=0V$, $V_{CE}=V_{CES}$, $T_J=25^{\circ}C$			1	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=\pm 20V$, $V_{CE}=0V$, $T_J=25^{\circ}C$			± 200	nA
C_{ies}	Input Capacitance	$V_{CE}=25V$, $V_{GE}=0V$, $f=100kHz$, $T_J=25^{\circ}C$		1.75		nF
C_{oes}	Output Capacitance			0.17		nF
C_{res}	Reverse Transfer Capacitance			0.05		nF

Switching Characteristics

t _{d(on)}	Turn-on Delay Time	V _{CC} =300V, I _C =30A, R _{Gon} =15Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		28		ns
			T _J =125℃		33		
t _r	Rise Time	V _{CC} =300V, I _C =30A, R _{Gon} =15Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		34		ns
			T _J =125℃		35		
t _{d(off)}	Turn-off Delay Time	V _{CC} =300V, I _C =30A, R _{Goff} =15Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		165		ns
			T _J =125℃		168		
t _f	Fall Time	V _{CC} =300V, I _C =30A, R _{Goff} =15Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		102		ns
			T _J =125℃		162		
E _{on}	Turn-on Switching Loss	V _{CC} =300V, I _C =30A, R _{Gon} =15Ω, V _{GE} =±15V, di/dt=790A/μs (T _J =125℃) Inductive Load	T _J =25℃		0.24		mJ
			T _J =125℃		0.42		
E _{off}	Turn-off Switching Loss	V _{CC} =300V, I _C =30A, R _{Goff} =15Ω, V _{GE} =±15V, du/dt=3760V/μs (T _J =125℃) Inductive Load	T _J =25℃		0.39		mJ
			T _J =125℃		0.60		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25℃		443		nC
R _{G(int)}	Internal Gate Resistor	T _J =25℃			0		Ω
SCSOA	V _{CC} =300V, V _{GE} =±15V, T _J =125℃			10			μs
R _{θJC}	IGBT Thermal Resistance: Junction-to-Case(per IGBT)					0.54	℃/W



Diode, Inverter Maximum Rated Values

V_{RRM}	Repetitive Peak Reverse Voltage	$T_J=25^{\circ}\text{C}$	600	V
I_F	Diode Continuous Forward Current	$T_C=80^{\circ}\text{C}$	30	A
I_{FM}	Diode Maximum Forward Current	$t_p=1\text{ms}$	60	A

Electrical Characteristics of Diode

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V _{FM}	Forward Voltage	I _F =30A	T _J =25℃		1.50	2.00	V
			T _J =125℃		1.50		
I _{rr}	Peak Reverse Recovery Current	I _F =30A, -diF/dt=960A/μs(T _J =125℃), V _{rr} =300V, V _{GE} =-15V	T _J =25℃		30		A
			T _J =125℃		35		
Q _{rr}	Reverse Recovery Charge		T _J =25℃		1.51		μC
			T _J =125℃		2.43		
E _{rec}	Reverse Recovery Energy		T _J =25℃		0.14		mJ
			T _J =125℃		0.31		
R _{θJC}	Diode Thermal Resistance: Junction-to-Case(per Diode)					1.06	℃/W

Internal NTC-Thermistor Characteristics

Symbol	Conditions	Min.	Typ.	Max.	Units
R_{25}	$T_C=25^{\circ}\text{C}$		5		$\text{k}\Omega$
$\Delta R/R$	$T_C=100^{\circ}\text{C}$, $R_{100}=465\Omega$	-5		+5	%
P_{25}	$T_C=25^{\circ}\text{C}$			10	mW
$B_{25/50}$	$R_2=R_{25} \exp[B_{25/50}(1/T_2-1/(298.15\text{K}))]$		3380		K
$B_{25/80}$	$R_2=R_{25} \exp[B_{25/80}(1/T_2-1/(298.15\text{K}))]$		3440		K
$B_{25/100}$	$R_2=R_{25} \exp[B_{25/100}(1/T_2-1/(298.15\text{K}))]$		3545		K



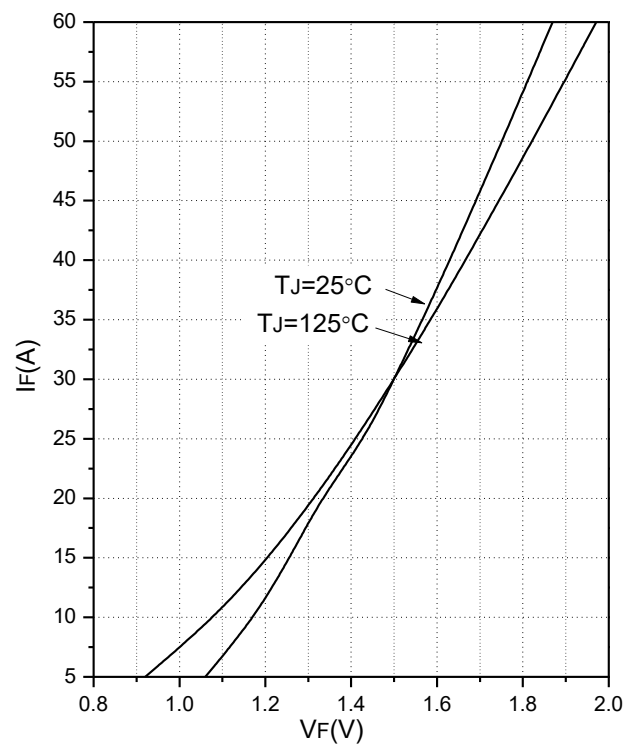
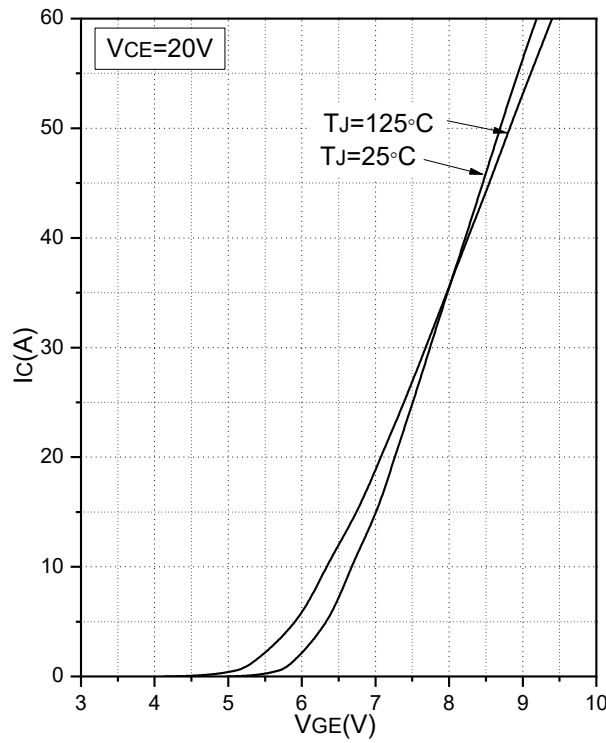
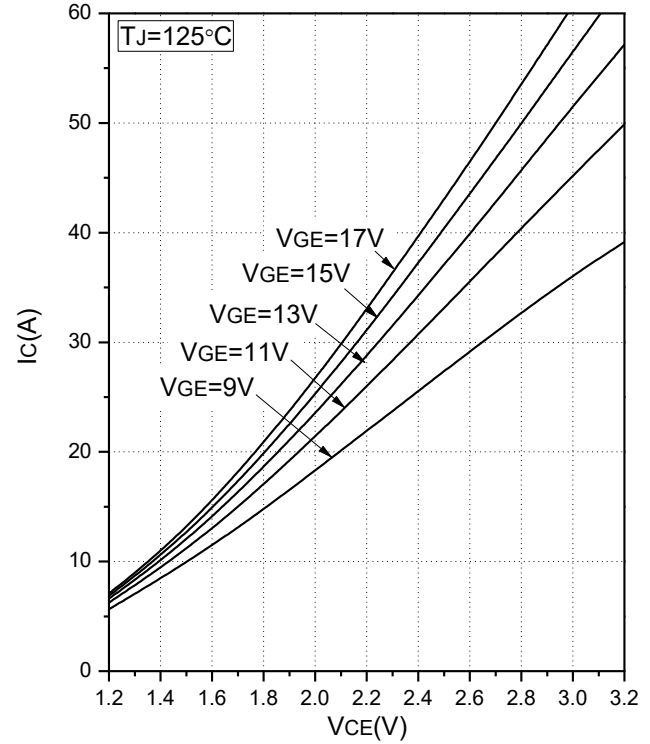
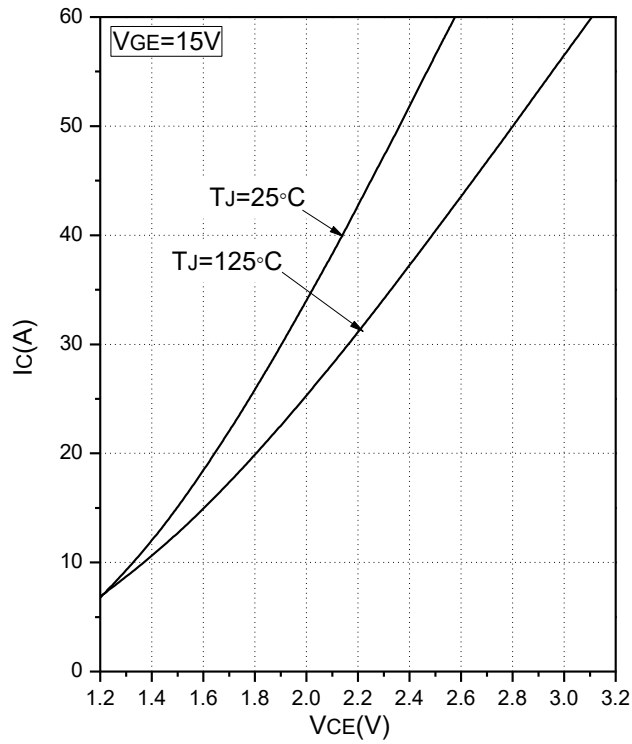
Module

Symbol	Description		Min.	Typ.	Max.	Units
V _{iso}	Isolation Voltage (All Terminals Shorted)	f=50Hz, 1minute	2500			V
T _J	Maximum Junction Temperature				150	°C
T _{JOP}	Maximum Operating Junction Temperature Range		-40		+150	°C
T _{stg}	Storage Temperature		-40		+125	°C
CTI	Comparative Tracking Index		200			
R _{θCS}	Case-to-Sink Thermally (Conductive Grease Applied)				0.08	°C/W
T	Mounting Screw:M4		1.5		1.8	N·m
G	Weight			23		g

Ordering Information Table

Device code	G	K	30	FF	60	B3	H
	①	②	③	④	⑤	⑥	⑦

- ① - IGBT Module
- ② - Non Punch Through (NPT) Technology
- ③ - Rated Current (30=30A)
- ④ - Circuit Configuration (FF=Full Bridge)
- ⑤ - Rated Voltage (60=600V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)



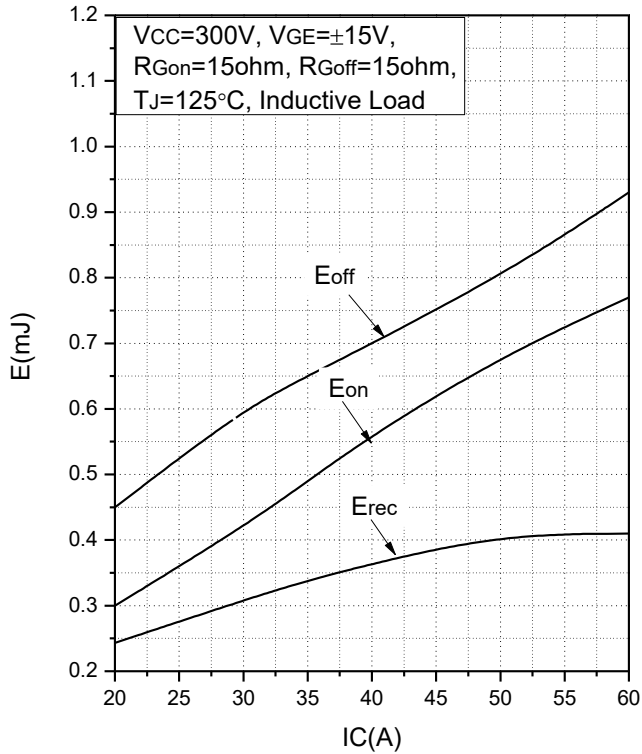


Fig.5 Typical Switching Loss vs. Collector Current

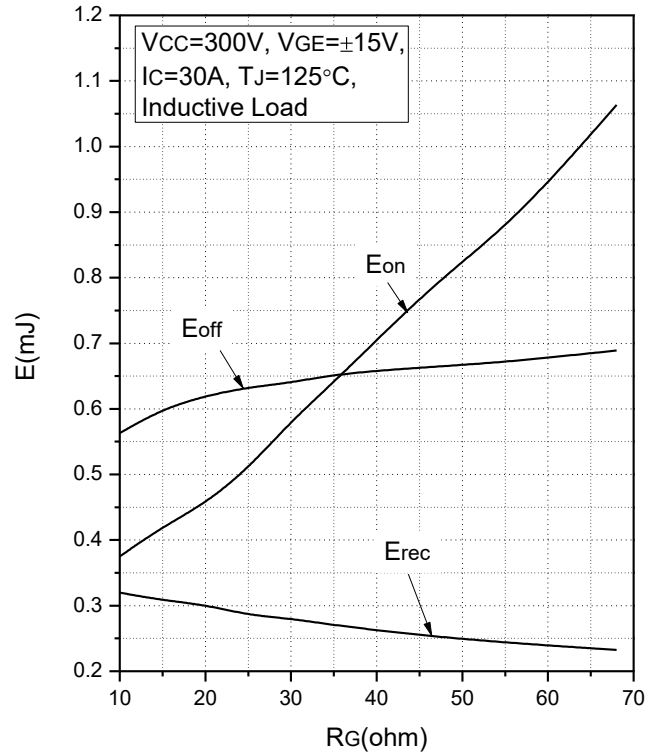


Fig.6 Typical Switching Loss vs. Gate Resistance

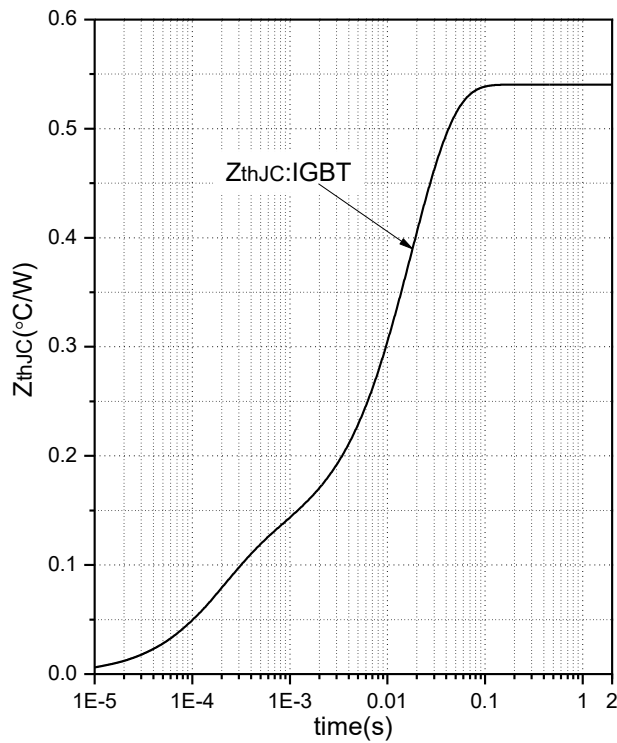


Fig.7 Transient Thermal Impedance IGBT

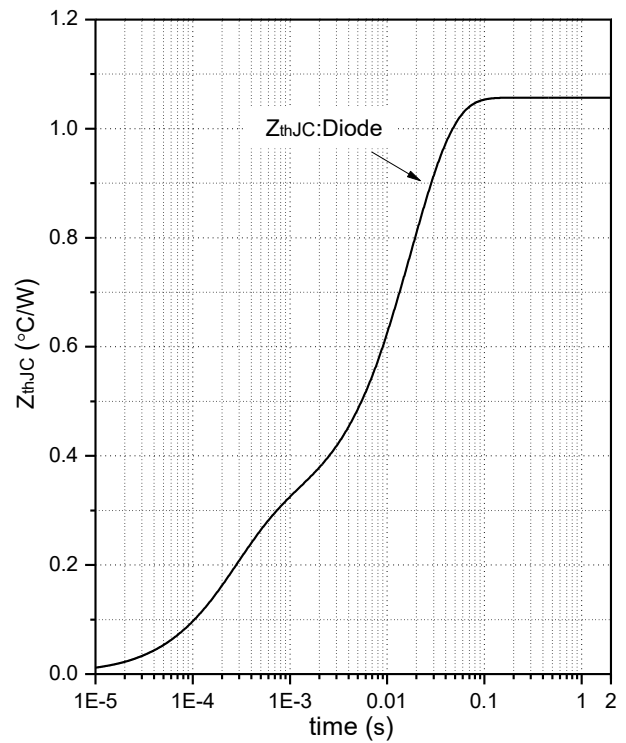


Fig.8 Transient Thermal Impedance Diode

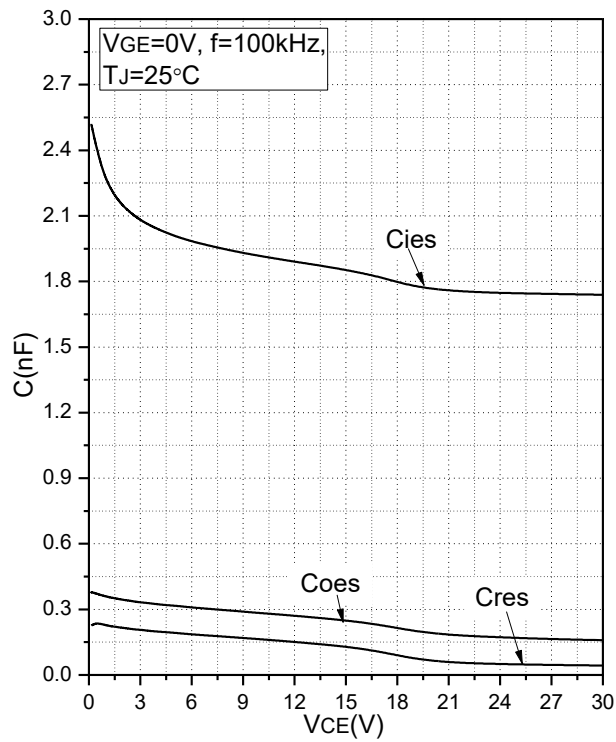


Fig.9 Capacitance Characteristics

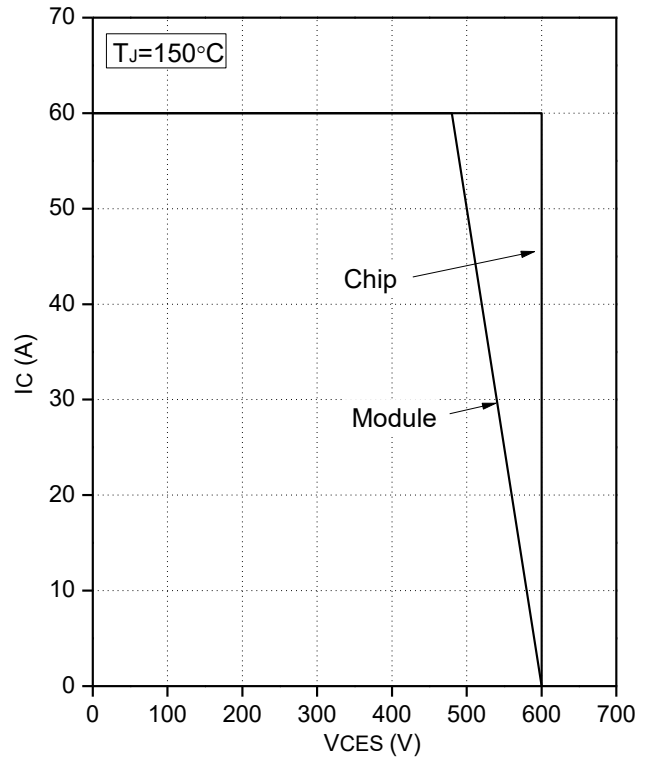


Fig.10 Reverse Bias Safe Operation Area (RBSOA)

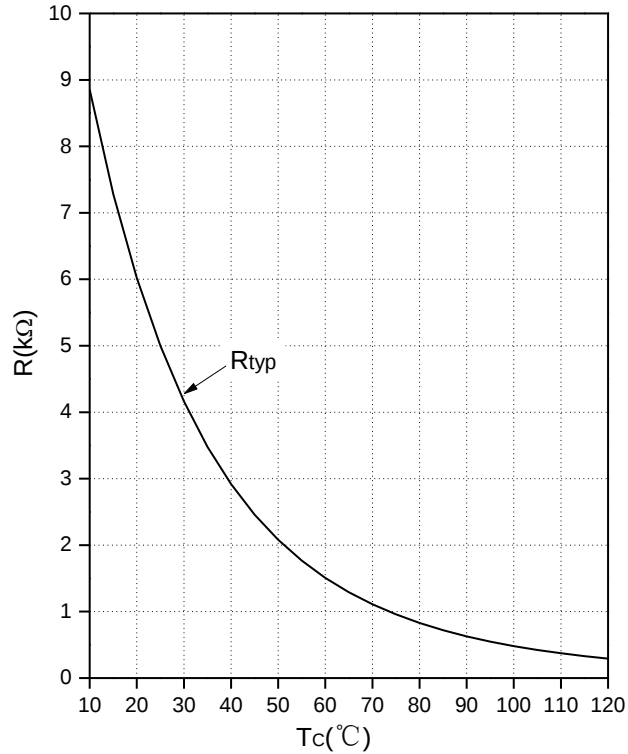
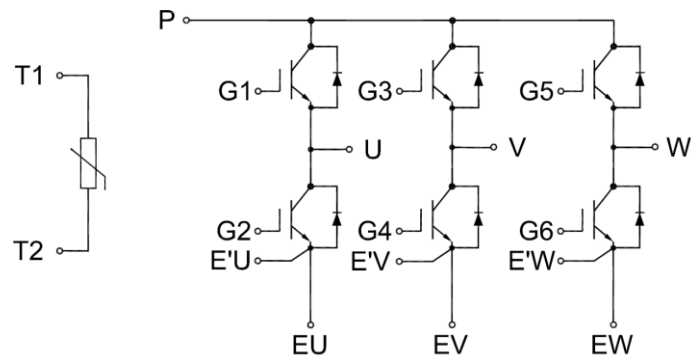


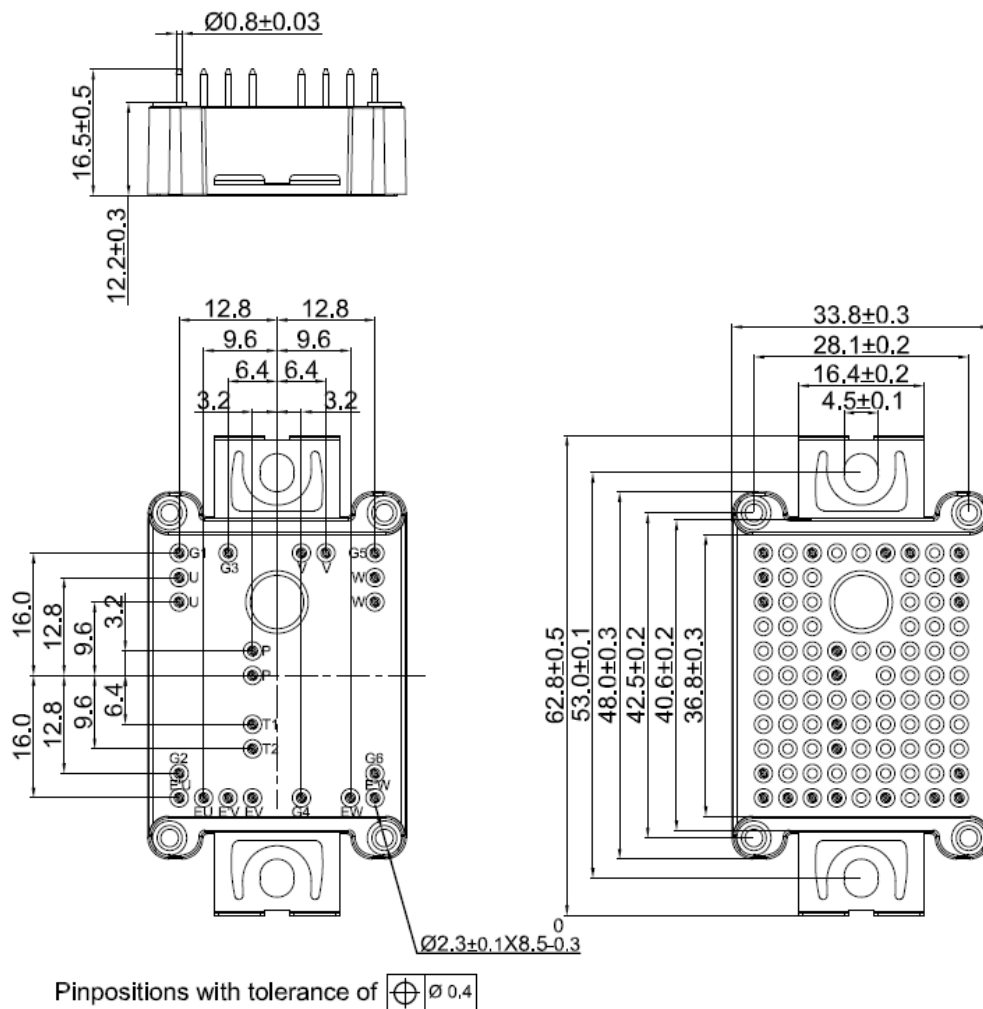
Fig.11 NTC Temperature Characteristics



Internal Circuit



Package Outline – Without Fixing Sticks (Unit: mm):





Revision	Notes
01	Initial Release

Announcement

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