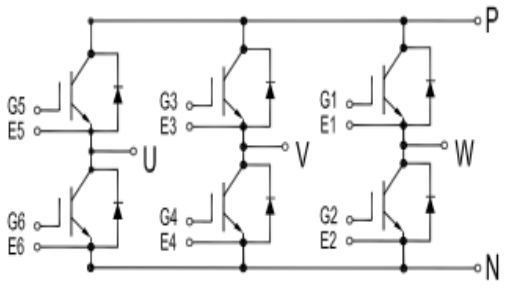
GK50FF60A1H-C

IGBT Module

Features：



- Non Punch Through (NPT) Technology
- Short Circuit Rated>10μs
- Low Saturation Voltage
- Low Switching Loss
- 100% RBSOA Tested(2×Ic)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement

Applications：

- Industrial Inverters
- Servo Applications

IGBT, Inverter

Maximum Rated Values (T_C=25℃ unless otherwise specified)

V_{CES}	Collector-Emitter Blocking Voltage		600	V
V_{GES}	Gate-Emitter Voltage		±20	V
I_C	Continuous Collector Current	T_C=80℃	50	A
		T_C=25℃	100	A
I_{CM}	Repetitive Peak Collector Current	T_J=150℃	100	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation per IGBT	T_C=25℃ T_{Jmax}=150℃	343	W

Electrical Characteristics of IGBT (T_C=25℃ unless otherwise specified)

Static Characteristics

Symbol	Description	Conditions		Min	Typ	Max	Unit
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=1mA, V_{CE}=V_{GE}		4.0	4.7	5.7	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=50A, V_{GE}=15V	T_J=25℃		1.90		V
			T_J=125℃		2.15		V
I_{CES}	Collector-Emitter Leakage Current	V_{GE}=0V, V_{CE}=V_{CES}, T_J=25℃				1	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=±20V, V_{CE}=0V, T_J=25℃				200	nA
C_{ies}	Input Capacitance	V_{CE}=25V, V_{GE}=0V, f=100KHz			2.63		nF
C_{oes}	Output Capacitance				0.73		nF
C_{res}	Reverse Transfer Capacitance				0.18		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC}=300V, I_C=50A, R_{Gon}=10Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		128		ns
			T_J=125℃		130		
t_r	Rise Time		T_J=25℃		44		ns
			T_J=125℃		46		
$t_{d(off)}$	Turn-off Delay Time	V_{CC}=300V, I_C=50A, R_{Goff}=10Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		203		ns
			T_J=125℃		208		
t_f	Fall Time		T_J=25℃		118		ns
			T_J=125℃		135		
E_{on}	Turn-on Switching Loss	V_{CC}=300V, I_C=50A, R_{Gon}=10Ω, V_{GE}=±15V, di/dt=963A/μs (T_J=125℃) Inductive Load	T_J=25℃		0.41		mJ
			T_J=125℃		0.64		
E_{off}	Turn-off Switching Loss	V_{CC}=300V, I_C=50A, R_{Goff}=10Ω, V_{GE}=±15V, du/dt=4908V/μs (T_J=125℃) Inductive Load	T_J=25℃		0.72		mJ
			T_J=125℃		1.10		
Q_g	Total Gate Charge	V_{GE}=+15V…-15V	T_J=25℃		283		nC
RBSOA	I_C=100A, V_{CC}=480V, Vp=600V, R_{Goff}=10 Ω, V_{GE}=+15V to 0V, T_J=125°C			Trapezoid			
SCSOA	V_{CC}=300V, V_{GE}=15V, T_J=125℃			10			μs
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case (Per Leg)					0.36	℃/W

Diode, Inverter

Maximum Rated Values (T_C=25℃ unless otherwise specified)

V_{RRM}	Repetitive Peak Reverse Voltage	600	V
I_F	Diode Continuous Forward Current	50	A
I_{FM}	Diode Maximum Forward Current	100	A

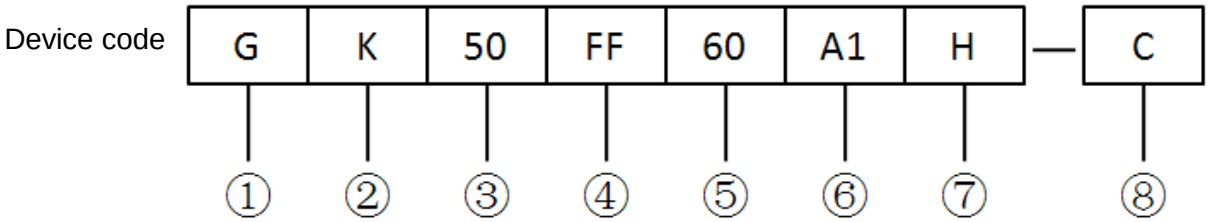
Electrical Characteristics of Diode (T_C=25℃ unless otherwise specified)

Symbol	Description	Conditions		Min	Typ	Max	Unit
V_{FM}	Forward Voltage	I_F=50A	T_J=25℃		1.40		V
			T_J=125℃		1.40		
I_{rr}	Peak Reverse Recovery Current	I_F=50A, -diF/dt=1282A/μs(T_J=125℃), V_{rr}=300V, V_{GE}=-15V	T_J=25℃		37.5		A
			T_J=125℃		44.4		
Q_{rr}	Reverse Recovery Charge		T_J=25℃		2.33		μC
			T_J=125℃		3.88		
E_{rec}	Reverse Recovery Energy		T_J=25℃		0.37		mJ
			T_J=125℃		0.82		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case (Per Leg)					0.65	℃/W

Module

Symbol	Description		Min	Typ	Max	Unit
V_{iso}	Isolation Voltage (All Terminals Shorted)	f = 50Hz, 1minute	2500			V
T_J	Maximum Junction Temperature				150	℃
T_{JOP}	Maximum Operating Junction Temperature Range		-40		+150	℃
T_{stg}	Storage Temperature		-40		+125	℃
CTI	Comparative Tracking Index		200			
$R_{\theta CS}$	Case-To-Sink Thermally (Conductive Grease Applied)				0.06	℃/W
T	Mounting Screw:M3		1.5		2.0	N·m
G	Weight			30		g

Ordering Information Table



① - IGBT Module
② - Non Punch Through (NPT) Technology
③ - Rated Current (50=50A)
④ - Circuit Configuration (Full Bridge)
⑤ - Rated Voltage (60=600V)
⑥ - Package Type
⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)
⑧ - Internal Code

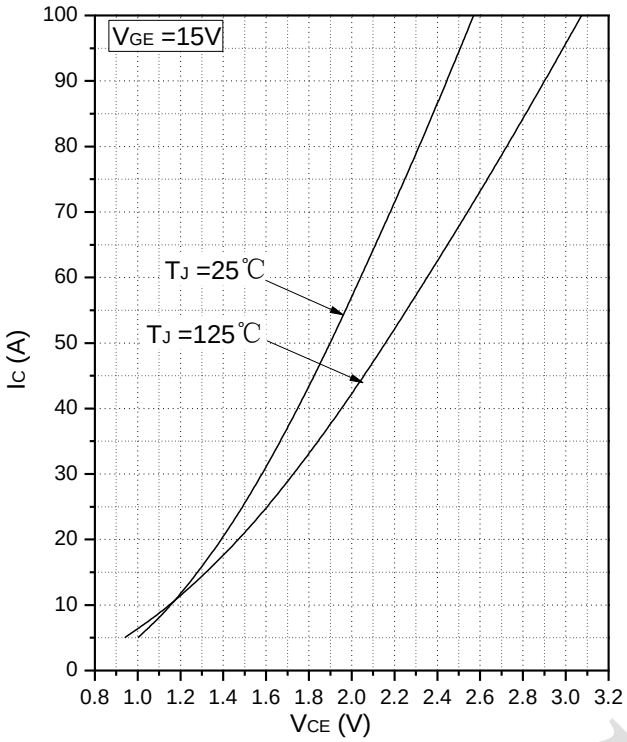


Fig.1 Typical Saturation Voltage Characteristics

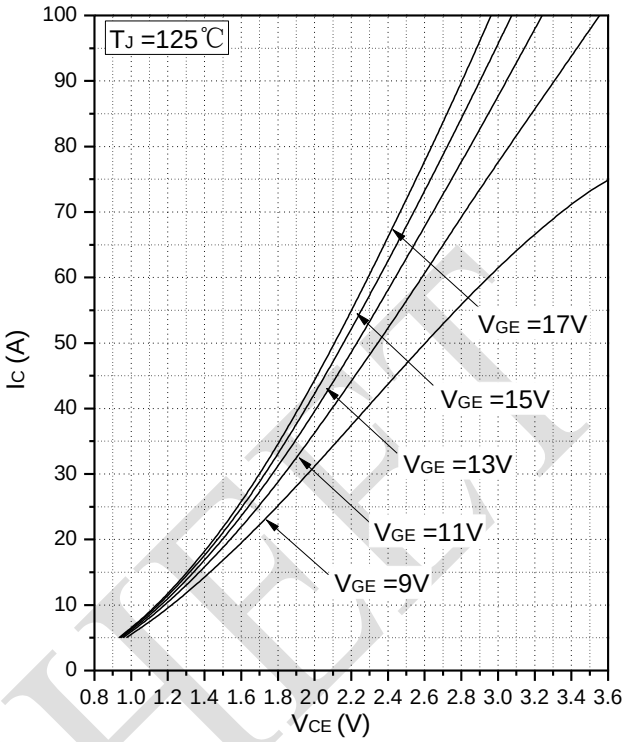


Fig.2 Typical Output Characteristics

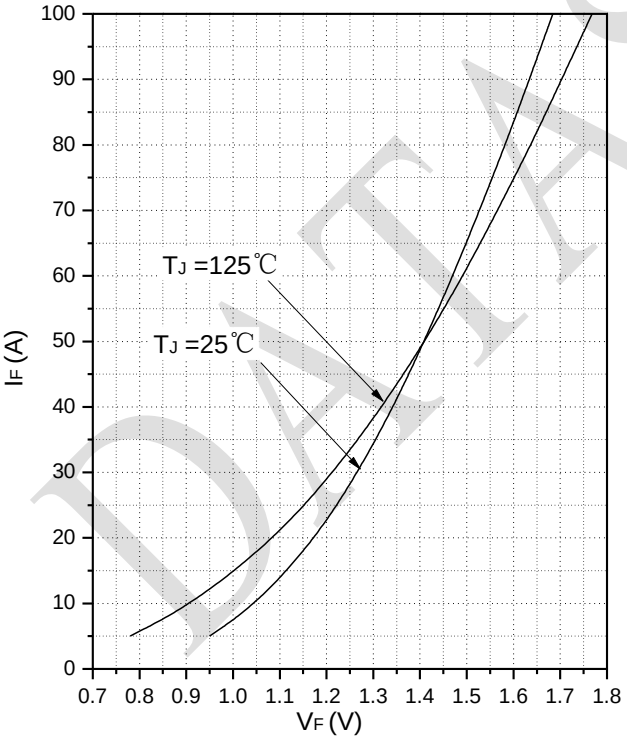


Fig.3 Forward Characteristics of Diode

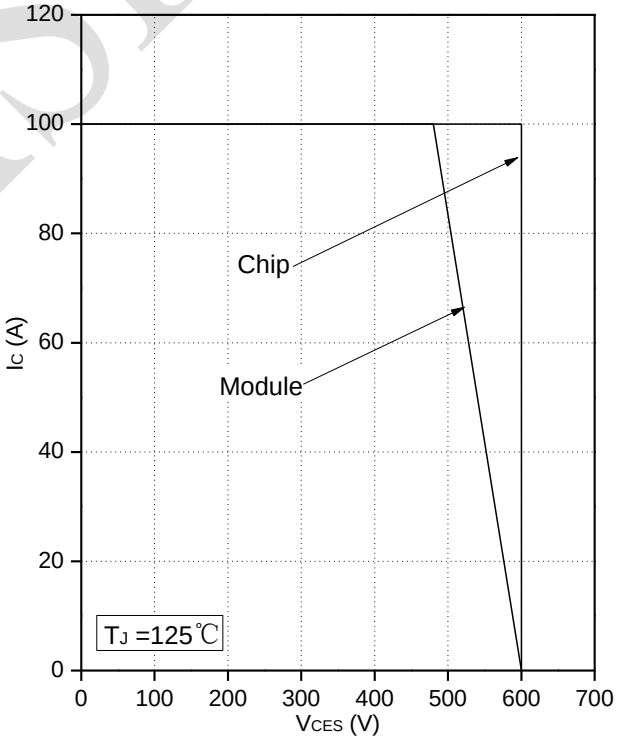


Fig.4 Reverse Bias Safe Operation Area (RBSOA)

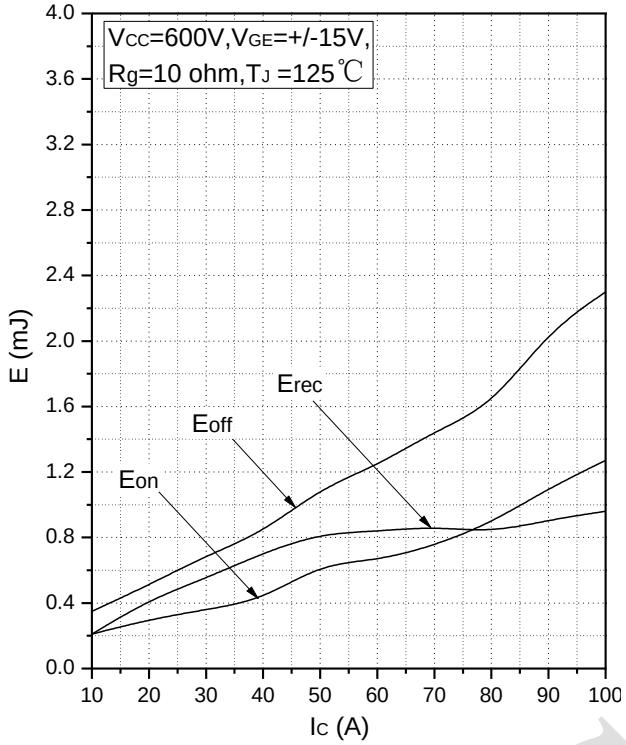


Fig.5 Typical Switching Loss vs. Collector Current

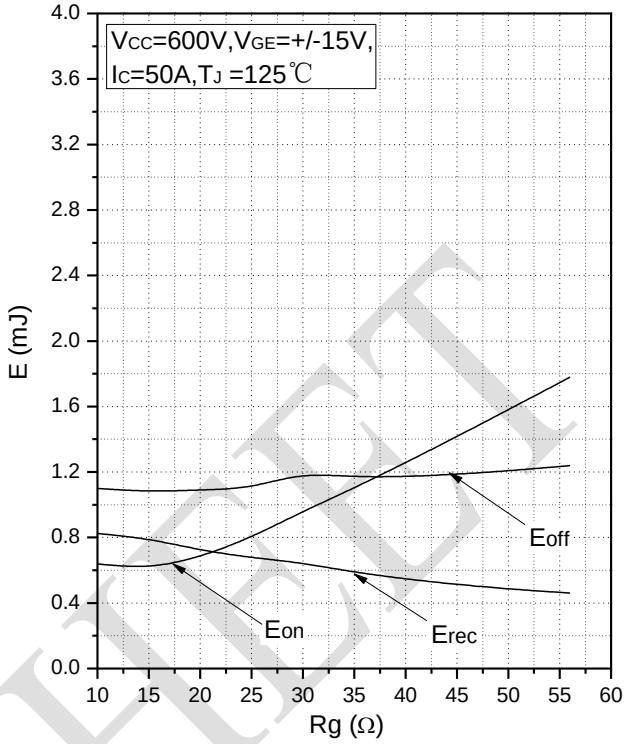


Fig.6 Typical Switching Loss vs. Gate Resistance

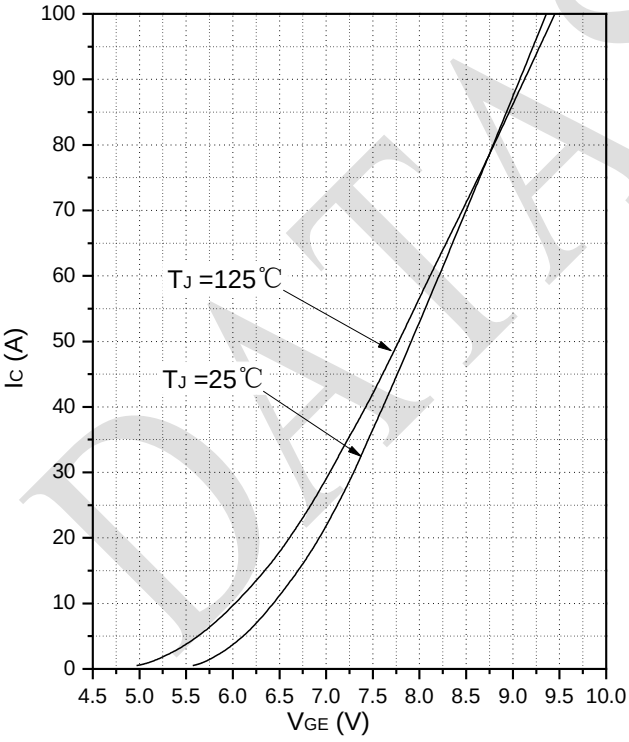


Fig.7 Transfer Characteristics

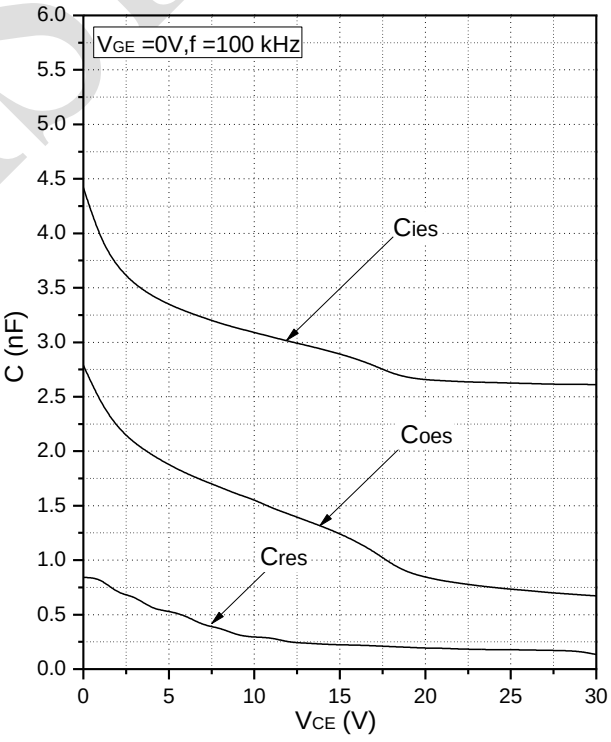


Fig.8 Capacitance Characteristics

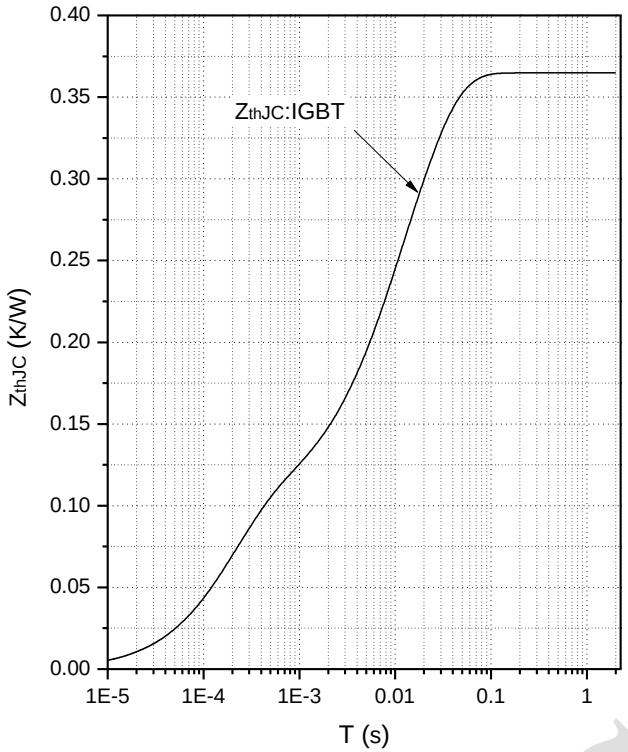


Fig.9 Transient Thermal Impedance IGBT

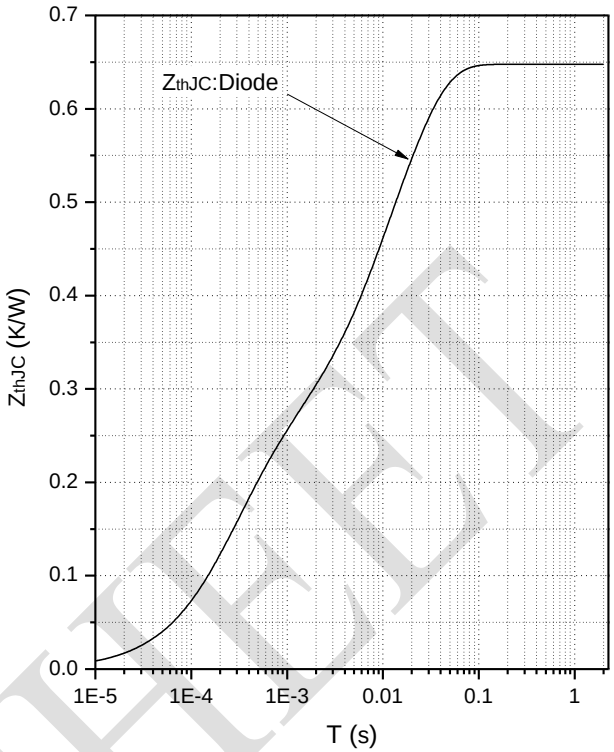
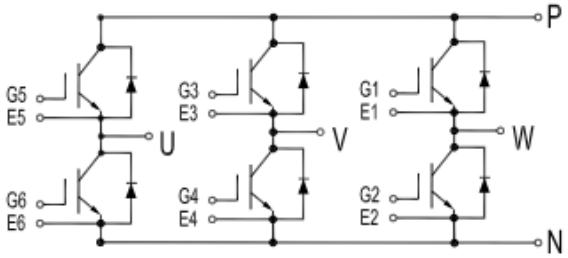
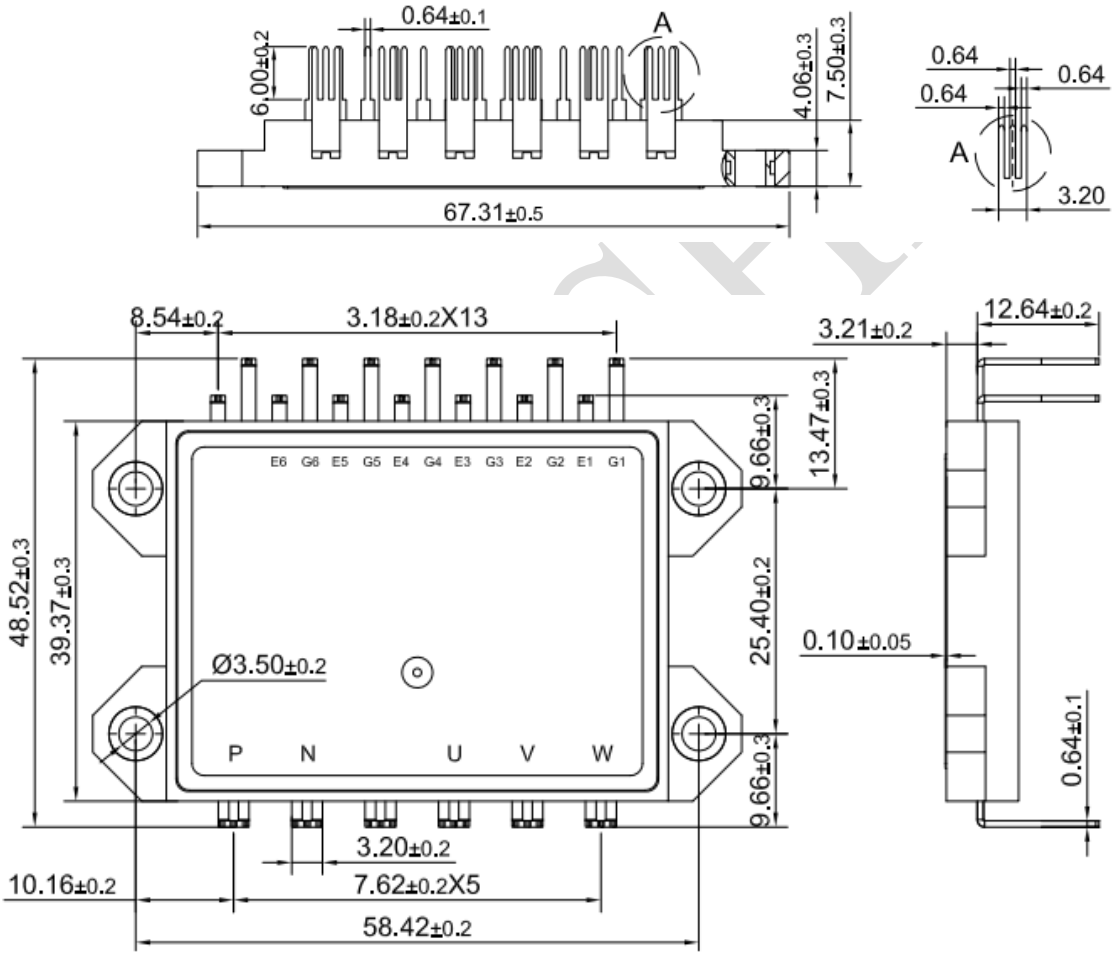


Fig.10 Transient Thermal Impedance Diode

Internal Circuit:



Package Outline (Unit: mm):



Date	Revision	Notes
04/15/2022	A	Final Version

Announcement

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The released datasheet would be issued with “REV.” + “alphabet characters”.