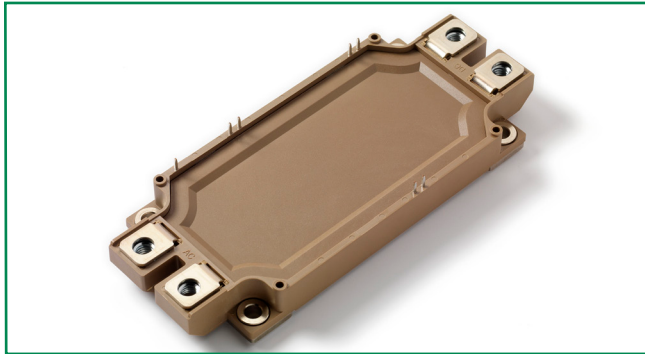


IGBT Power Module

1200 V 600 A IGBT Module

MG12600WB-BR2MM



Agency Approvals

AGENCY	AGENCY FILE NUMBER
	E71639

Features

- Trench-gate field stop IGBT technology
- Low saturation voltage and positive temperature coefficient
- Fast switching and short tail current
- Free wheeling diodes with fast and soft reverse recovery
- Temperature sense included
- $T_{J\max} = 175\text{ }^{\circ}\text{C}$

Applications

- Industrial and servo drives
- Solar inverters
- High-power converters
- UPS
- Welding
- RoHS compliant

Module Characteristics ($T_c = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Symbol	Parameters	Test Conditions	Values	Unit
$T_{J\max}$	Max. Junction Temperature		175	$^{\circ}\text{C}$
$T_{J\text{op}}$	Operating Temperature		-40~150	$^{\circ}\text{C}$
T_{stg}	Storage Temperature		-40~125	$^{\circ}\text{C}$
V_{isol}	Isolation Breakdown Voltage	AC, 50 Hz(R.M.S), t = 1 minute	3000	V
Torque	to heatsink	Recommended (M5)	2.5~5	N·m
	terminal	Recommended (M6)	3~5	N·m
Weight			350	g

Absolute Maximum Ratings ($T_c = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Symbol	Parameters	Test Conditions	Values	Unit
IGBT				
V_{CES}	Collector Emitter Voltage	$T_J = 25\text{ }^{\circ}\text{C}$	1200	V
V_{GES}	Gate Emitter Voltage		± 20	V
I_c	DC Collector Current	$T_c = 25\text{ }^{\circ}\text{C}$	750	A
		$T_c = 80\text{ }^{\circ}\text{C}$	600	A
I_{CM}	Repetitive Peak Collector Current	$t_p = 1\text{ ms}$	1200	A
P_{tot}	Power Dissipation Per IGBT		2500	W
Diode				
V_{RRM}	Repetitive Reverse Voltage	$T_J = 25\text{ }^{\circ}\text{C}$	1200	V
$I_{\text{F(AV)}}$	Average Forward Current	$T_c = 25\text{ }^{\circ}\text{C}$	600	A
I_{FRM}	Repetitive Peak Forward Current	$t_p = 1\text{ ms}$	1200	A
I^2t		$T_J = 125\text{ }^{\circ}\text{C}$, t = 10 ms, $V_R = 0\text{ V}$	45	KA ² s

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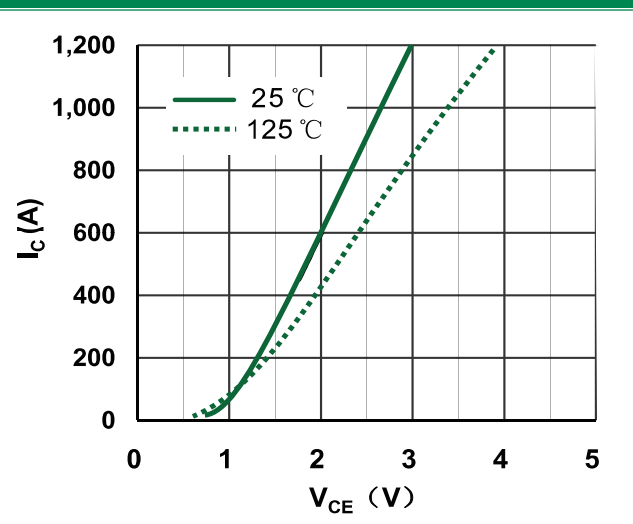
Electrical and Thermal Specifications ($T_c = 25^\circ\text{C}$, unless otherwise specified)

Symbol	Parameters		Test Conditions		Min	Typ	Max	Unit
IGBT								
V _{GE(th)}	Gate Emitter Threshold Voltage		V _{CE} = V _{GE} , I _C = 24 mA		5.0	5.4	6.4	V
V _{CE(sat)}	Collector Emitter Saturation Voltage	chip	I _C = 600 A, V _{GE} = 15 V, T _J = 25 °C			1.7	2.15	V
			I _C = 600 A, V _{GE} = 15 V, T _J = 125 °C			1.9		
		terminal	I _C = 600 A, V _{GE} = 15 V, T _J = 25 °C			2.0	2.5	V
			I _C = 600 A, V _{GE} = 15 V, T _J = 125 °C			2.4		
I _{CES}	Collector Leakage Current		V _{CE} = 1200 V, V _{GE} = 0 V, T _J = 25 °C				100	μA
			V _{CE} = 1200 V, V _{GE} = 0 V, T _J = 125 °C				1	mA
I _{GES}	Gate Leakage Current		V _{CE} = 0 V, V _{GE} = ±15 V, T _J = 125 °C		-400		400	nA
R _{Gint}	Integrated Gate Resistor					0.5		Ω
Q _g	Gate Charge		V _{CE} = 600 V, I _C = 600 A , V _{GE} = ±15 V			3.4		μC
C _{ies}	Input Capacitance		V _{CE} = 25 V, V _{GE} = 0 V, f = 1 MHz			60.5		nF
C _{res}	Reverse Transfer Capacitance					1.8		nF
t _{d(on)}	Turn-on Delay Time		V _{CC} = 600 V I _C = 600 A R _G = 5 Ω V _{GE} = ±15 V Inductive Load	T _J = 25 °C		250		ns
				T _J = 125 °C		280		ns
t _r	Rise Time			T _J = 25 °C		220		ns
				T _J = 125 °C		240		ns
t _{d(off)}	Turn-off Delay Time			T _J = 25 °C		1000		ns
				T _J = 125 °C		1100		ns
t _f	Fall Time			T _J = 25 °C		170		ns
				T _J = 125 °C		190		ns
E _{on}	Turn-on Energy			T _J = 25 °C		20		mJ
				T _J = 125 °C		35		mJ
E _{off}	Turn-off Energy			T _J = 25 °C		105		mJ
				T _J = 125 °C		120		mJ
I _{SC}	Short Circuit Current		t _{psc} ≤ 10 μS , V _{GE} = 15 V, T _J = 125 °C , V _{CC} = 600 V			2400		A
R _{thJC}	Junction-to-Case Thermal Resistance (Per IGBT)						0.06	K/W
Diode								
V _F	Forward Voltage	chip	I _F = 600 A, V _{GE} = 0 V, T _J = 25 °C			2.1	2.5	V
			I _F = 600 A, V _{GE} = 0 V, T _J = 125 °C			2.2		V
t _{RR}	Reverse Recovery Time		I _F = 600 A, V _R = 600 V di _F /dt = -2700 A/μs T _J = 125 °C			330		ns
I _{RRM}	Max. Reverse Recovery Current					305		A
Q _{RR}	Reverse Recovery Charge					96		μC
E _{rec}	Reverse Recovery Energy					42		mJ
R _{thJCD}	Junction-to-Case Thermal Resistance (Per Diode)						0.1	K/W

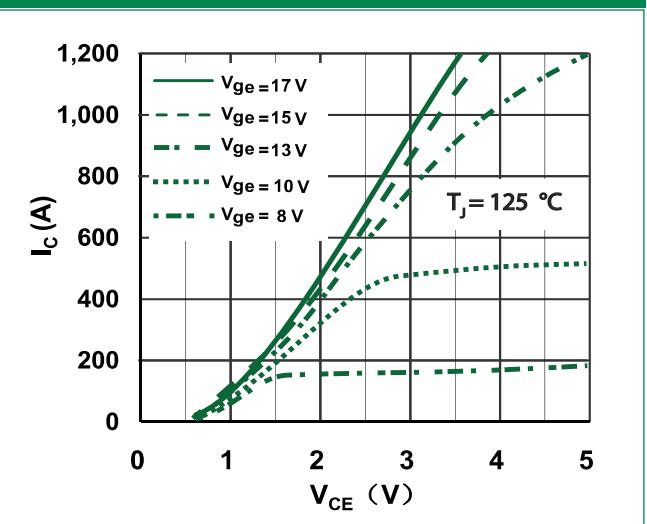
NTC Characteristics ($T_c = 25^\circ\text{C}$, unless otherwise specified)

Symbol	Parameters	Test Conditions	Min	Typ	Max	Unit
R_{25}	Resistance	$T_c = 25^\circ\text{C}$		5		K Ω
$B_{25/50}$	$R_2 = R_{25} \exp [B_{25/50} (1/T_2 - 1/(298, 15\text{ K}))]$			3375		K

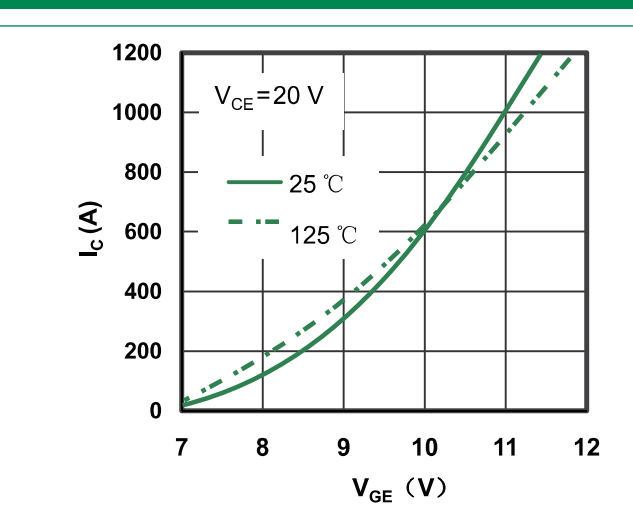
**Figure 1: Typical Output Characteristics
IGBT Inverter**



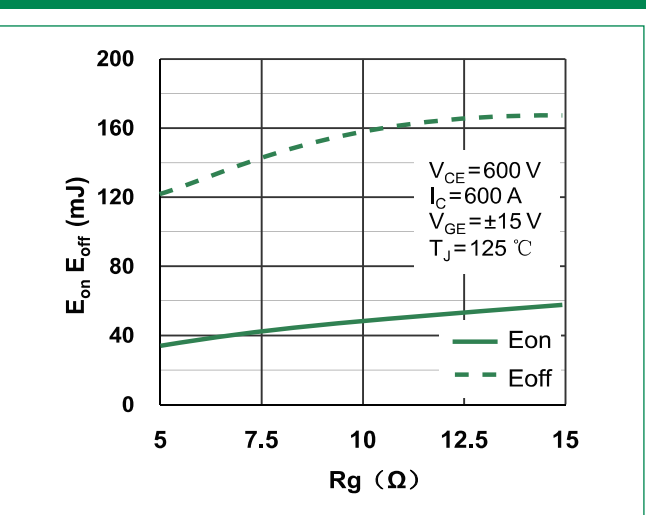
**Figure 2: Typical Output Characteristics
IGBT Inverter**



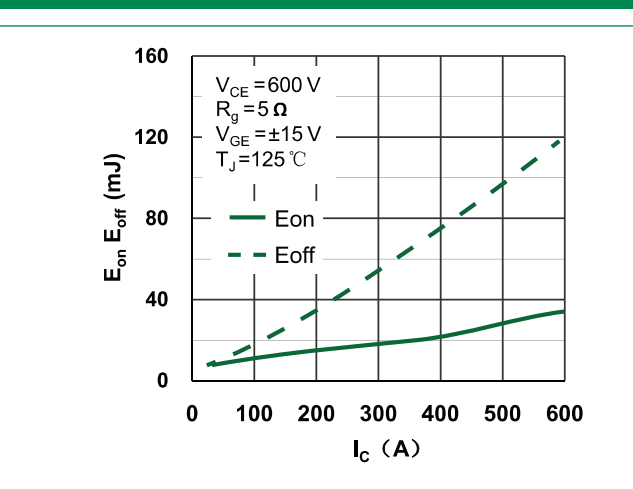
**Figure 3: Typical Transfer Characteristics
IGBT Inverter**



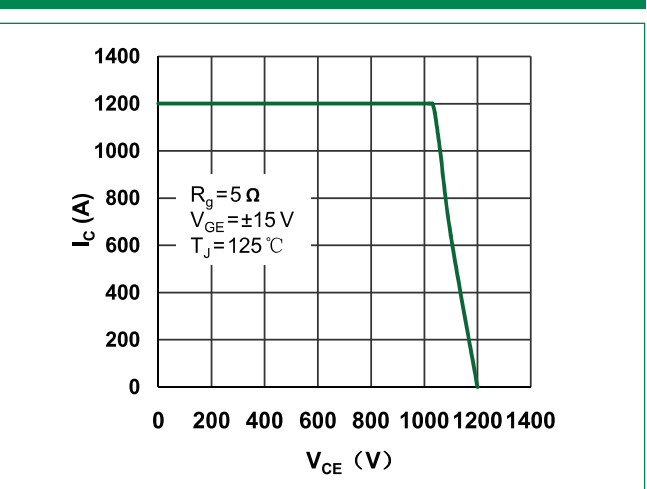
**Figure 4: Switching Energy vs. Gate Resistor
IGBT Inverter**



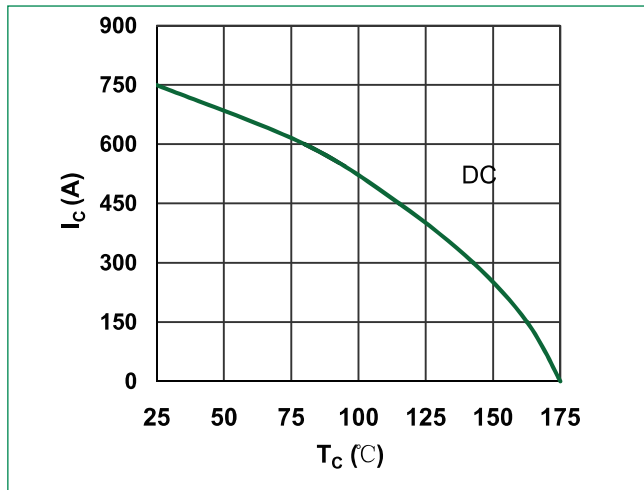
**Figure 5: Switching Energy vs. Collector Current
IGBT Inverter**



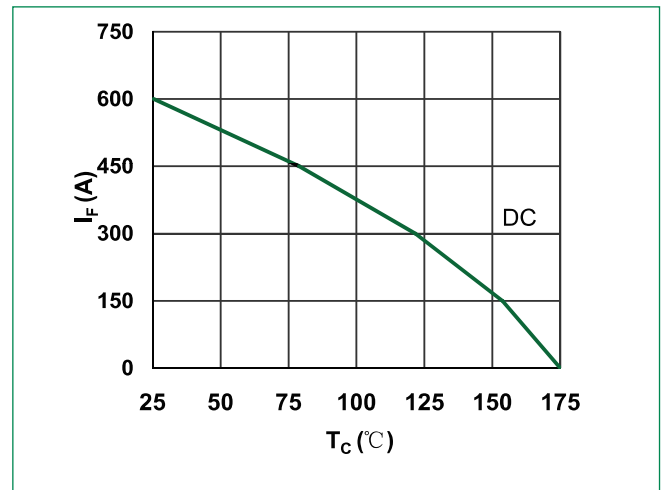
**Figure 6: Reverse Biased Safe Operating Area
IGBT Inverter**



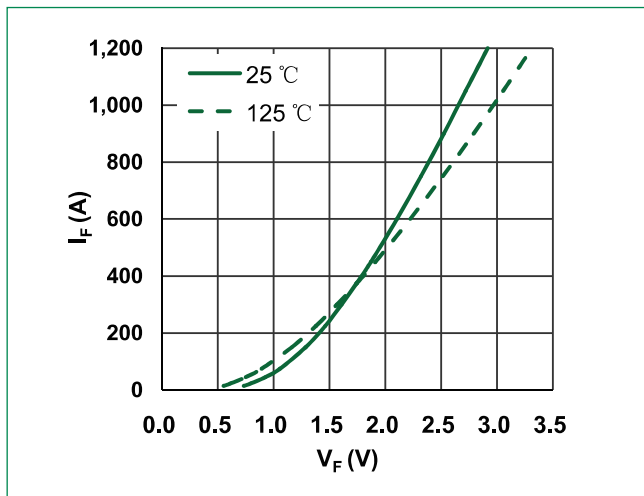
**Figure 7: Collector Current vs Case temperature
IGBT -inverter**



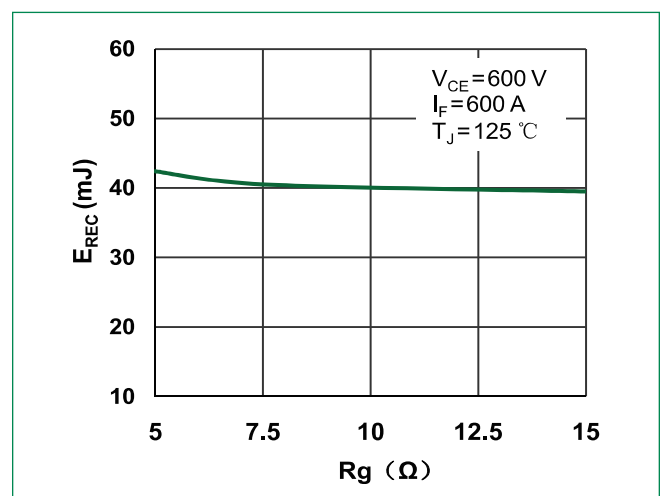
**Figure 8: Forward current vs Case temperature
Diode -inverter**



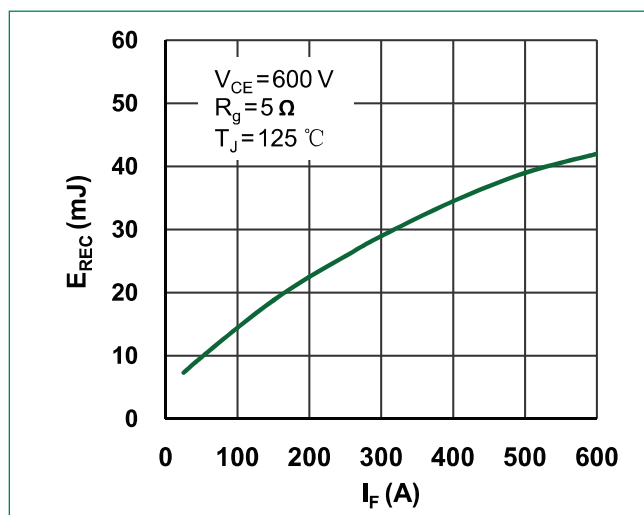
**Figure 9: Diode Forward Characteristics
Diode -inverter**



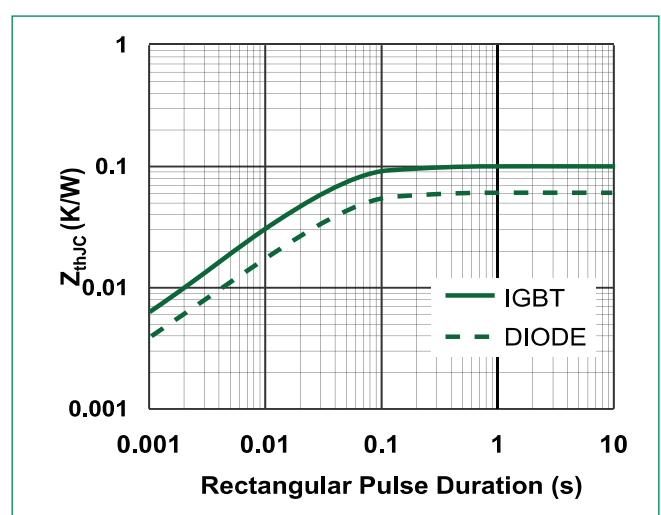
**Figure 10: Switching Energy vs Gate Resistor
Diode -inverter**



**Figure 11: Switching Energy vs Forward Current
Diode-inverter**



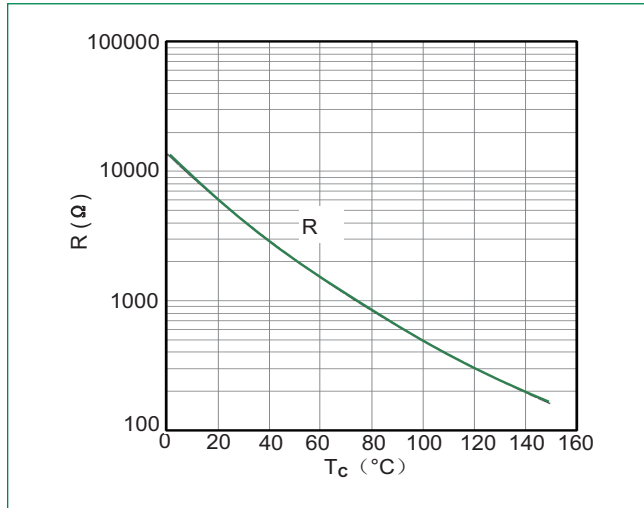
**Figure 12: Transient Thermal Impedance of
Diode and IGBT -inverter**



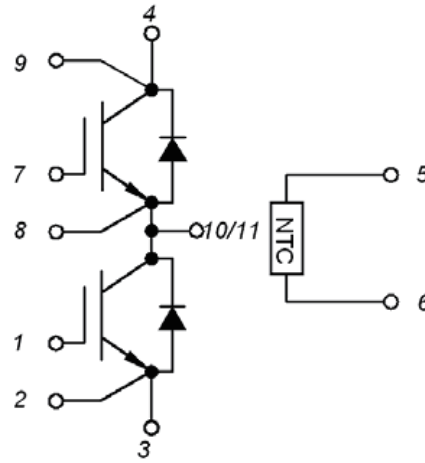
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1200 V 600 A IGBT Module

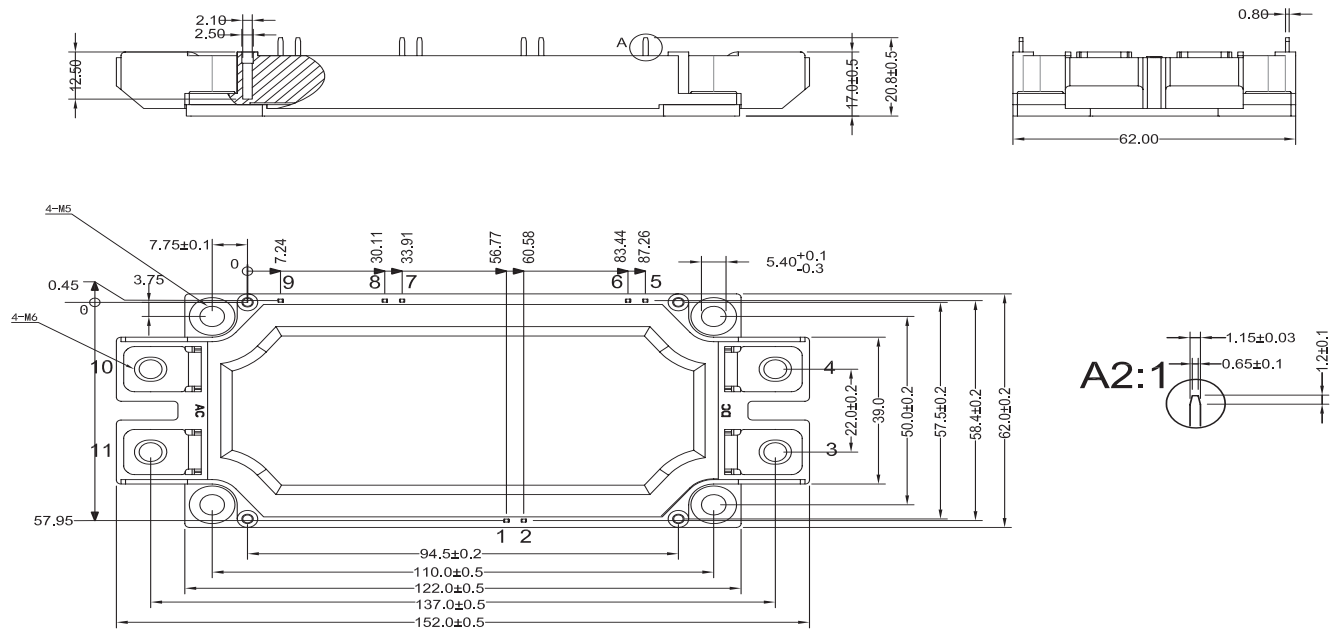
Figure 13: NTC Characteristics



Circuit Diagram



Dimensions-Package WB

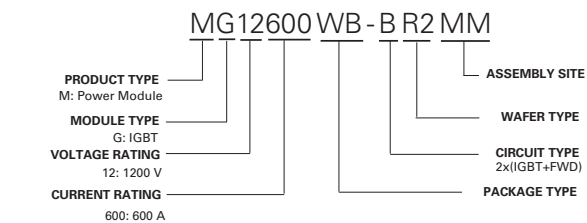


The foot pins are in gold / nickel coating

Packing Options

Part Number	Marking	Weight	Packing Mode	M.O.Q
MG12600WB-BR2MM	MG12600WB-BR2MM	350 g	Bulk Pack	60

Part Numbering System



MG12600WB-BR2MM

Part Marking System

