

Features

- Low Switching Losses
- Low $V_{ce(sat)}$ with Positive Temperature Coefficient
- Including Ultra Fast & Soft Recovery Anti-parallel FWD
- Low Inductance Package
- High Short Circuit Capability(10 μ s)
- Maximum Junction Temperature 175°C
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant (Note 1)("P" Suffix Designates RoHS Compliant. See Ordering Information)

Applications

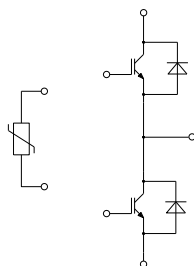
- High Frequency Switching Application
- Motion/sevo control
- UPS (Uninterruptible Power Supplies)
- Welding machine

Parameter	Symbol	Rating	Unit	
Collector-Emitter Voltage @V _{GE} =0V, I _C =1mA, T _{vj} =25°C	V _{CES}	1200	V	
Continuous Collector Current @T _C =100°C	I _C	600	A	
Repetitive Peak Collector Current @t _p =1ms	I _{CRM}	1200	A	
Gate-Emitter peak Voltage@T _{vj} =25°C	V _{GES}	±20	V	
Total Power Dissipation	T _C =25°C	P _{tot}	3260	W
	T _{vjmax} =175°C			

Note:

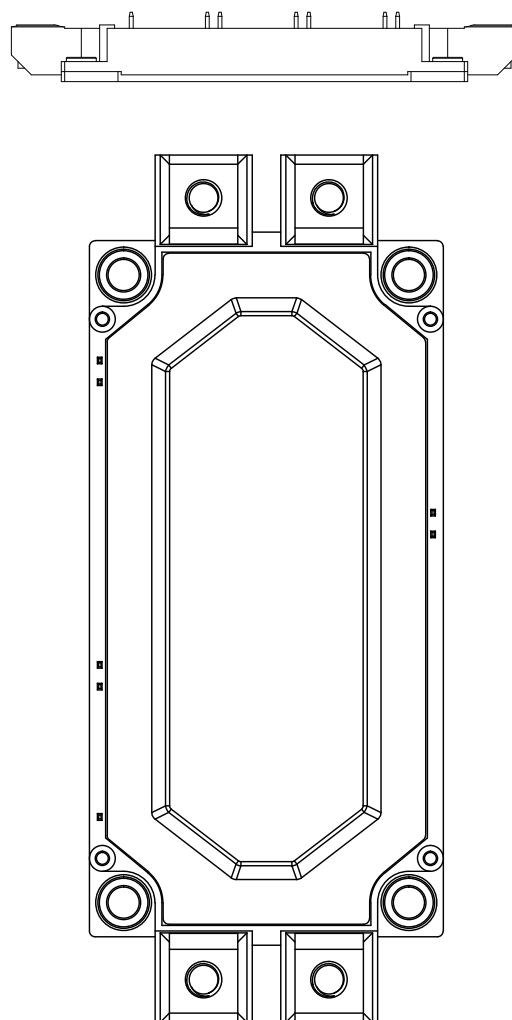
1. High Temperature Solder Exemptions Applied, see EU Directive Annex 7a.

Circuit Diagram



IGBT Modules 1200V 600A

E3



Electrical Characteristics of IGBT @ 25°C (Unless Otherwise Specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}$, $I_C=13mA$, $T_{vj}=25^{\circ}C$	5.0	6.2	7.5	V
Collector-Emitter Cut-off Current	I_{CES}	$V_{CE}=1200V$, $V_{GE}=0V$, $T_{vj}=25^{\circ}C$			1.0	mA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=600A$, $V_{GE}=15V$, $T_{vj}=25^{\circ}C$		1.50		V
		$I_C=600A$, $V_{GE}=15V$, $T_{vj}=125^{\circ}C$		1.70		V
		$I_C=600A$, $V_{GE}=15V$, $T_{vj}=175^{\circ}C$		1.80		V
Internal Gate Resistance	R_{Gint}			1.2		Ω
Gate Charge	Q_g			5.3		μC
Input Capacitance	C_{ies}	$V_{CE}=25V$, $V_{GE}=0V$, $f=1MHz$, $T_{vj}=25^{\circ}C$		44		nF
Reverse Transfer Capacitance	C_{res}			2.1		
Gate-Emitter leakage current	I_{GES}	$V_{CE}=0V$, $V_{GE}=20V$, $T_{vj}=25^{\circ}C$			500	nA
Turn-On Delay Time	$t_{d(on)}$	$V_{CE}=600V$, $I_C=600A$, $V_{GE}=\pm 15V$, $R_{GON}=0.47\Omega$, $R_{GOFF}=1.5\Omega$, $L_S=30nH$, $T_{vj}=25^{\circ}C$		120		ns
Rise Time	t_r			60		
Turn-Off Delay Time	$t_{d(off)}$			575		
Fall Time	t_f			165		
Turn-On Energy	E_{on}			20		mJ
Turn-Off Energy	E_{off}			90		
Turn-On Delay Time	$t_{d(on)}$	$V_{CE}=600V$, $I_C=600A$, $V_{GE}=\pm 15V$, $R_{GON}=0.47\Omega$, $R_{GOFF}=1.5\Omega$, $L_S=30nH$, $T_{vj}=125^{\circ}C$		145		ns
Rise Time	t_r			67		
Turn-Off Delay Time	$t_{d(off)}$			685		
Fall Time	t_f			290		
Turn-On Energy	E_{on}			50		mJ
Turn-Off Energy	E_{off}			94		
Turn-On Delay Time	$t_{d(on)}$	$V_{CE}=600V$, $I_C=600A$, $V_{GE}=\pm 15V$, $R_{GON}=0.47\Omega$, $R_{GOFF}=1.5\Omega$, $L_S=30nH$, $T_{vj}=175^{\circ}C$		155		ns
Rise Time	t_r			70		
Turn-Off Delay Time	$t_{d(off)}$			735		
Fall Time	t_f			335		
Turn-On Energy	E_{on}			73		mJ
Turn-Off Energy	E_{off}			100		
SC Data	I_{SC}	$T_p \leq 10\mu s$, $V_{GE}=15V$, $T_{vj}=175^{\circ}C$, $V_{CC}=800V$, $V_{CEM} \leq 1200V$		2000		A

Electrical Characteristics of Diode @ 25°C (Unless Otherwise Specified)

Maximum Ratings

Parameter	Symbol	Test Conditions	Rating	Unit
Repetitive Peak Reverse Voltage	V_{RRM}	$T_{vj}=25^{\circ}C$	1200	V
Continuous DC Forward Current	I_F		600	A
Repetitive Peak Forward Current	I_{FRM}	$t_p=1ms$	1200	A
I^2t -value	I^2t	$V_R=0, t_p=10ms, T_{vj}=150^{\circ}C$	37500	A ² S

Electrical Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Forward Voltage	V_F	$I_F=600A, T_{vj}=25^{\circ}C$		1.85	2.30	V
		$I_F=600A, T_{vj}=125^{\circ}C$		1.95		V
		$I_F=600A, T_{vj}=175^{\circ}C$		2.00		V
Recovered Charge	Q_{rr}	$I_F=600A, V_R=600V, -diF/dt=5700A/\mu s, L_s=30nH, T_{vj}=25^{\circ}C$		53		μC
Peak Reverse Recovery Current	I_{rr}			485		A
Reverse Recovery Time	t_{rr}			155		ns
Reverse Recovery Energy	E_{rec}			27		mJ
Recovered Charge	Q_{rr}	$I_F=600A, V_R=600V, -diF/dt=5700A/\mu s, L_s=30nH, T_{vj}=125^{\circ}C$		75		μC
Peak Reverse Recovery Current	I_{rr}			570		A
Reverse Recovery Time	t_{rr}			700		ns
Reverse Recovery Energy	E_{rec}			43		mJ
Recovered Charge	Q_{rr}	$I_F=600A, V_R=600V, -diF/dt=5700A/\mu s, L_s=30nH, T_{vj}=175^{\circ}C$		133		μC
Peak Reverse Recovery Current	I_{rr}			585		A
Reverse Recovery Time	t_{rr}			840		ns
Reverse Recovery Energy	E_{rec}			55		mJ

NTC-Thermistor Electrical Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Rated Resistance	R_{25}			5		k Ω
R100	R100	$T_C=100\text{ }^{\circ}\text{C}$	468		518	Ω
B-value	$B_{25/50}$	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15\text{K}))]$		3375		K
B-value	$B_{25/100}$	$R_2=R_{25}\exp[B_{25/100}(1/T_2-1/(298.15\text{K}))]$		3433		K

Module Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Isolation voltage	V_{isol}	$t=1\text{min}, f=50\text{Hz}$	3400			V
Maximum Junction Temperature	T_{jmax}				175	$^{\circ}\text{C}$
Operating Junction Temperature	$T_{\text{vj op}}$		-40		175	$^{\circ}\text{C}$
Storage Temperature	T_{stg}		-40		125	$^{\circ}\text{C}$
Stray-inductance-module	L_{SCE}			20		nH
Module lead resistance, Terminals-chip	$R_{\text{CC}'+\text{EE}'}$	$T_C=25^{\circ}\text{C}$, per switch		0.90		m Ω
		$T_C=125^{\circ}\text{C}$, per switch		1.25		m Ω
		$T_C=175^{\circ}\text{C}$, per switch		1.40		m Ω
Thermal Resistance Junction to Case	$R_{\theta\text{JC(IGBT)}}$	per switch			0.046	K/W
	$R_{\theta\text{JC(Diode)}}$	per switch			0.077	K/W
Thermal Resistance Case to Sink	$R_{\theta\text{CS(IGBT)}}$	IGBT per switch		0.030		K/W
	$R_{\theta\text{CS(Diode)}}$	Diode per switch		0.036		K/W
Comparative Tracking Index	CTI		200			
Module Electrodes Torque	M_t	Recommended(M6)	3.0		6.0	N·m
Module to Sink Torque	M_s	Recommended(M5)	3.0		6.0	N·m
Weight of Module	G			350		g

Curve Characteristics

Fig1.IGBT Output Characteristics

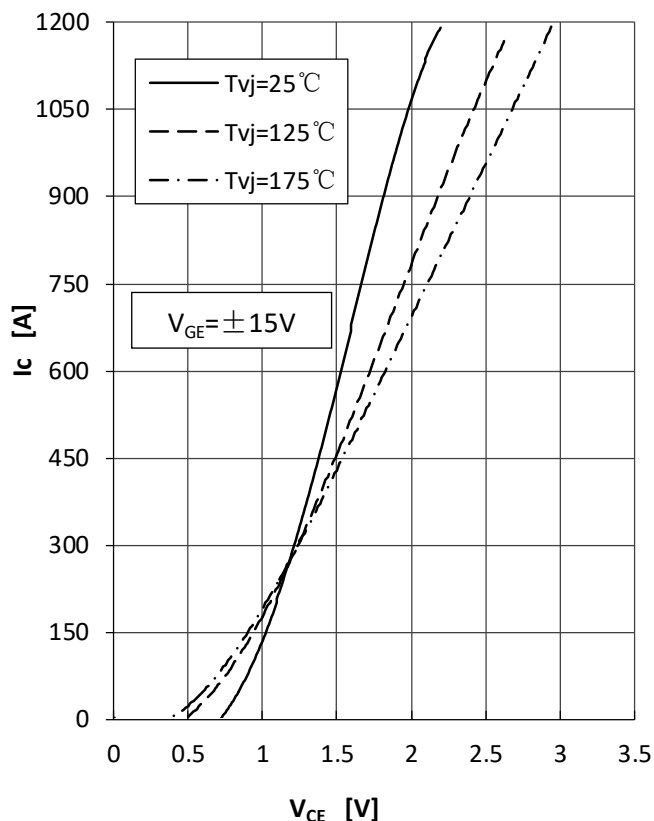


Fig2.IGBT Transfer Characteristics

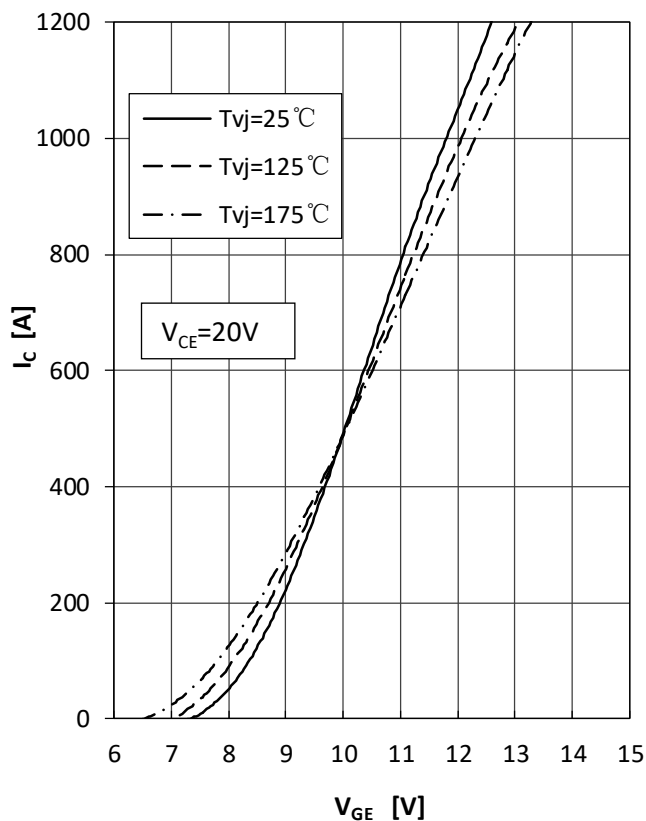


Fig3.IGBT Switching Loss vs. Ic

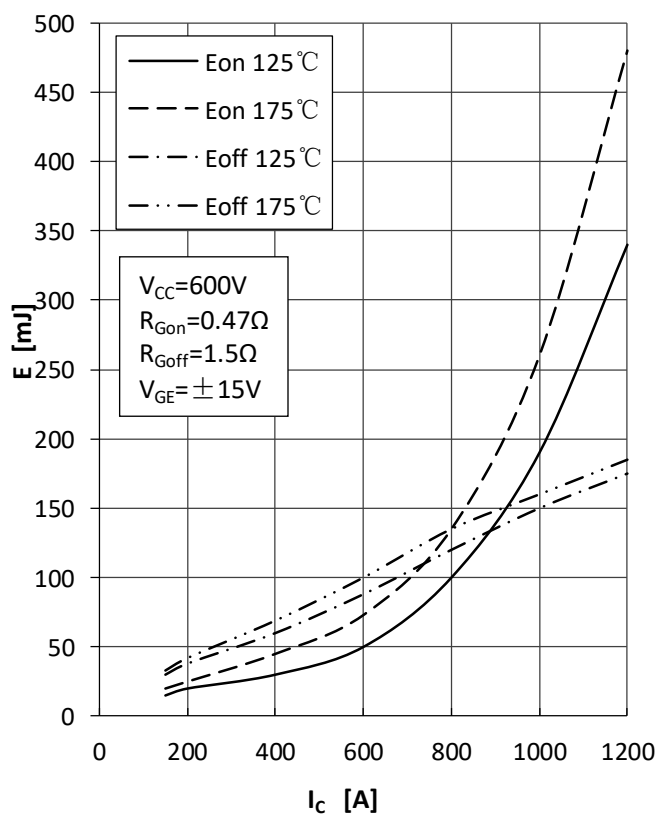
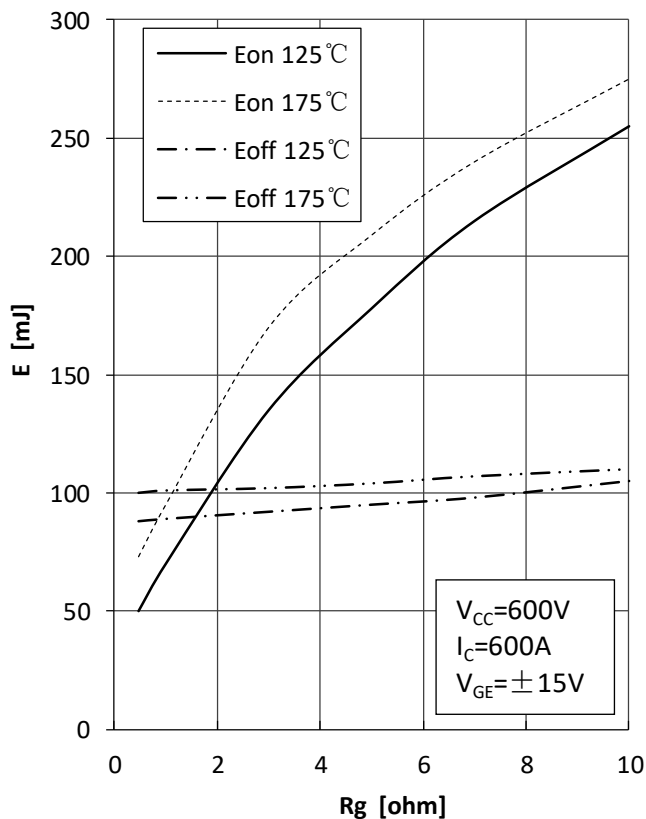


Fig4.IGBT Switching Loss vs. Rg



Curve Characteristics

Fig5.RBSOA

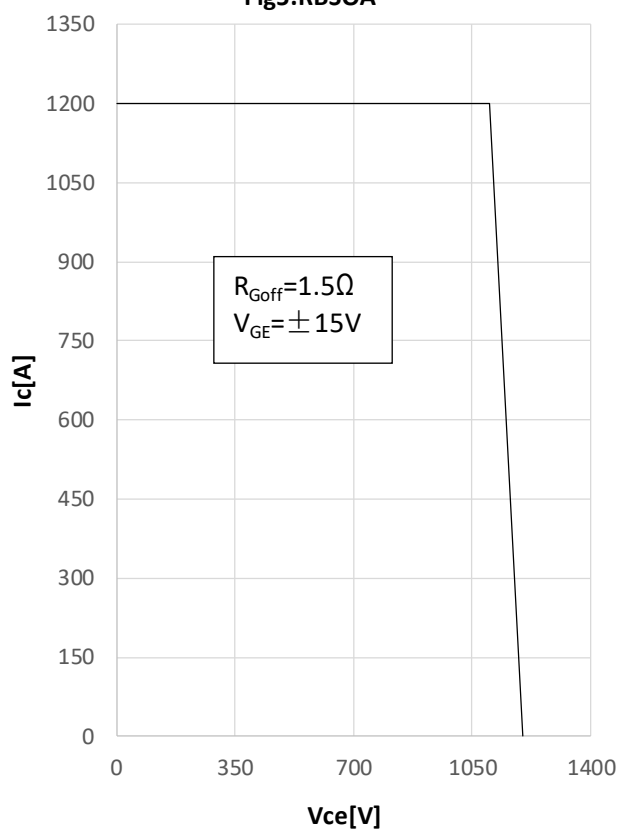


Fig 6. IGBT Transient Thermal Impedance

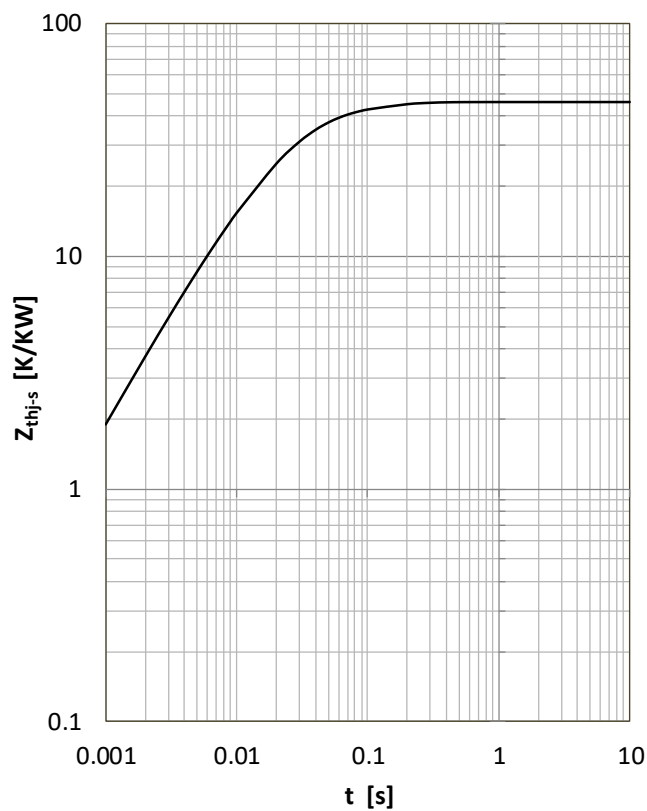


Fig7.Diode Foward Characteristics

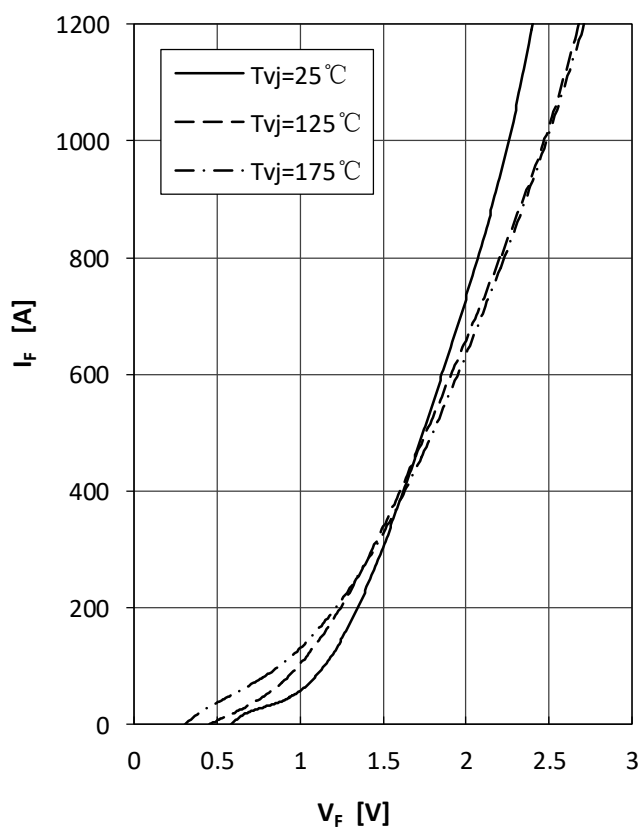
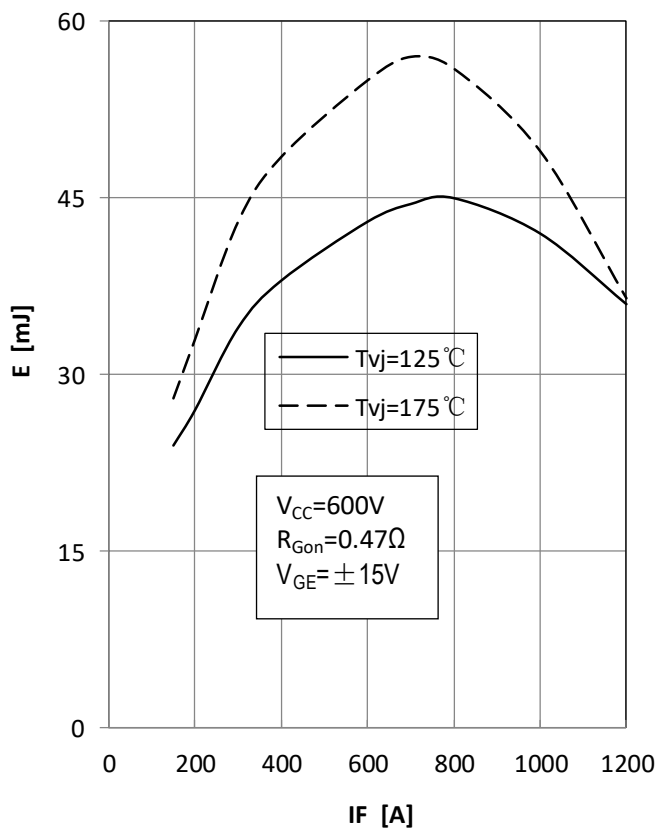
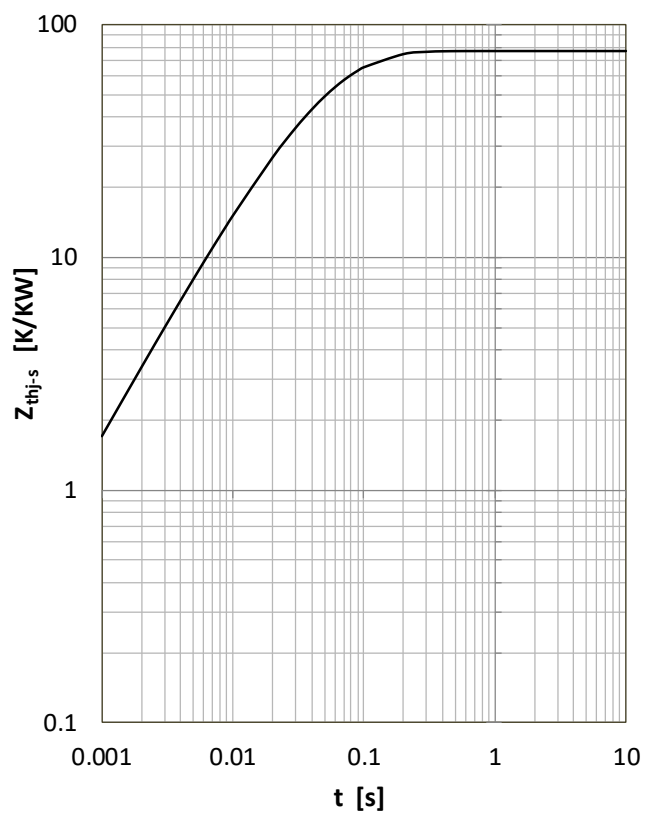


Fig8.Diode Switching Loss(Erec) vs.IF

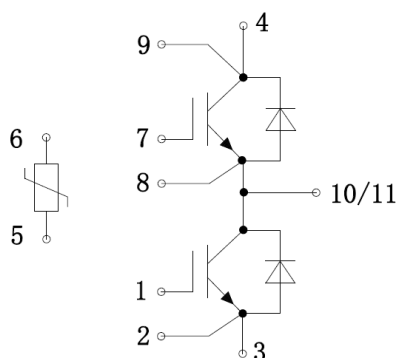


Curve Characteristics

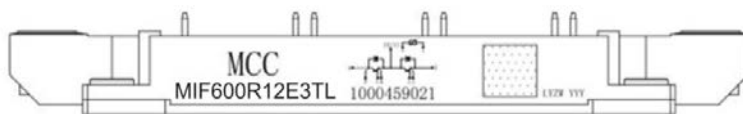
Fig9.Diode Transient Thermal Impedance



Circuit Diagram



Module Marking

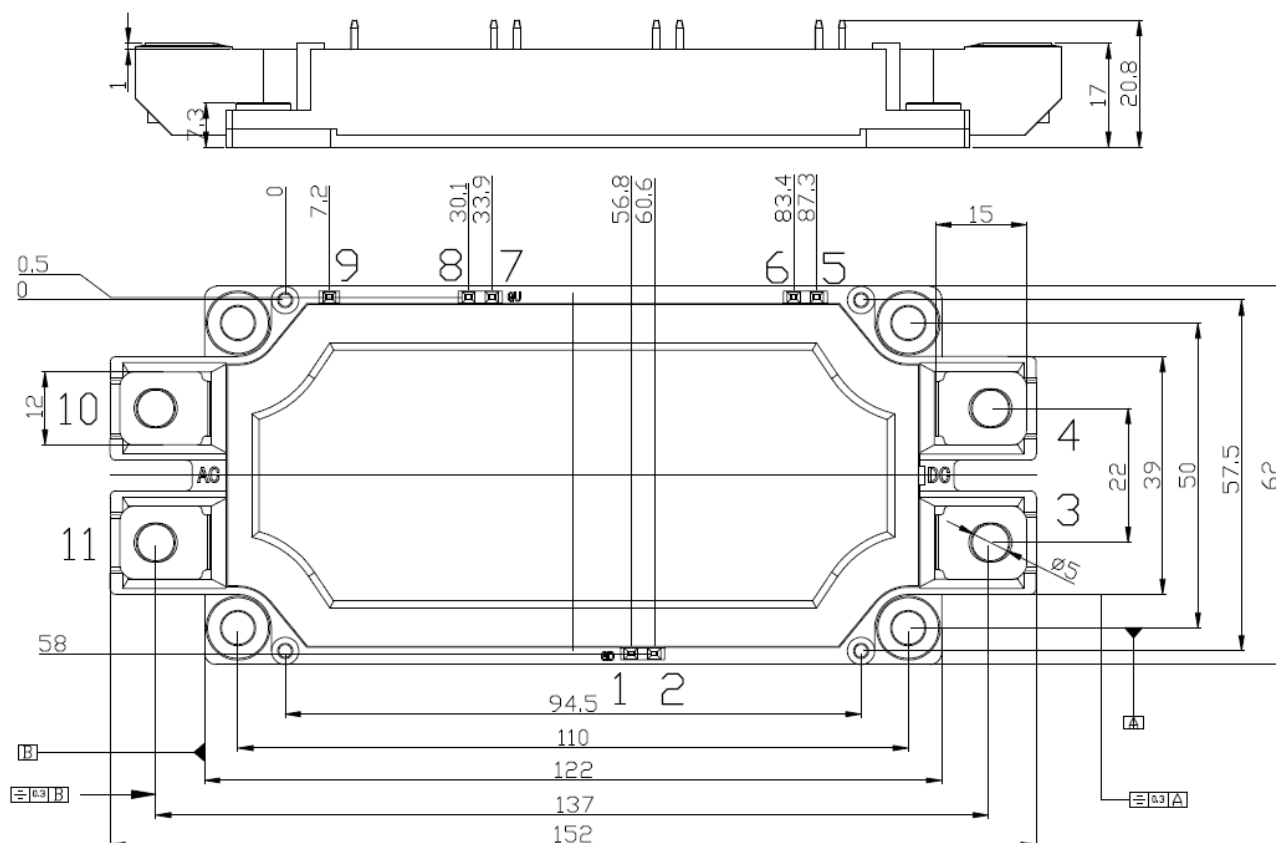


Marking Code Contents:
Logo: MCC
Product Number: MIF600R12E3TL
Trace Code: 10 Digits
Circuit Diagram
2D Code format: Data Matrix

Package Dimensions

Dimensions in mm

E3



Ordering Information

Device	Packing
Part Number-BP	Bulk: 4pcs/Box ; 24pcs/Ctn

IMPORTANT NOTICE

Micro Commercial Components Corp. reserves the right to make changes without further notice to any product herein to make corrections, modifications , enhancements , improvements , or other changes . **Micro Commercial Components Corp.** does not assume any liability arising out of the application or use of any product described herein; neither does it convey any license under its patent rights ,nor the rights of others . The user of products in such applications shall assume all risks of such use and will agree to hold **Micro Commercial Components Corp.** and all the companies whose products are represented on our website, harmless against all damages. **Micro Commercial Components Corp.** products are sold subject to the general terms and conditions of commercial sale, as published at <https://www.mccsemi.com/Home/TermsAndConditions>.

LIFE SUPPORT

MCC's products are not authorized for use as critical components in life support devices or systems without the express written approval of Micro Commercial Components Corporation.

CUSTOMER AWARENESS

Counterfeiting of semiconductor parts is a growing problem in the industry. Micro Commercial Components (MCC) is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. MCC strongly encourages customers to purchase MCC parts either directly from MCC or from Authorized MCC Distributors who are listed by country on our web page cited below. Products customers buy either from MCC directly or from Authorized MCC Distributors are genuine parts, have full traceability, meet MCC's quality standards for handling and storage. **MCC will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources.** MCC is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.