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(10μs)
- 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)

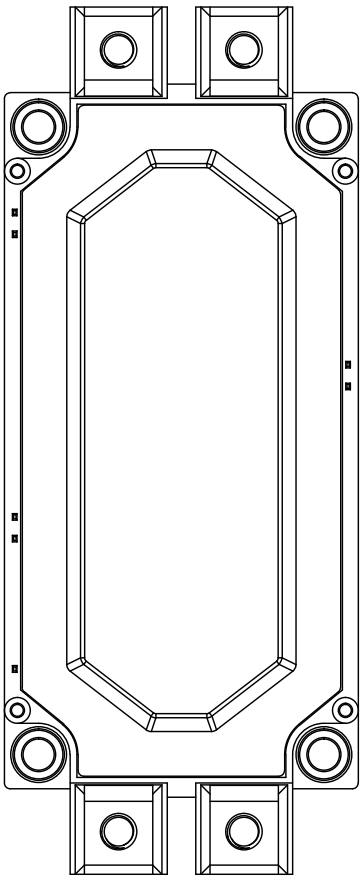
IGBT Modules
1200V 600A

Applications

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

E3



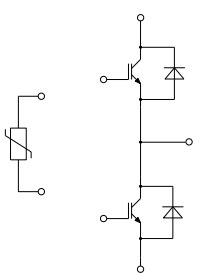


Parameter		Symbol	Rating	Unit
Collector-Emitter Voltage @V_{GE}=0V,I_C=1mA, T_{vj}=25ºC		V_{CES}	1200	V
Continuous Collector Current @T_C=100ºC		I_C	600	A
Repetitive Peak Collector Current @t_p=1ms		I_{CRM}	1200	A
Gate-Emitter peak Voltage@T_{vj}=25ºC		V_{GES}	±20	V
Total Power Dissipation	T_C=25°C	P_{tot}	3260	W
	T_{vjmax}=175°C			

Note:

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

Circuit Diagram



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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°C	5.0	6.2	7.5	V
Collector-Emitter Cut-off Current	I_{CES}	V_{CE}=1200V,V_{GE}=0V, T_{vj}=25°C			1.0	mA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=600A,V_{GE}=15V, T_{vj}=25°C		1.50		V
		I_C=600A,V_{GE}=15V, T_{vj}=125°C		1.70		V
		I_C=600A,V_{GE}=15V, T_{vj}=175°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°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°C			500	nA
Turn-On Delay Time	$t_{d(on)}$	V_{CE}=600V, I_C=600A, V_{GE}=± 15V, R_{GON}=0.47Ω,R_{GOFF}=1.5Ω, L_S=30nH, T_{vj}=25°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}=± 15V, R_{GON}=0.47Ω,R_{GOFF}=1.5Ω, L_S=30nH, T_{vj}=125°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}=± 15V, R_{GON}=0.47Ω,R_{GOFF}=1.5Ω, L_S=30nH, T_{vj}=175°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≤10μs,V_{GE}=15V,T_{vj}=175°C, V_{CC}=800V,V_{CEM}≤1200V		2000		A

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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°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,tp=10ms, T_{vj}=150°C	37500	A^2S

Electrical Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Forward Voltage	V_F	I_F=600A, T_{vj}=25℃		1.85	2.30	V
		I_F=600A, T_{vj}=125℃		1.95		V
		I_F=600A, T_{vj}=175℃		2.00		V
Recovered Charge	Q_{rr}	I_F=600A, V_R=600V, -diF/dt=5700A/μs, Ls=30nH,T_{vj}=25°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/μs, Ls=30nH,T_{vj}=125°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/μs, Ls=30nH,T_{vj}=175°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

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NTC-Thermistor Electrical Characteristics

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

Module Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Isolation voltage	V_{isol}	t=1min,f=50Hz	3400			V
Maximum Junction Temperature	T_{jmax}				175	°C
Operating Junction Temperature	$T_{vj\ op}$		-40		175	°C
Storage Temperature	T_{stg}		-40		125	°C
Stray-inductance-module	L_{SCE}			20		nH
Module lead resistance, Terminals-chip	$R_{CC'+EE'}$	T_C=25℃, per switch		0.90		mΩ
		T_C=125℃, per switch		1.25		mΩ
		T_C=175℃, per switch		1.40		mΩ
Thermal Resistance Junction to Case	$R_{\theta JC(IGBT)}$	per switch			0.046	K/W
	$R_{\theta JC(Diode)}$	per switch			0.077	K/W
Thermal Resistance Case to Sink	$R_{\theta CS(IGBT)}$	IGBT per switch		0.030		K/W
	$R_{\theta CS(Diode)}$	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

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Curve Characteristics

Fig1.IGBT Output Characteristics

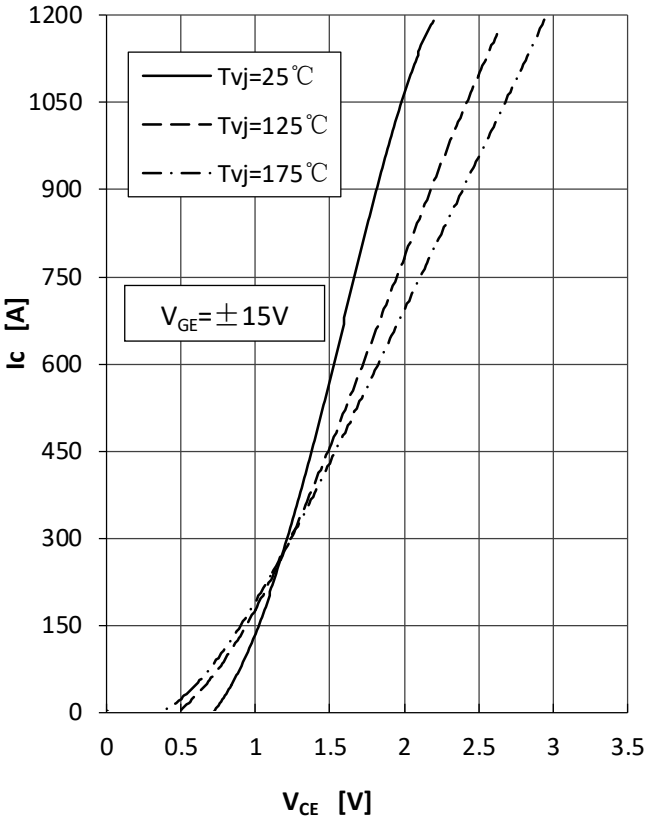


Fig2.IGBT Transfer Characteristics

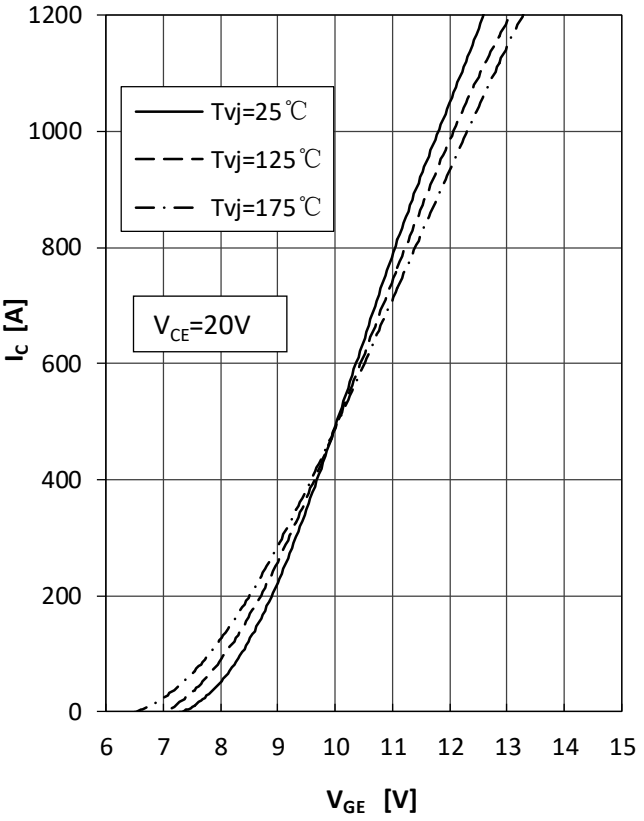


Fig3.IGBT Switching Loss vs.Ic

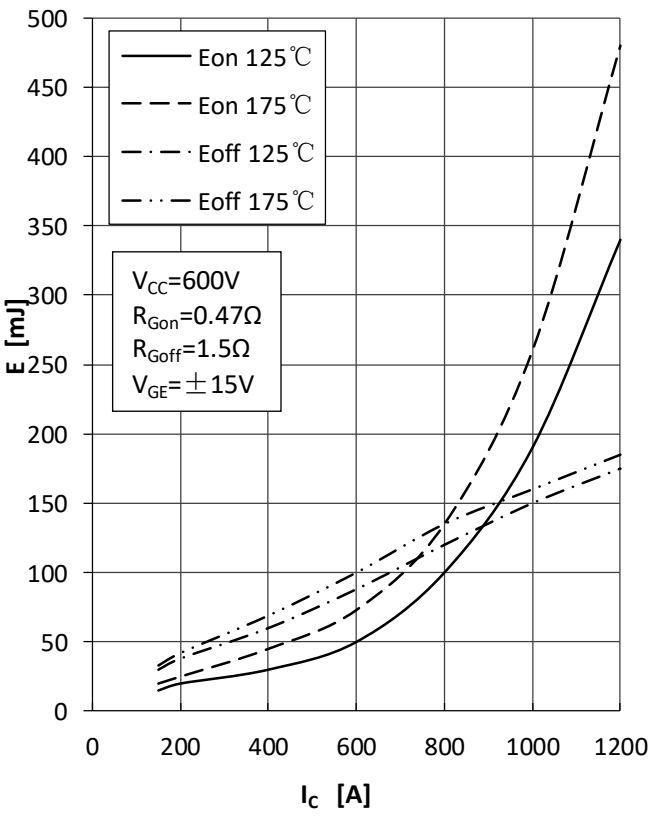
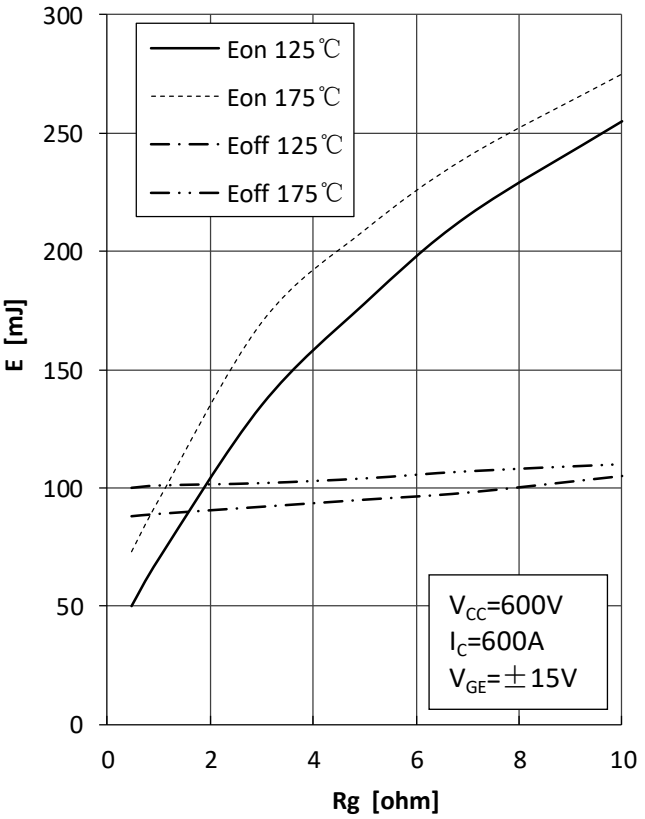


Fig4.IGBT Switching Loss vs.Rg



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Curve Characteristics

Fig5.RBSOA

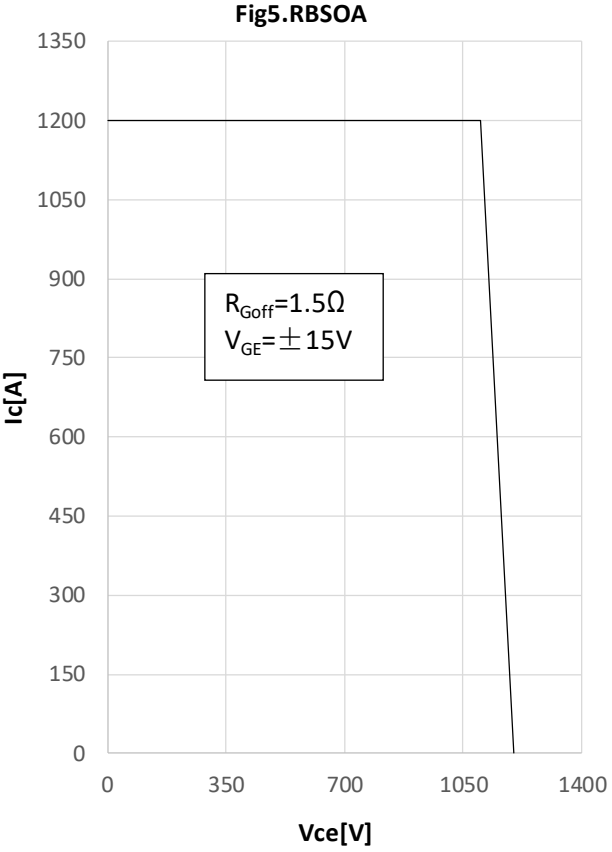


Fig 6. IGBT Transient Thermal Impedance

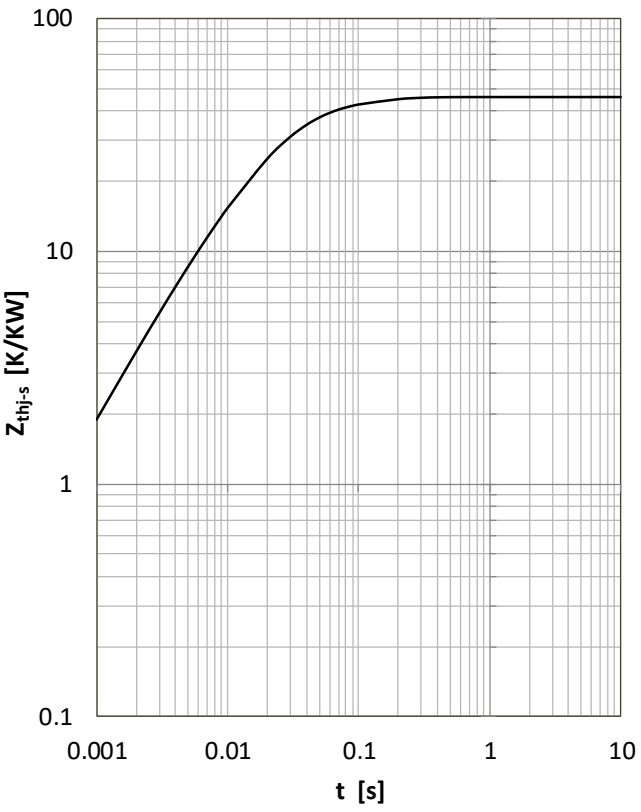


Fig7.Diode Foward Characteristics

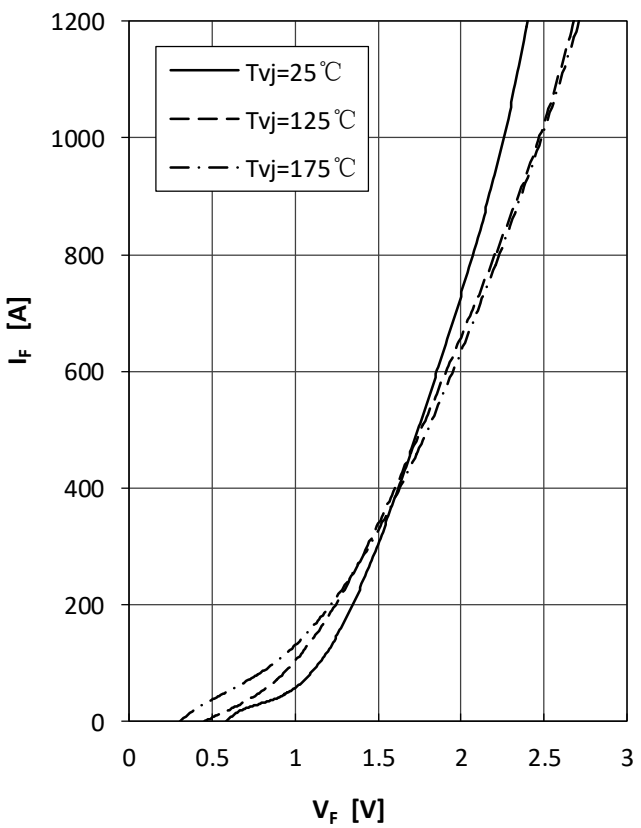
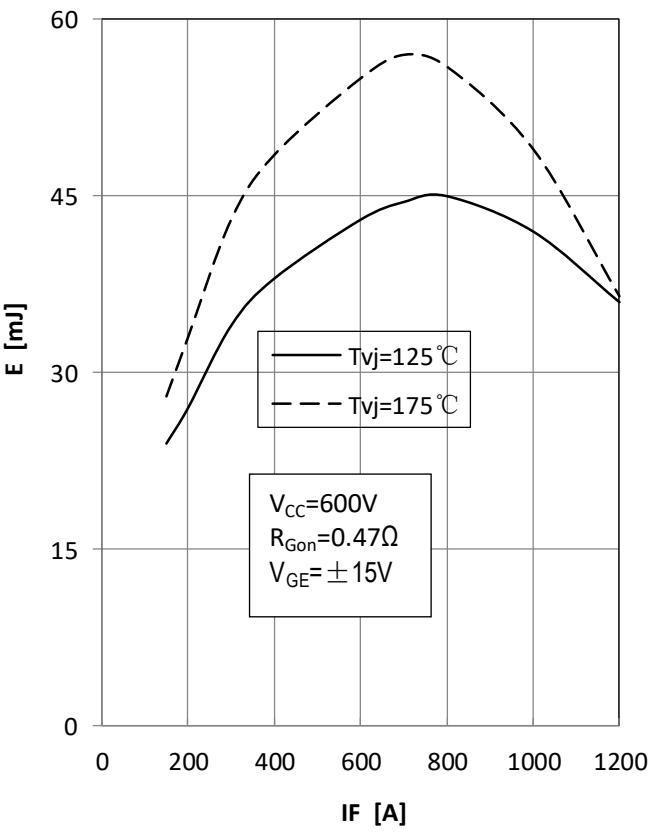


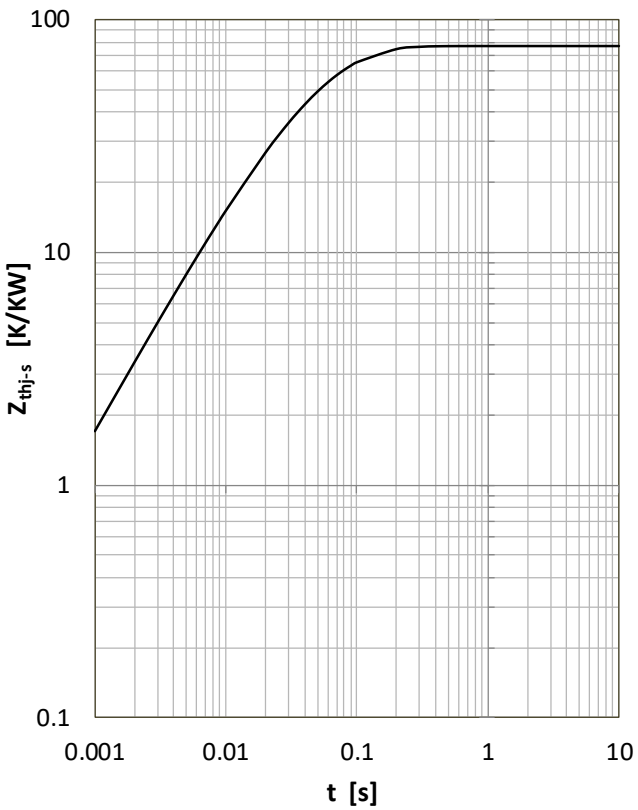
Fig8.Diode Switching Loss(Erec) vs.IF



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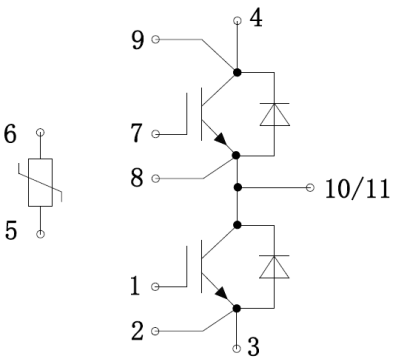
Curve Characteristics

Fig9.Diode Transient Thermal Impedance

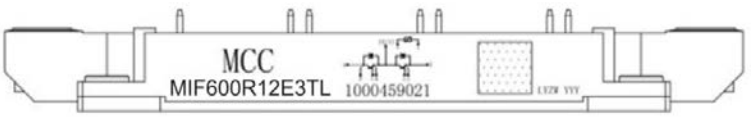


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Circuit Diagram



Module Marking

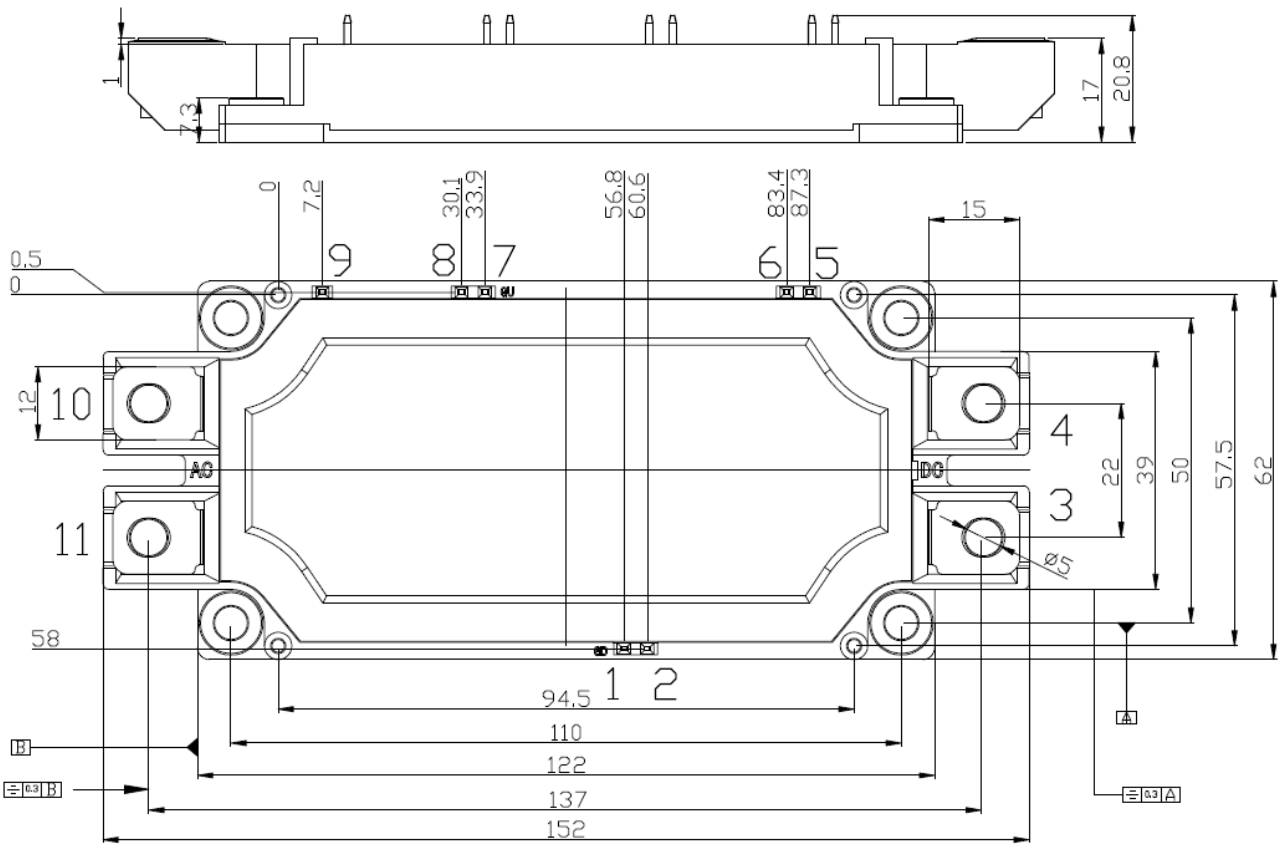


Marking Code Contents:
Logo: MCC
Product Number:MIF600R12E3TL
Trace Code: 10 Digits
Circuit Diagram
2D Code format: Data Matrix

Package Dimensions

Dimensions in mm

E3



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Ordering Information

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

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