SEMICONDUCTOR

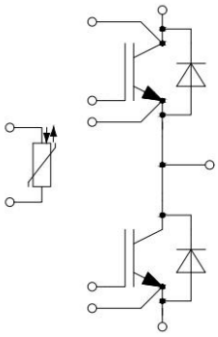
JFF450R17MHT6
HALF BRIDGE IGBT Module

Features

- Trench+ Field Stop Technology
- Ultrasonic Welding of Terminal
- Aluminum Wire Bonging
- High Strength Ceramic Substrate

Product Summary		
V_{CES}(V)	V_{CESAT}(V)Typ	I_C(A)
1700	2.23 @ 15V,450A	450

Block Diagram



Application

- Inverter for motor drive
- Automotive Application
- Wind Turbines

IGBT,Inverter

Table1 Absolute Maximum Ratings (T_C=25℃, unless otherwise specified)

Parameters	Symbol	Value	Unit
Collector-Emmiter Voltage	V_{CES}	1700	V
Gate-Emmiter Voltage	V_{GES}	±20	V
Collector DC Current-continuous T_C=100°C, T_J max=175℃	I_C	450	A
Repetitive peak collector current tp=1ms	I_{CRM}	900	A

Table 2. Electrical Chatacteristics (T_J=25℃,unless otherwise specified)

Parameters	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-Emmiter saturation Voltage	V_{CESAT}	V_{GE}=15V,I_C=450A,T_j=25°C		2.23	2.65	V
		V_{GE}=15V,I_C=450A,T_j=125°C		2.47		
		V_{GE}=15V,I_C=450A,T_j=150°C		2.62		
Gate Threshold Voltage	$V_{GE(TH)}$	V_{CE}=V_{GE},I_C=18mA	5.3	5.9	6.5	V
Internal gate resistor	R_{gint}	T_j=25°C		2.17		Ω
Gate charge	Q_G	V_{GE}=-15V~+15V		2.7		μC
Zero Gate Voltage Collector Current	I_{CES}	V_{CE}=1700V,V_{GE}=0V			1	mA
Gate-body Leakage Current	I_{GES}	V_{CE}=0V,V_{GE}=20V			400	nA

Input Capacitance	C_{IES}	V_{CE}=25V,V_{GE}=0V,f=1MHz		38		nF
Reverse Transfer Capacitance	C_{RES}			0.3		nF
Turn-On Delay Time	td(on)	V_{CE}=900V,I_C=450A, V_{GE}=±15V,R_G=2.0Ω, T_j=25°C		550		ns
Turn-On Rise Time	tr			160		ns
Turn-Off Delay Time	td(off)			740		ns
Turn-Off Fall Time	tf			410		ns
Turn-On energy	E_{on}			89		mJ
Turn-Off energy	E_{off}			110		mJ
Turn-On Delay Time	td(on)	V_{CE}=900V,I_C=450A, V_{GE}=±15V,R_G=2.0Ω, T_j=125°C		550		ns
Turn-On Rise Time	tr			180		ns
Turn-Off Delay Time	td(off)			840		ns
Turn-Off Fall Time	tf			570		ns
Turn-On energy	E_{on}			100		mJ
Turn-Off energy	E_{off}			145		mJ
Turn-On Delay Time	td(on)	V_{CE}=900V,I_C=450A, V_{GE}=±15V,R_G=2.0Ω, T_j=150°C		630		ns
Turn-On Rise Time	tr			180		ns
Turn-Off Delay Time	td(off)			870		ns
Turn-Off Fall Time	tf			640		ns
Turn-On energy	E_{on}			120		mJ
Turn-Off energy	E_{off}			158		mJ
Temperature under switching conditions	T_{vjop}		-40		175	℃
SC data	I_{SC}	tp≤10us, V_{GE}≤15V, Vcc=1000V, T_j=25°C		1600		A

Diode, Inverter

Table1 Absolute Maximum Ratings (T_C=25℃, unless otherwise specified)

Parameters	Symbol	Value	Unit
Repetitive peak reverse voltage	V_{RRM}	1700	V
Continuous DC forward current	I_F	450	A
Repetitive peak forward current tp=1ms	I_{FRM}	900	A

Table 2. Electrical Chatacteristics (TJ=25℃,unless otherwise specified)

Parameters	Symbol	Test Conditions	Min	Typ	Max	Unit
Diode Forward Voltage	V_F	I_F=450A,T_j=25°C		2.57		V
		I_F=450A,T_j=125°C		2.74		
		I_F=450A,T_j=150°C		2.82		
Diode Peak Reverse Recovery Current	Irrm	I_F=450A V_R=900V V_{GE}=±15V, T_j=25°C		402		A
Reverse Recovery Charge	Qrr			75		μC
Reverse recovery energy	Erec			56		mJ
Diode Peak Reverse Recovery Current	Irrm	I_F=450A V_R=900V V_{GE}=±15V, T_j=125°C		479		A
Reverse Recovery Charge	Qrr			121		μC
Reverse recovery energy	Erec			88		mJ
Diode Peak Reverse Recovery Current	Irrm	I_F=450A V_R=900V V_{GE}=±15V, T_j=150°C		479		A
Reverse Recovery Charge	Qrr			130		μC
Reverse recovery energy	Erec			89		mJ
Temperature under switching conditions	T_{vjop}		-40		150	℃

NTC-Thermistor

Table 1. Electrical Chatacteristics

Parameters	Symbol	Test Conditions	Min	Typ	Max	Unit
Rated resistances	R_{25}	T_C=25℃, ±5%		5		KΩ
B-value	$R_{25/50}$	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15K))]$		3375		K
Deviation of R100	ΔR/R	Tc=100℃, R_{100}=493.3Ω	-5		5	%

Module

Table 1. Electrical Chatacteristics (TJ=25℃,unless otherwise specified)

Parameters	Symbol	Test Conditions	Min	Typ	Max	Unit
Isolation test voltage	V_{ISOL}	RMS, f=50Hz, t=60s		3400		V
Maximum junction temperature	T_{jmax}				175	℃
Storage temperature	T_{stg}		-40		125	℃
Operating junction temperature	$T_{j\,op}$		-40		150	℃
Mounting torque for modul mounting	M		3.0		6.0	Nm
Weight	W			340		g

Electrical Characteristics (curves)

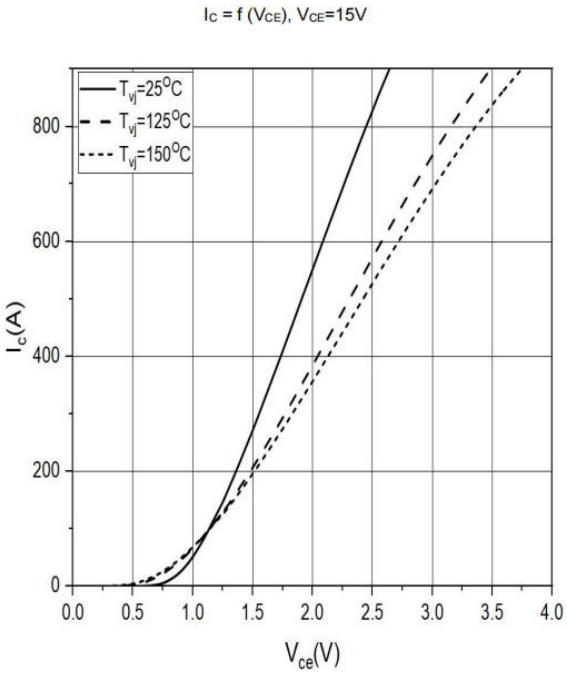


Fig 1. IGBT Output Characteristic

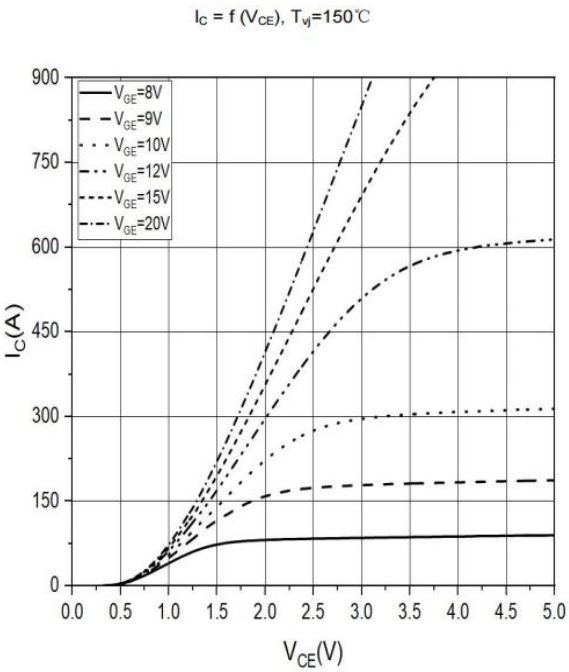


Fig 2. IGBT Output Characteristic

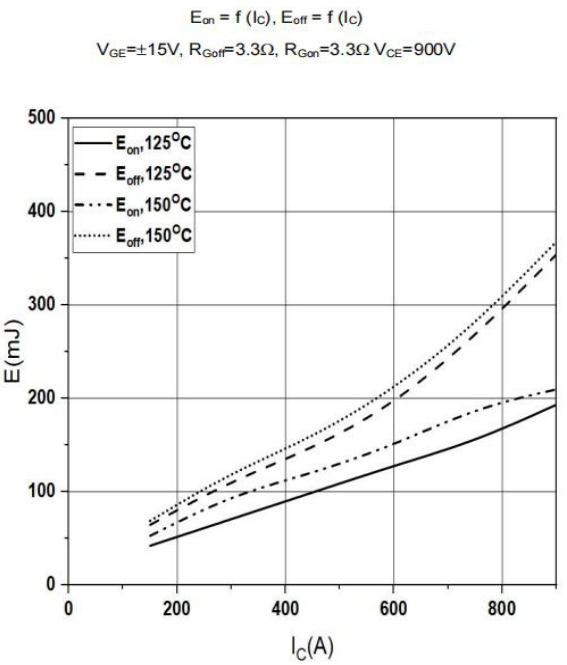


Fig 3. IGBT Switching Loss E_{on} & E_{off} vs. I_C

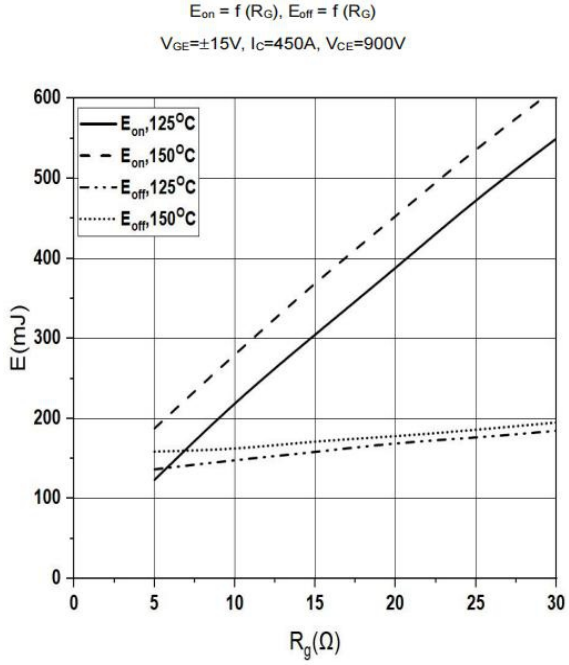


Fig 4. IGBT Switching Loss E_{on} &E_{off} vs. R_G

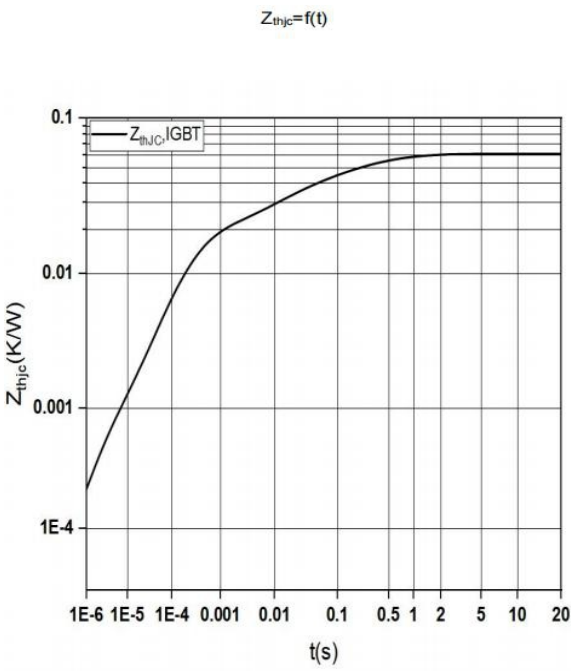


Fig 5. IGBT Transient Thermal Impedance

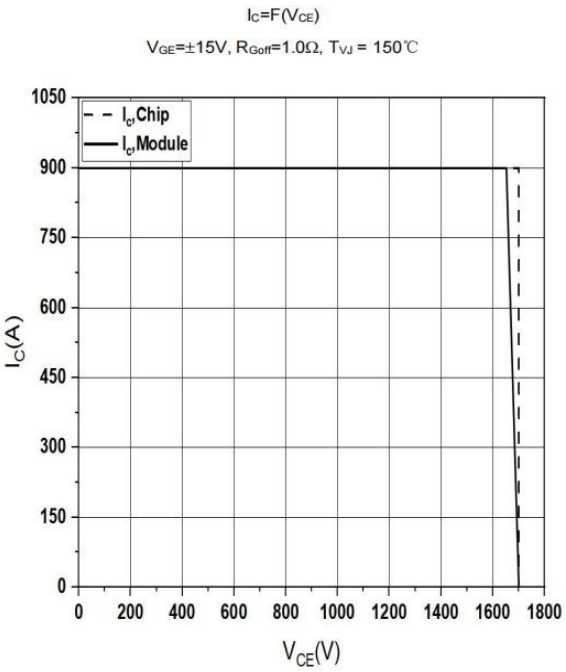


Fig 6. IGBT Reverse Bias Safe Operating Area

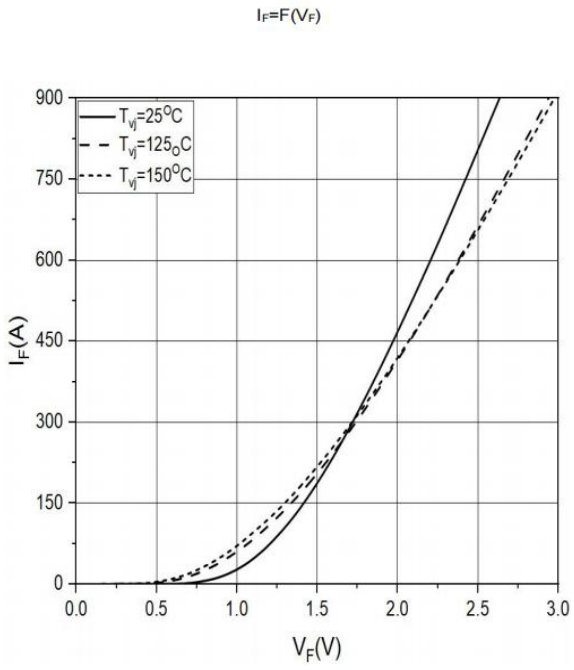


Fig 7. Diode Forward Voltage V_F vs. I_F

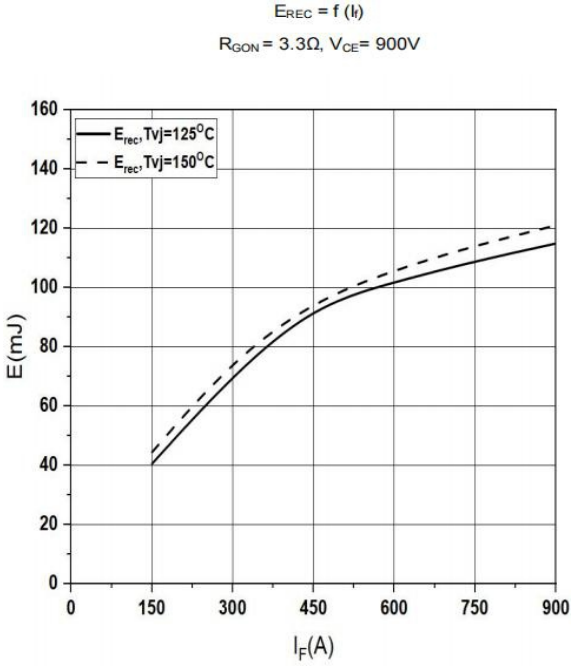


Fig 8. Diode Switching Loss E_{rec} vs. I_F

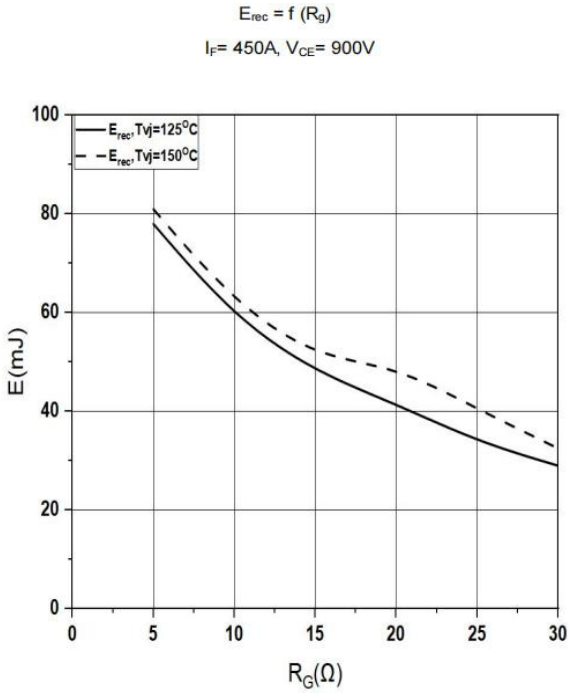


Fig 9. Diode Switching Loss E_{rec} vs. R_G

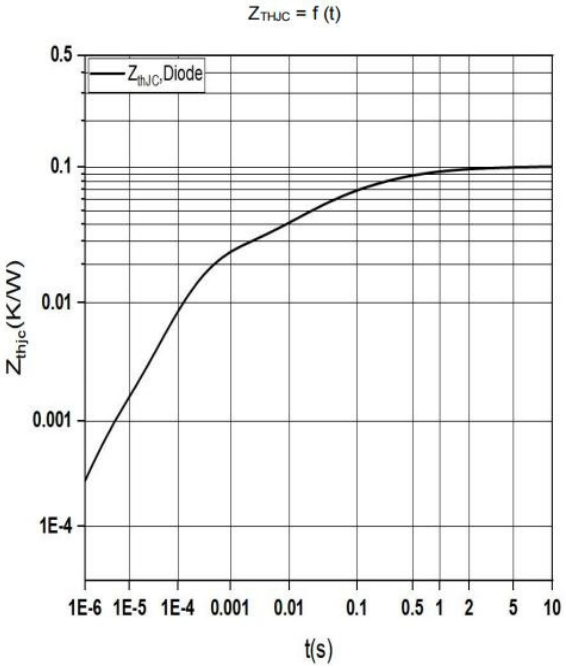


Fig 10. Diode Transient Thermal Impedance

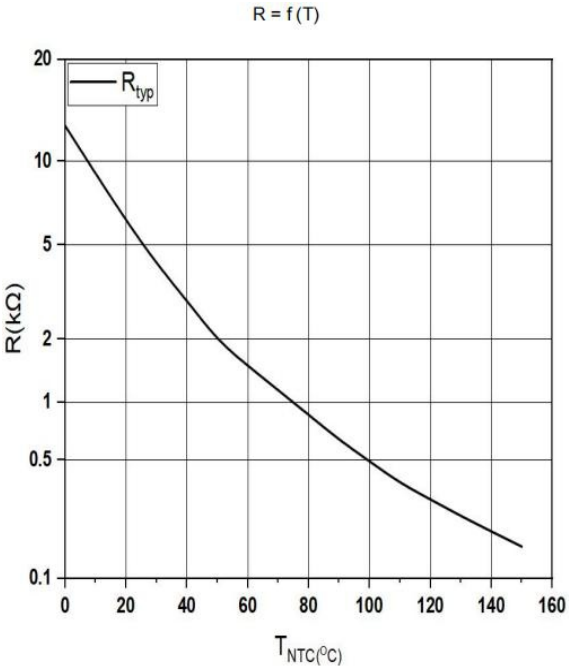
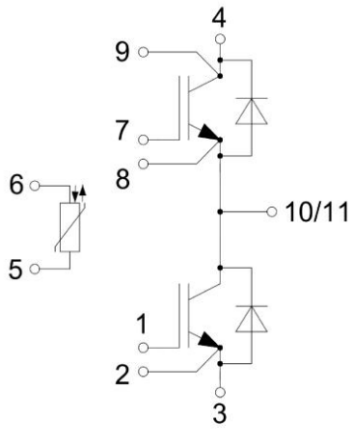
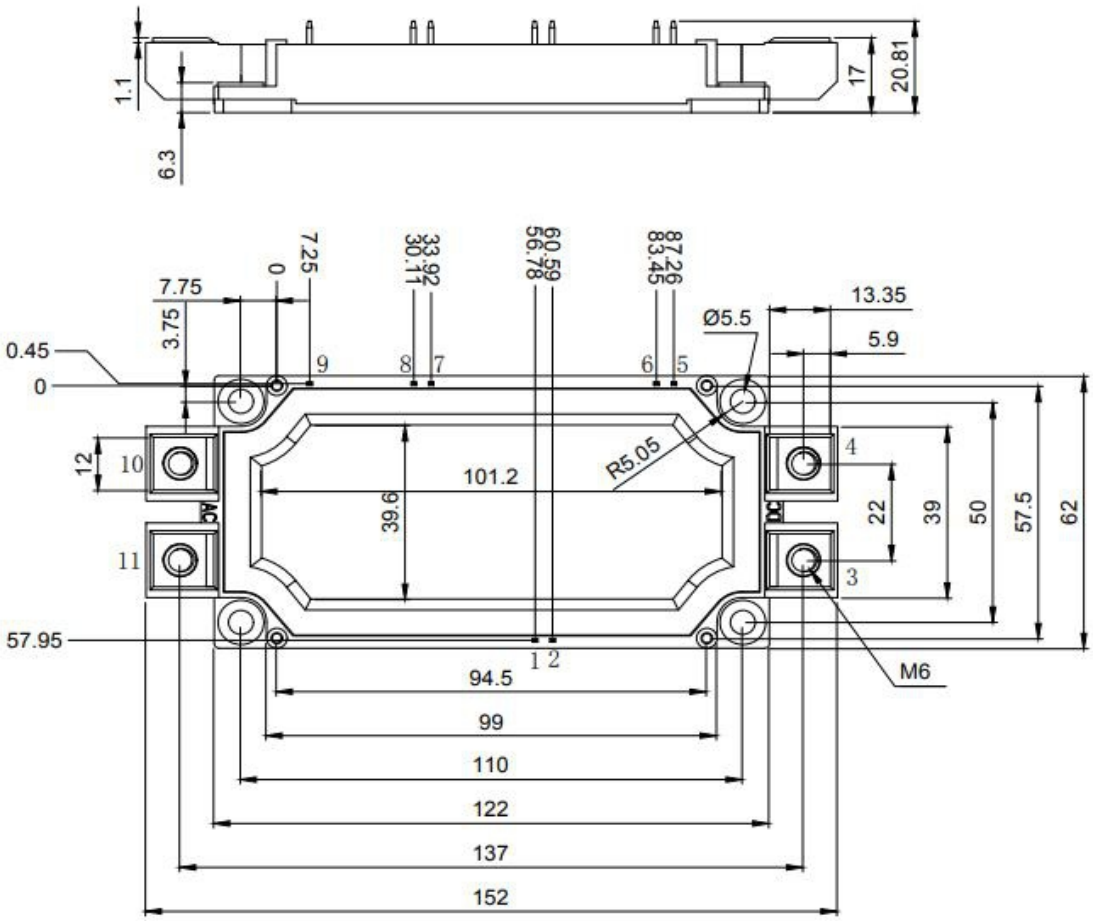


Fig 11. NTC Curve

Circuit Diagram



PackageDimensions



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