MPFF75R12RB

1200V 75A IGBT Module

Electrical Features

- Trench/Fieldstop IGBT
- Half-bridge
- Standard package
- High short circuit capability
- Including anti-parallel FWD

Typical Applications

- High Power Converters
- UPS Systems
- Welding Machine

IGBT，Inverter

Maximum Rated Values					
Symbol	Item	Conditions		Rating	Unit
IGBT					
V_{CES}	Collector-emitter voltage	T_{vj}=25℃		1200	V
V_{GES}	Gate-emitter voltage	-		±20	V
I_C	Collector current,DC	T_C=100℃,T_{vj}=175℃		75	A
I_{CRM}	Repetitive peak collector current	t_p=1ms		150	A
P_{tot}	Total power dissipation	T_C=25℃,T_{vj}=175℃		384	W

Characteristics Values							
Symbol	Item	Conditions		Values			Unit
IGBT				Min.	Typ.	Max.	
I_{CES}	Collector-emitter cut-off current	V_{CE}=1200V,V_{GE}=0V,T_{vj}=25℃		-	-	1	mA
I_{GES}	Gate leakage current	V_{CE}=0V,V_{GE}=20V,T_{vj}=25℃		-	-	250	nA
$V_{GE(th)}$	Gate-emitter threshold voltage	I_C=2.4mA,V_{CE}=V_{GE},T_{vj}=25℃		5.2	5.8	6.4	V
V_{CEsat}	Collector-emitter saturation voltage	I_C=75A V_{GE}=15V	T_{vj}=25℃	-	1.93	2.2	
			T_{vj}=125℃	-	2.37	-	
			T_{vj}=150℃	-	2.48	-	
C_{ies}	Input capacitance	V_{CE}=25V,V_{GE}=0V f=1MHz,T_{vj}=25℃		-	5.30	-	nF
C_{res}	Reverse transfer capacitance			-	0.18	-	
Q_G	Gate charge	V_{GE}=-15V…+15V		-	1.12	-	uC

$t_{d(on)}$	Turn-on delay time	V_{CC}=600V, I_C=75A, V_{GE}=±15V, $R_{G(on)}$=10Ω, $R_{G(off)}$=10Ω, di/dt=2905A/μs (T_{vj}=150℃), du/dt=5796V/μs (T_{vj}=150℃) , Inductive load	T_{vj}=25℃	-	108	-	ns
			T_{vj}=125℃	-	101	-	
			T_{vj}=150℃	-	96	-	
t_r	Rise time		T_{vj}=25℃	-	38.4	-	
			T_{vj}=125℃	-	40.8	-	
			T_{vj}=150℃	-	41.6	-	
$t_{d(off)}$	Turn-off delay time		T_{vj}=25℃	-	188	-	
			T_{vj}=125℃	-	214	-	
			T_{vj}=150℃	-	217	-	
t_f	Fall time		T_{vj}=25℃	-	183.2	-	
			T_{vj}=125℃	-	276.8	-	
			T_{vj}=150℃	-	284.8	-	
E_{on}	Turn-on energy (per pulse)		T_{vj}=25℃	-	6.1	-	mJ
			T_{vj}=125℃	-	9.1	-	
			T_{vj}=150℃	-	9.9	-	
E_{off}	Turn-off energy (per pulse)		T_{vj}=25℃	-	4.5	-	
			T_{vj}=125℃	-	6.2	-	
			T_{vj}=150℃	-	6.5	-	
SC data	Short-circuit current	V_{CC}=600V,V_{GE}≤15V,T_{vj}=150℃, t_P≤10μs		-	319	-	A
R_{thJC}	Thermal resistance,junction to case	per IGBT		-	-	0.39	K/W
R_{thCH}	Thermalresistance,case to heatsink	per IGBT/ λgrease=1W/(m·K)		-	0.13	-	K/W
T_{vjop}	Temperature under switching conditions			-40		150	℃

Diode，Inverter

Maximum Rated Values

Symbol	Item	Conditions	Rating	Unit
V_{RRM}	Repetitive peak reverse voltage	T_{vj}=25℃	1200	V
I_F	Forward current,DC	T_C=100℃,T_{vj}=150℃	30	A
I_{FRM}	Repetitive peak forward current	t_p=1ms	60	A

Characteristic Values

V_F	Continuous forward voltage	I_F=30A V_{GE}=0V	T_{vj}=25℃	-	2.1	2.5	V
			T_{vj}=125℃	-	1.7	-	
			T_{vj}=150℃	-	1.6	-	
I_{RM}	Peak reverse recovery current	V_R=600V I_F=75A -di$_F$/dt=2154A/μs (T_{vj}=150℃)	T_{vj}=25℃	-	56.9	-	A
			T_{vj}=125℃	-	70.8	-	
			T_{vj}=150℃	-	75.2	-	
t_{rr}	Reverse recovery time		T_{vj}=25℃	-	70.7	-	ns
			T_{vj}=125℃	-	178.2	-	
			T_{vj}=150℃	-	231.1	-	
Q_r	Recovered charge		T_{vj}=25℃	-	2.3	-	μC
			T_{vj}=125℃	-	8.9	-	
			T_{vj}=150℃	-	9.9	-	

E_{rec}	Reverse recovery energy		T_{vj}=25℃	-	0.5	-	mJ
			T_{vj}=125℃	-	3.7	-	
			T_{vj}=150℃	-	4.7	-	
R_{thJC}	Thermal resistance, junction to case	per diode		-	-	0.62	K/W
R_{thCH}	Thermalresistance,case to heatsink	per diode/ λgrease=1W/(m·K)		-	0.205	-	K/W
T_{vjop}	Temperature under switching conditions			-40		150	℃

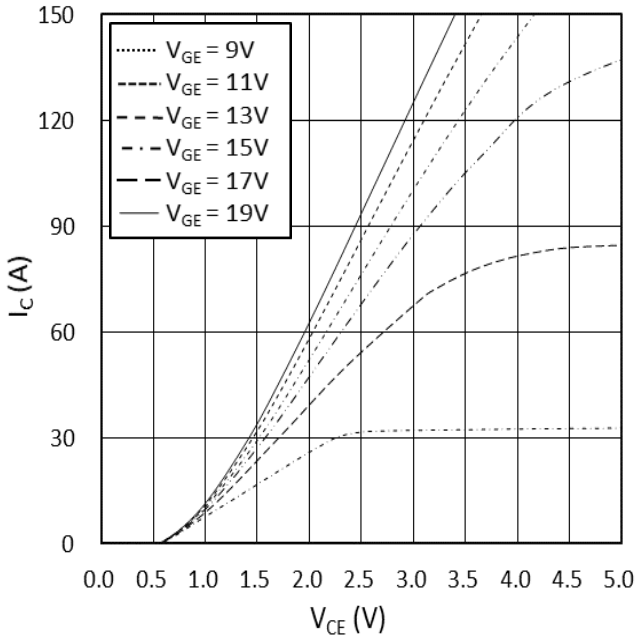
Module

Symbol	Item	Conditions	Rating			Unit
V_{ISOL}	Isolation voltage	Terminals to baseplate，RMS,f=50Hz,t=1min	2500			V
-	Material of module baseplate	-	Cu			-
-	Internal isolation	Basic insulation(class 1, IEC 61140)	Al_2O_3			-
T_{stg}	Storage temperature	-	-40~125			℃
Symbol	Item	Conditions	Values			Unit
			Min.	Typ.	Max.	
M	Mounting torque for module mounting	Screw M6	3.0	-	5.0	Nm
	Terminal connection torque	Screw M5	2.5	-	5.0	Nm
ds	Creepage distance	Terminal to terminal	-	23	-	mm
		Terminal to base plate	-	29	-	
da	Clearance	Terminal to terminal	-	11	-	mm
		Terminal to base plate	-	23	-	
m	Weight	-	-	150	-	g

output characteristic IGBT, Inverter (typical)

$I_C = f(V_{CE})$

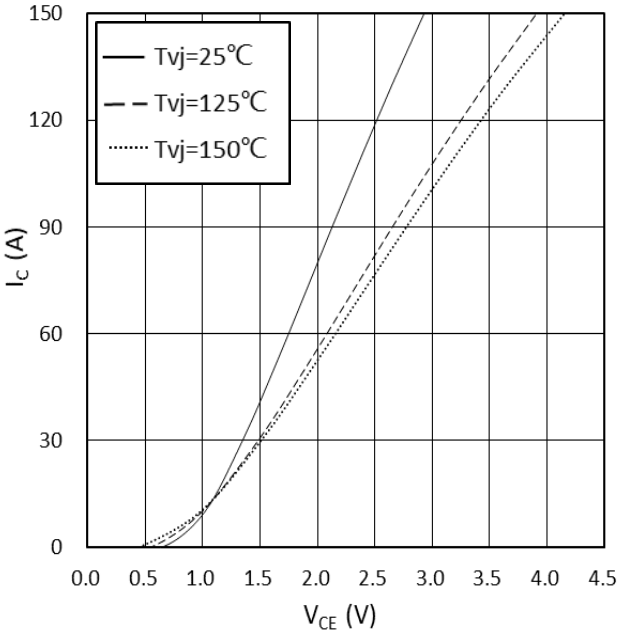
$T_{vj} = 150℃$



output characteristic IGBT, Inverter (typical)

$I_C = f(V_{CE})$

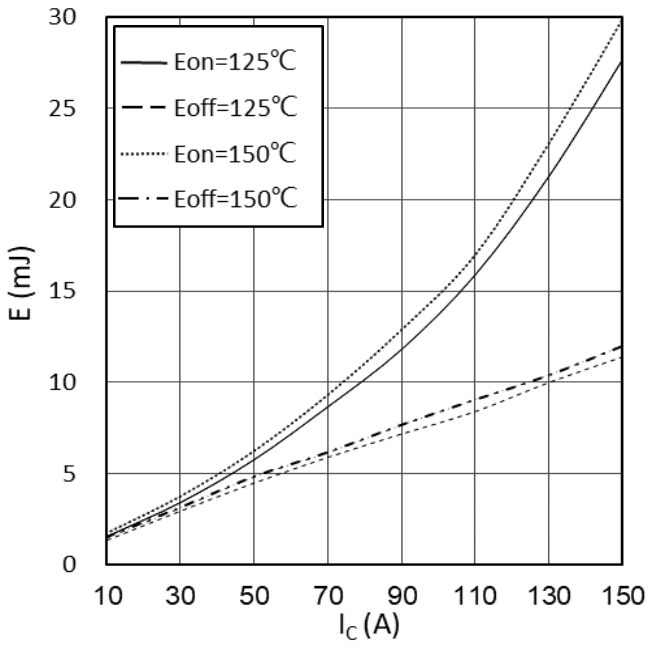
$V_{GE} = 15$ V



switching losses IGBT,Inverter(typical)

$E_{on} = f(I_C)$, $E_{off} = f(I_C)$

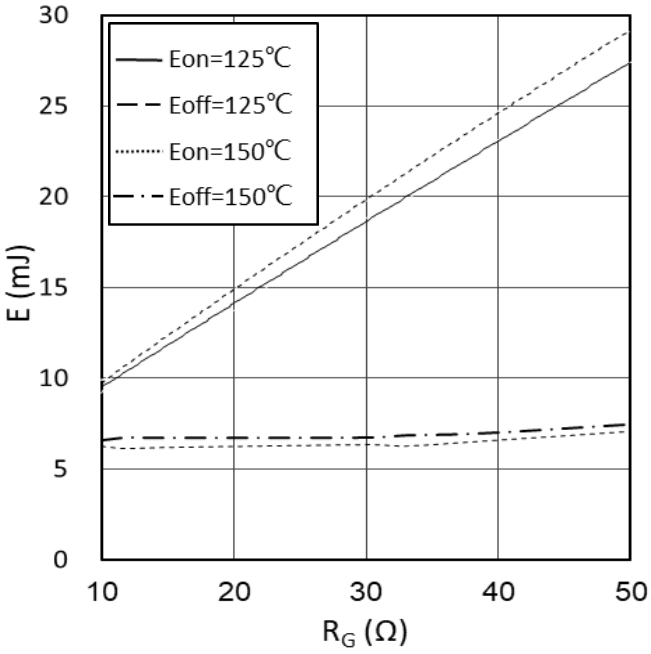
$V_{GE} = \pm 15V$, $R_{Gon} = 10\Omega$, $R_{Goff} = 10\Omega$, $V_{CE} = 600V$



switching losses IGBT,Inverter(typical)

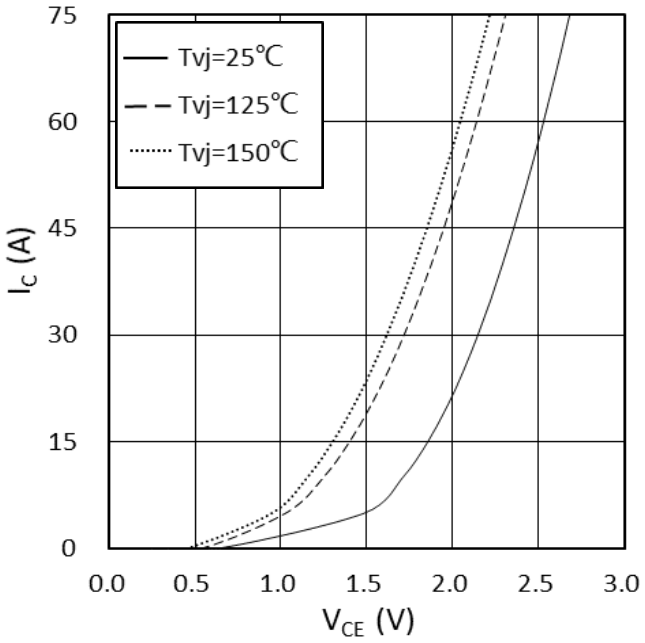
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$

$V_{GE} = \pm 15V$, $I_C = 75A$, $V_{CE} = 600V$



forward characteristic of Diode, Inverter (typical)

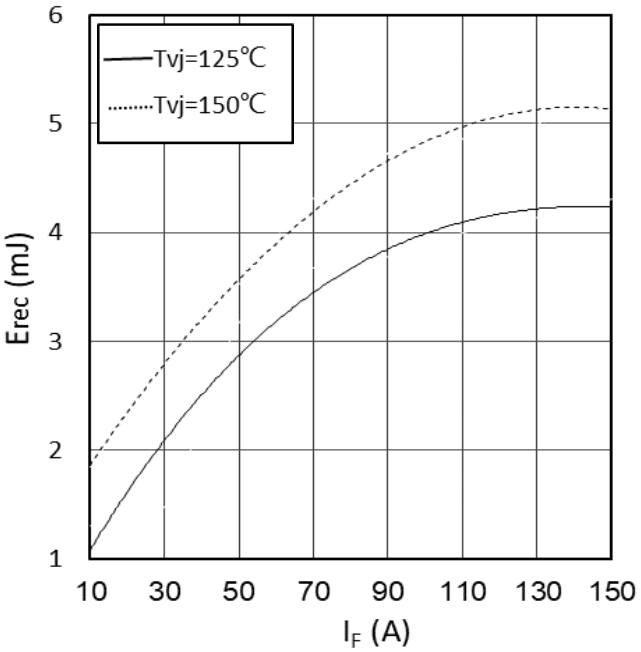
$I_F = f(V_F)$



switching losses Diode, Inverter (typical)

$E_{rec} = f(I_F)$

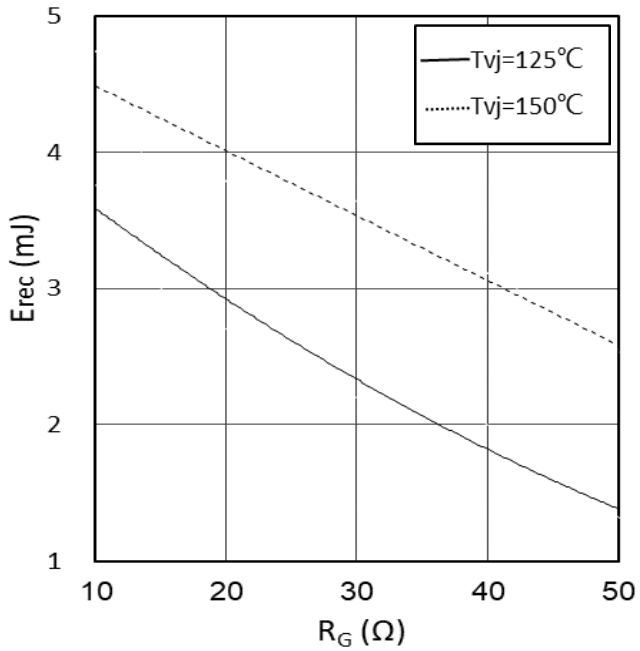
R_{Gon}=10Ω, V_{CE}=600V



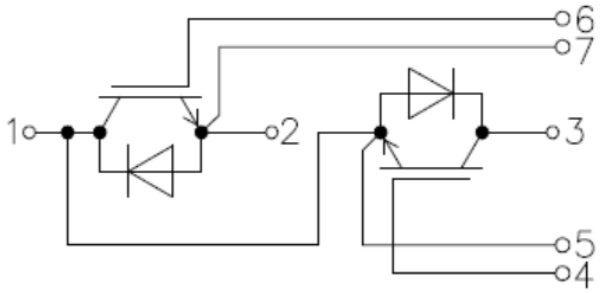
switching losses Diode, Inverter (typical)

$E_{rec} = f(R_G)$

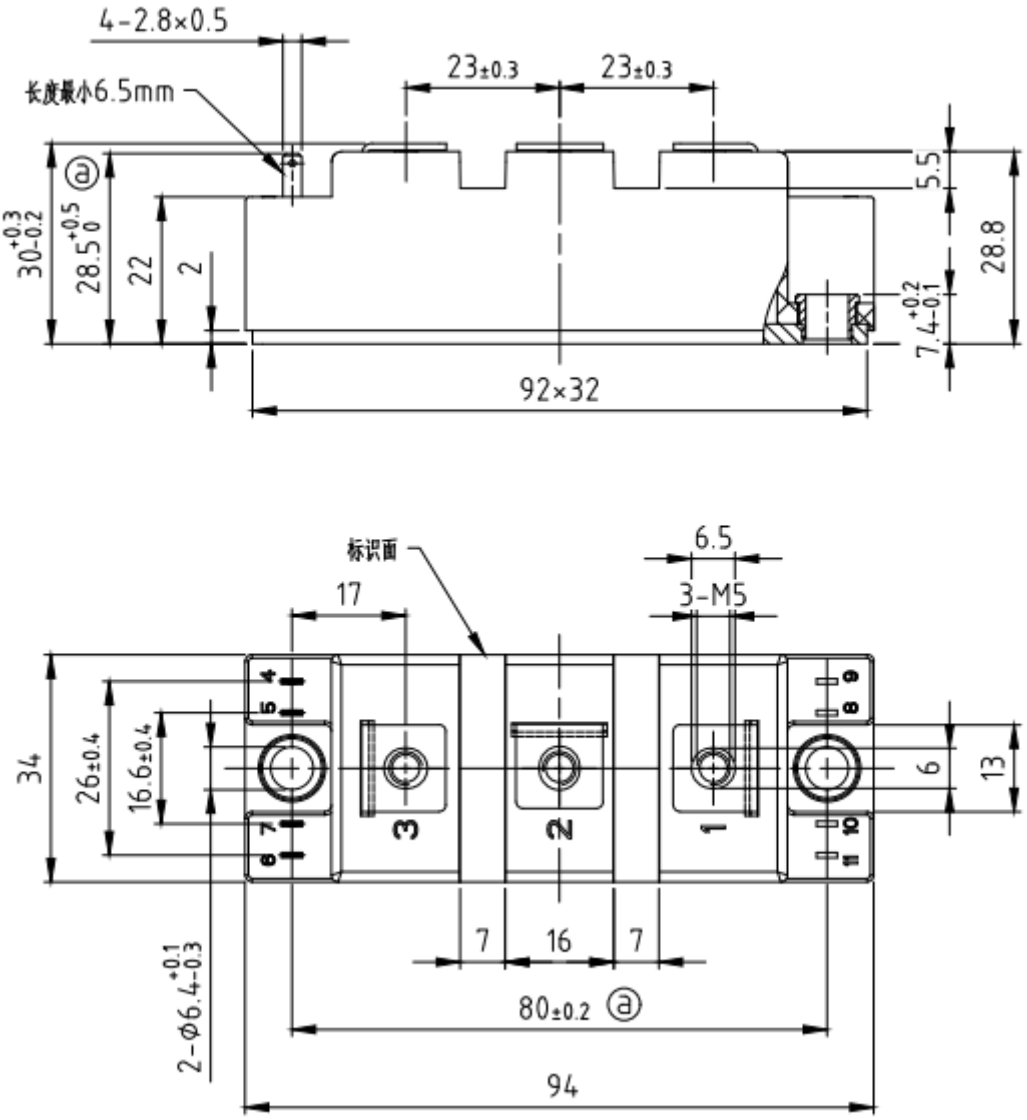
I_F=75A, V_{CE}=600V



Circuit diagram headline



Package outlines（Unit：mm）



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序号 Item	日期 Date	变更记录及描述 Change History Description	版本序号 Rev. item	经办人 Responsibility
1	2023.5.4	初版规格书发布，版本为V1.0	2023 5 Ver1.0	梁华文
2	2023.5.5	更新高温数据和曲线，版本为V1.1	2023 5 Ver1.1	梁华文