MPFF200R12RB

1200V 200A IGBT Module

Electrical Features

- Trench/Fieldstop IGBT
- Low VCE(sat)
- VCE(sat) with positive temperature coefficient
- 10 μ s short circuit capability
- Fast&soft reverse recovery anti-parallel FWD
- Low inductance case

Typical Applications

- UPS System
- Welding Machine
- High Frequency Swithing Application

IGBT，Inverter

Maximum Rated Values					
Symbol	Item	Conditions		Rating	Unit
IGBT					
V_{CES}	Collector-emitter voltage	T_{vj}=25°C		1200V	V
V_{GES}	Gate-emitter voltage	-		±20	V
I_C	Collector current,DC	T_C=100°C,T_{vj}=175°C		200	A
I_{CRM}	Repetitive peak collector current	t_p=1ms		400	A
t_{SC}	Short circuit withstand time	V_{GE}=15V, V_{CC}=600V, T_{vj}≤150°C		5	us
P_{tot}	Total power dissipation	T_C=25°C,T_{vj}=175°C		1071	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°C		-	-	1	mA
I_{GES}	Gate leakage current	V_{CE}=0V,V_{GE}=20V,T_{vj}=25°C		-	-	250	nA
$V_{GE(th)}$	Gate-emitter threshold voltage	I_C=7.4mA,V_{CE}=V_{GE},T_{vj}=25°C		5.0	6.0	7.0	V
V_{CEsat}	Collector-emitter saturation voltage	I_C=200A V_{GE}=15V	T_{vj}=25°C	-	1.97	2.3	V
			T_{vj}=125°C	-	2.26	-	
			T_{vj}=150°C	-	2.3	-	
C_{ies}	Input capacitance	V_{CE}=25V,V_{GE}=0V f=1MHz,T_{vj}=25°C		-	14.1	-	nF
C_{res}	Reverse transfer capacitance			-	0.48	-	
Q_G	Gate charge	V_{CC}=600V, I_C=200A, V_{GE}=15V		-	803	-	uC
R_g	Internal gate resistance	T_{vj}=25°C			0.84		Ω

$t_{d(on)}$	Turn-on delay time	V_{CC}=600V, I_C=200A, V_{GE}=±15V, $R_{G(on)}$=10 Ω, $R_{G(off)}$=10 Ω, L_{load}=200uH	T_{vj}=25℃	-	169.6	-	ns
			T_{vj}=125℃	-	156.8	-	
			T_{vj}=150℃	-	158.4	-	
t_r	Rise time		T_{vj}=25℃	-	110.4	-	
			T_{vj}=125℃	-	113.6	-	
			T_{vj}=150℃	-	110.4	-	
$t_{d(off)}$	Turn-off delay time		T_{vj}=25℃	-	392.0	-	
			T_{vj}=125℃	-	444.8	-	
			T_{vj}=150℃	-	491.2	-	
t_f	Fall time		T_{vj}=25℃	-	219.2	-	
			T_{vj}=125℃	-	291.2	-	
			T_{vj}=150℃	-	307.2	-	
E_{on}	Turn-on energy (per pulse)		T_{vj}=25℃	-	22.7	-	mJ
			T_{vj}=125℃	-	30.3	-	
			T_{vj}=150℃	-	33.1	-	
E_{off}	Turn-off energy (per pulse)		T_{vj}=25℃	-	17.1	-	
			T_{vj}=125℃	-	21.4	-	
			T_{vj}=150℃	-	22.5	-	
R_{thJC}	Thermal resistance,junction to case	per IGBT		-	-	0.14	K/W
R_{thCH}	Thermalresistance,case to heatsink	per IGBT/ λgrease=1W/(m·K)		-	0.04	-	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℃	100	A
I_{FRM}	Repetitive peak forward current	t_p=1ms	200	A

Characteristic Values

V_F	Continuous forward voltage	I_F=100A V_{GE}=0V	T_{vj}=25℃	-	1.67	-	V
			T_{vj}=125℃	-	1.51	-	
			T_{vj}=150℃	-	1.45	-	
I_{RM}	Peak reverse recovery current	V_R=600V I_F=100A di_F/dt=-1400A/μs	T_{vj}=25℃	-	-	-	A
			T_{vj}=125℃	-	119.0	-	
			T_{vj}=150℃	-	132.5	-	
t_{rr}	Reverse recovery time		T_{vj}=25℃	-	-	-	ns
			T_{vj}=125℃	-	459.2	-	
			T_{vj}=150℃	-	484.0	-	
Q_r	Repetitive peak forward current		T_{vj}=25℃	-	-	-	μC
			T_{vj}=125℃	-	23.3	-	
			T_{vj}=150℃	-	28.3	-	
E_{rec}	Recovered charge		T_{vj}=25℃	-	-	-	mJ
			T_{vj}=125℃	-	8.83	-	
			T_{vj}=150℃	-	10.55	-	

R_{thJC}	Thermal resistance, junction to case	per diode	-	-	0.27	K/W
R_{thCH}	Thermalresistance,case to heatsink	per IGBT/ λgrease=1W/(m·K)	-	0.04	-	K/W
T_{vjop}	Temperature under switching conditions		-40		150	℃

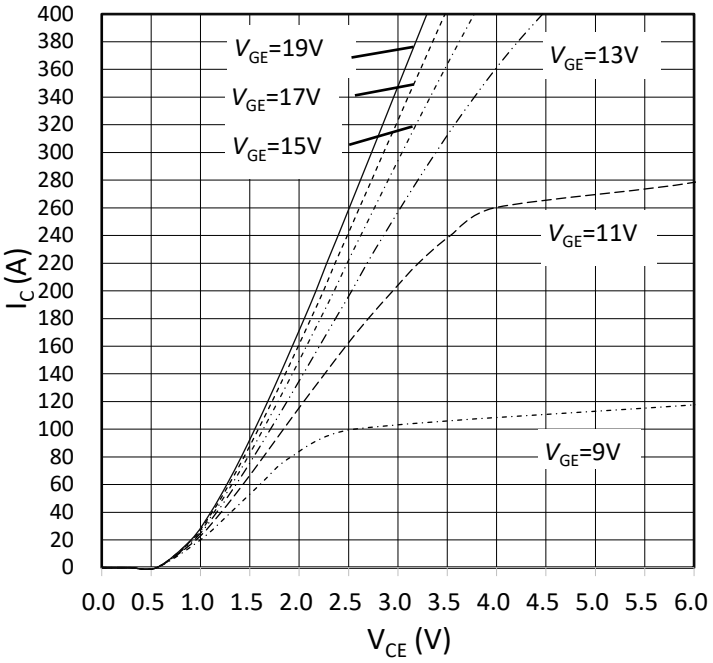
Module

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 M6	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)

$I_C = f(V_{CE})$

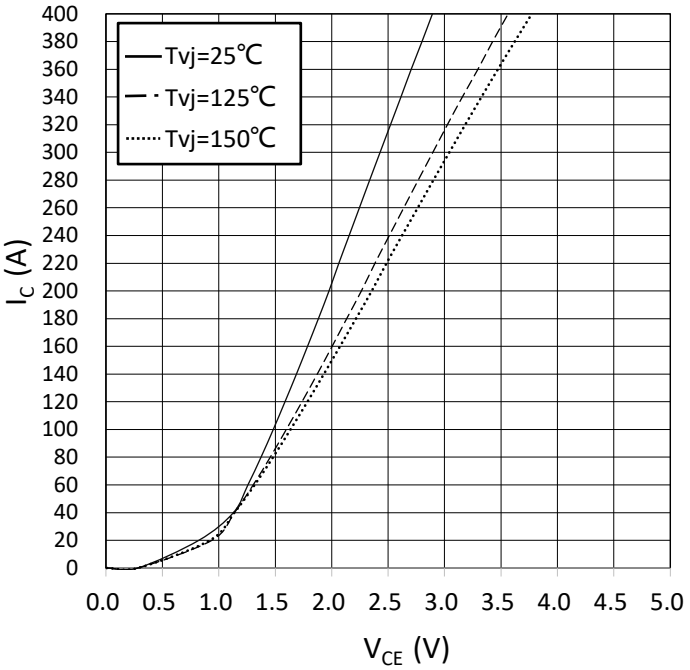
$V_{GE} = 15$ V



output characteristic IGBT, Inverter (typical)

$I_C = f(V_{CE})$

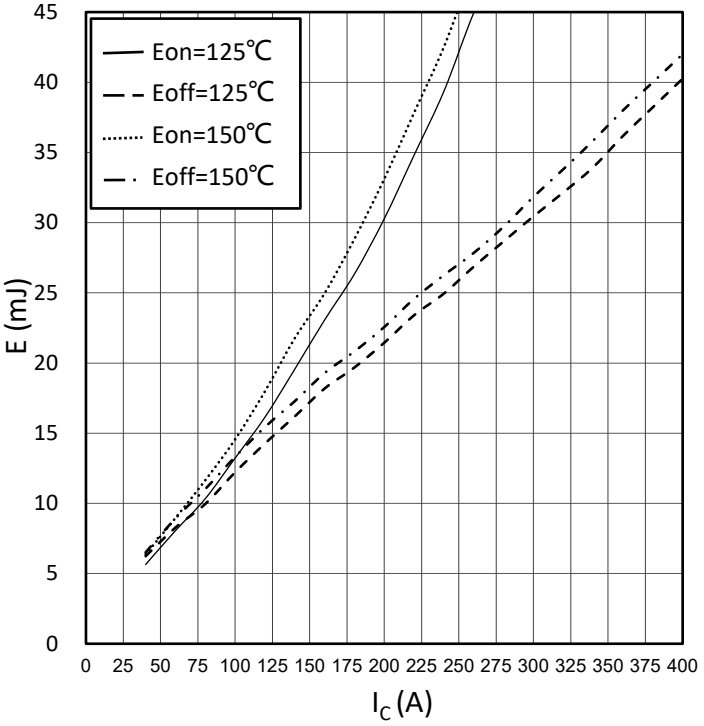
$T_{vj} = 150℃$



switching losses IGBT,Inverter(typical)

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

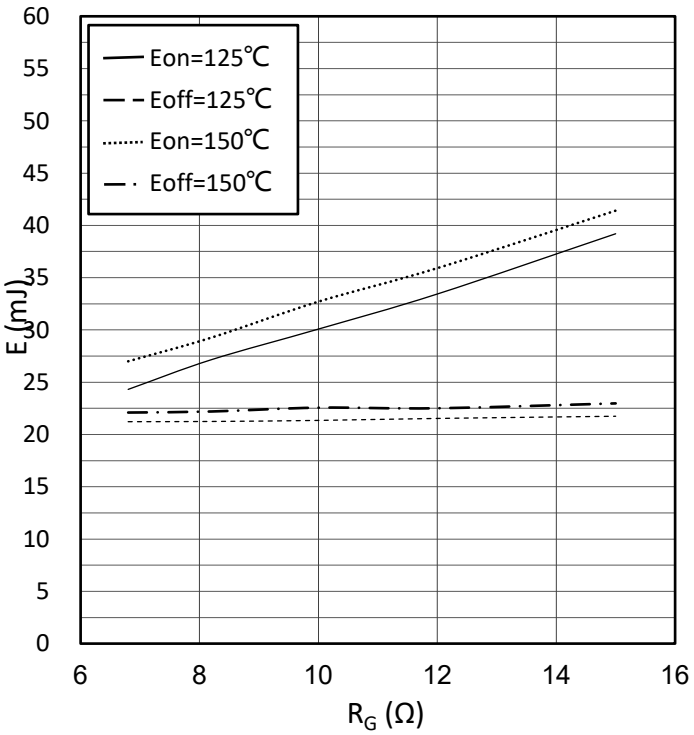
$V_{GE} = \pm 15V$, $R_{Gon} = 10\Omega$, $R_{Goff} = 10\Omega$, $V_{CE} = 600V$



switching losses IGBT,Inverter(typical)

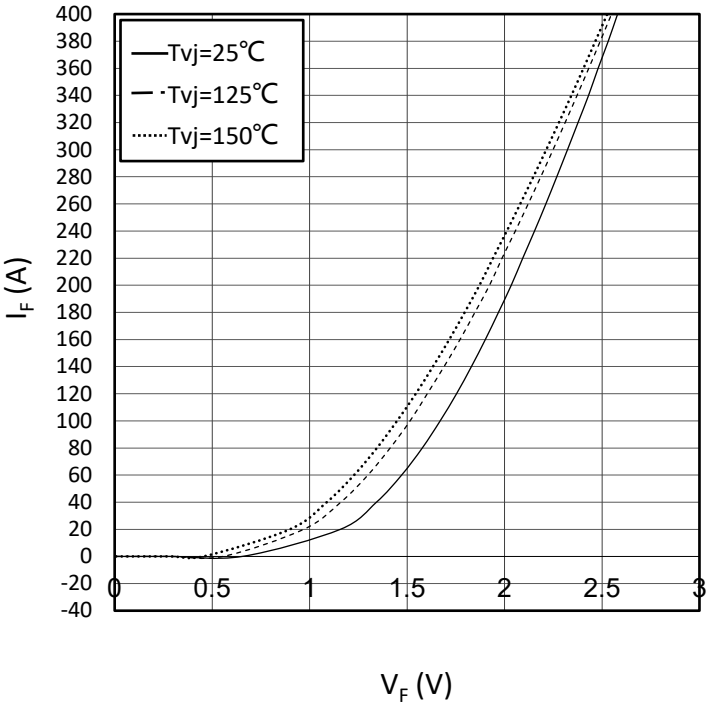
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$

$V_{GE} = \pm 15V$, $I_C = 200A$, $V_{CE} = 600V$



forward characteristic of Diode, Inverter (typical)

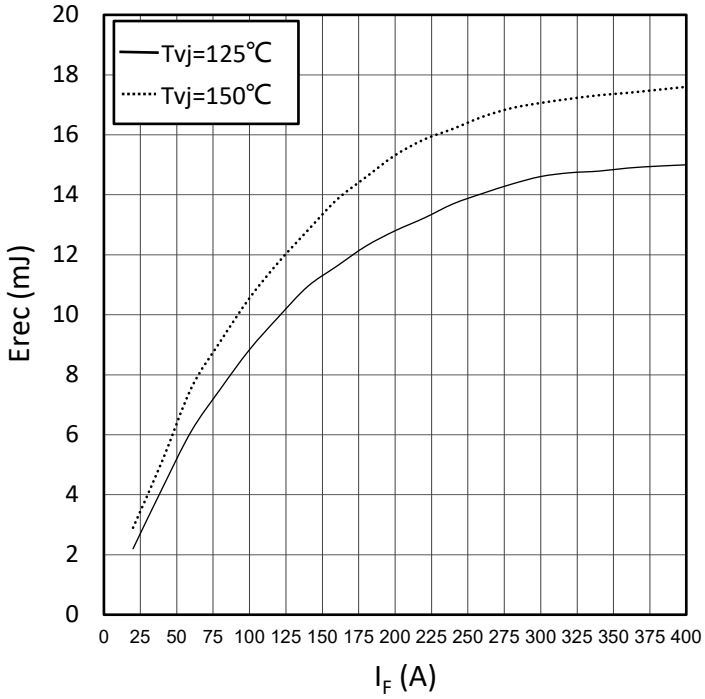
$I_F = f(V_F)$



switching losses Diode, Inverter (typical)

$E_{rec} = f(I_F)$

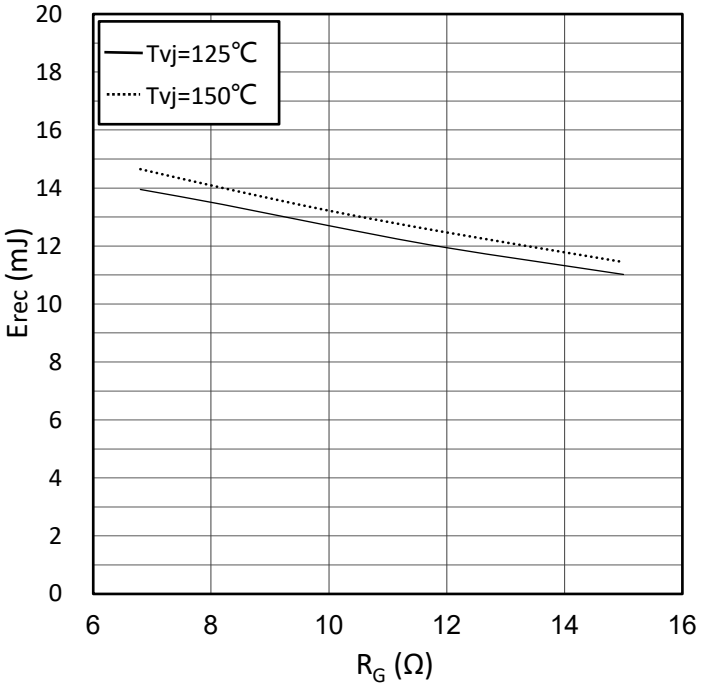
R_{Gon}=10Ω, V_{CE}=600V



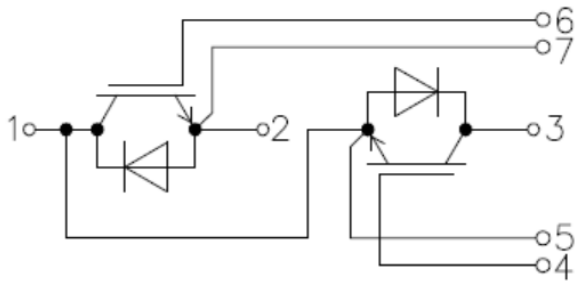
switching losses Diode, Inverter (typical)

$E_{rec} = f(R_G)$

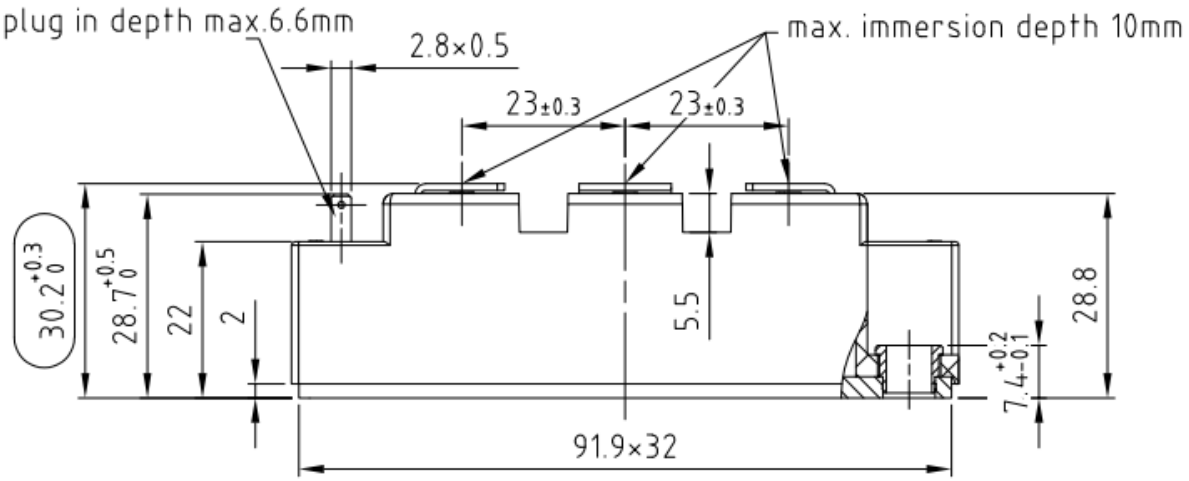
I_F=200A, V_{CE}=600V

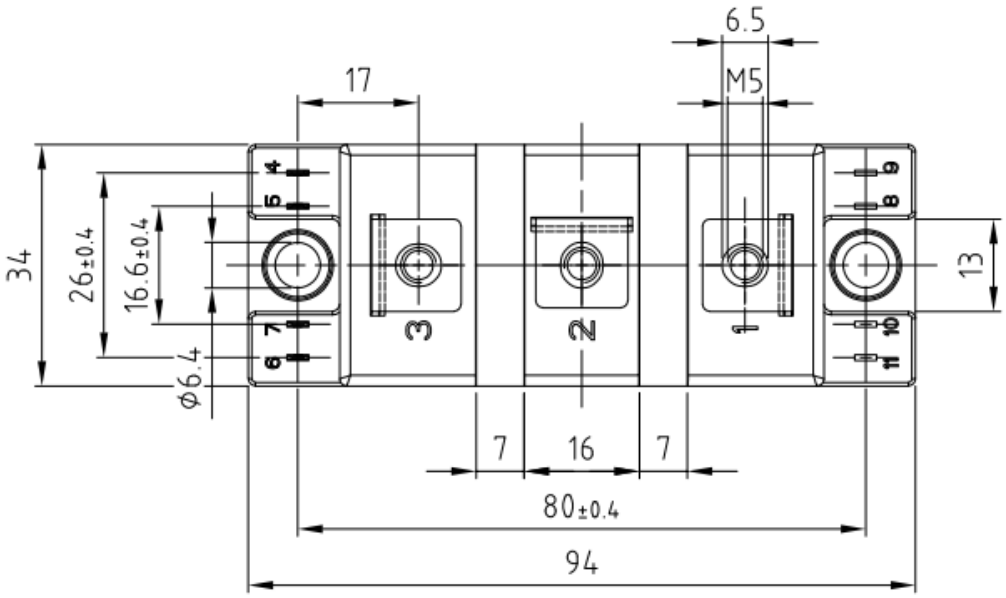


Circuit diagram headline



Package outlines（Unit：mm）





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