MPFF150R12KB

1200V 150A IGBT Module

Electrical Features

- Trench/Fieldstop IGBT
- Half-bridge
- Standard package
- Including anti-parallel FWD

Typical Applications

- UPS System
- Motor Drivers
- 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		1200	V
V_{GES}	Gate-emitter voltage	-		±20	V
I_C	Collector current,DC	T_C=100°C,T_{vj}=175°C		150	A
I_{CRM}	Repetitive peak collector current	t_p=1ms		300	A
P_{tot}	Total power dissipation	T_C=25°C,T_{vj}=175°C		937	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=5.7mA,V_{CE}=V_{GE},T_{vj}=25°C		5	5.8	7	V
V_{CEsat}	Collector-emitter saturation voltage	I_C=150A V_{GE}=15V	T_{vj}=25°C	-	1.81	2.3	V
			T_{vj}=125°C	-	2.16	-	
			T_{vj}=150°C	-	2.26	-	
C_{ies}	Input capacitance	V_{CE}=25V,V_{GE}=0V f=1MHz,T_{vj}=25°C		-	9.7	-	nF
C_{res}	Reverse transfer capacitance			-	0.3	-	
Q_G	Gate charge	V_{CC}=600V, I_C=150A, V_{GE}=15V		-	1.2	-	μC

$t_{d(on)}$	Turn-on delay time	V_{CC}=600V I_C=150A V_{GE}=±15V $R_{G(on)}$=10 Ω $R_{G(off)}$=10 Ω Inductive load	T_{vj}=25℃	-	81.6	-	ns
			T_{vj}=125℃	-	93.2	-	
			T_{vj}=150℃	-	95.4	-	
t_r	Rise time		T_{vj}=25℃	-	38.5	-	
			T_{vj}=125℃	-	42.1	-	
			T_{vj}=150℃	-	43.2	-	
$t_{d(off)}$	Turn-off delay time		T_{vj}=25℃	-	243.2	-	
			T_{vj}=125℃	-	265.6	-	
			T_{vj}=150℃	-	272.0	-	
t_f	Fall time		T_{vj}=25℃	-	164.8	-	
			T_{vj}=125℃	-	192.0	-	
			T_{vj}=150℃	-	211.2	-	
E_{on}	Turn-on energy (per pulse)	V_{CC}=600V，I_C=150A V_{GE}=±15V，$R_{G(on)}$=10Ω di/dt=8780A/μs(T_{vj}=150℃)	T_{vj}=25℃	-	9.40	-	mJ
			T_{vj}=125℃	-	13.16	-	
			T_{vj}=150℃	-	14.71	-	
E_{off}	Turn-off energy (per pulse)	V_{CC}=600V，I_C=150A V_{GE}=±15V，$R_{G(off)}$=10Ω du/dt=6800V/μs(T_{vj}=150℃)	T_{vj}=25℃	-	7.39	-	
			T_{vj}=125℃	-	9.81	-	
			T_{vj}=150℃	-	10.31	-	
R_{thJC}	Thermal resistance,junction to case	per IGBT		-	-	0.16	K/W
R_{thCH}	Thermalresistance,case to heatsink	per IGBT/ λgrease=1W/(m·K)		-	0.03	-	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		60	A
I_{FRM}	Repetitive peak forward current	t_p=1ms	120	A

Characteristic Values

V_F	Continuous forward voltage	I_F=60A V_{GE}=0V	T_{vj}=25℃	-	1.86	2.3	V
			T_{vj}=125℃	-	1.57	-	
			T_{vj}=150℃	-	1.48	-	
I_{RM}	Peak reverse recovery current	V_R=600V I_F=150A V_{GE}=-15V -di$_F$/dt=5200A/μs (T_{vj}=150℃)	T_{vj}=25℃	-	164	-	A
			T_{vj}=125℃	-	180	-	
			T_{vj}=150℃	-	192	-	
t_{rr}	Reverse recovery time		T_{vj}=25℃	-	68.7	-	ns
			T_{vj}=125℃	-	114.9	-	
			T_{vj}=150℃	-	138.6	-	
Q_r	Recovered charge		T_{vj}=25℃	-	6.0	-	μC
			T_{vj}=125℃	-	20.6	-	
			T_{vj}=150℃	-	24.7	-	
E_{rec}	Reverse recovery energy		T_{vj}=25℃	-	2.69	-	mJ
			T_{vj}=125℃	-	11.86	-	
			T_{vj}=150℃	-	14.16	-	

R_{thJC}	Thermal resistance, junction to case	per diode	-	-	0.3	K/W
R_{thCH}	Thermal resistance,case to heatsink	per diode/ λgrease=1W/(m·K)	-	0.06	-	K/W
T_{vjop}	Temperature under switching conditions		-40		150	℃

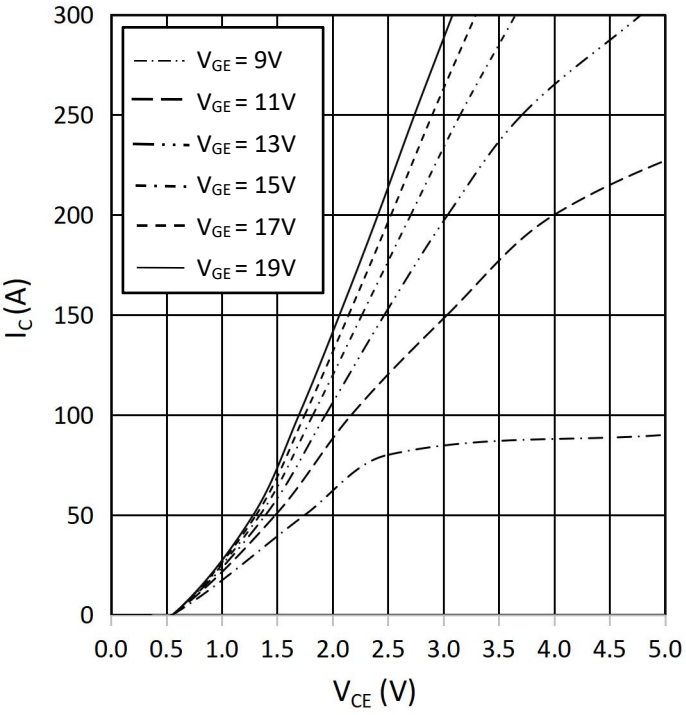
Module

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	-	6.0	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	-	-	315	-	g

output characteristic IGBT, Inverter (typical)

$I_C = f(V_{CE})$

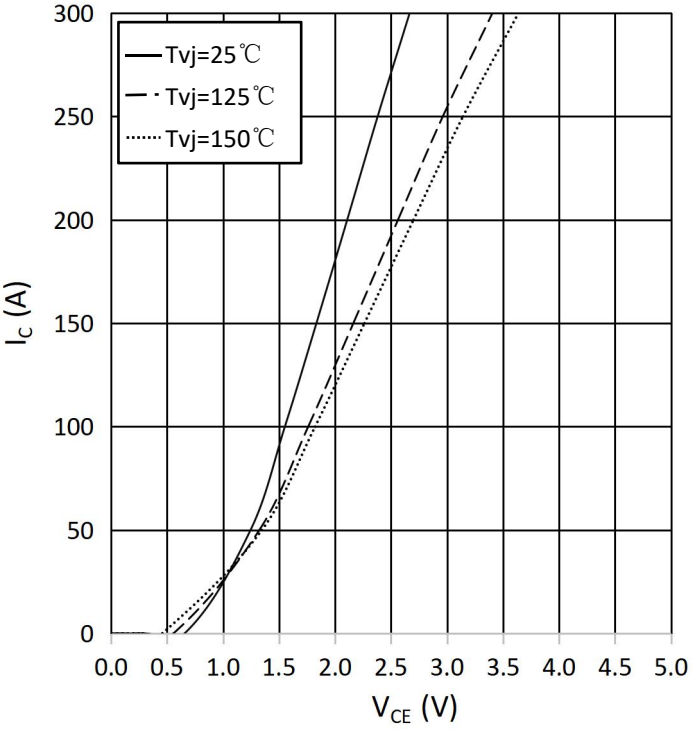
$T_{vj} = 150℃$



output characteristic IGBT, Inverter (typical)

$I_C = f(V_{CE})$

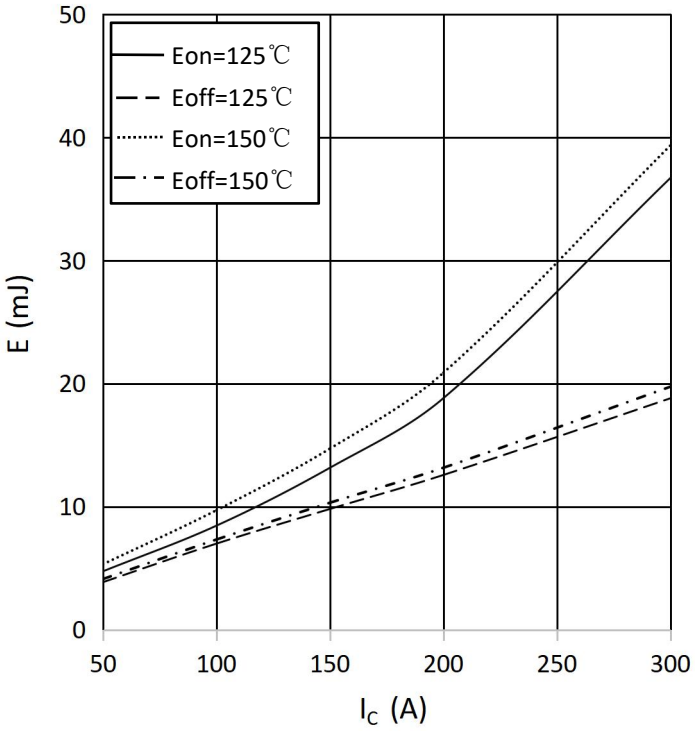
$V_{GE} = 15\ V$



switching losses IGBT,Inverter(typical)

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

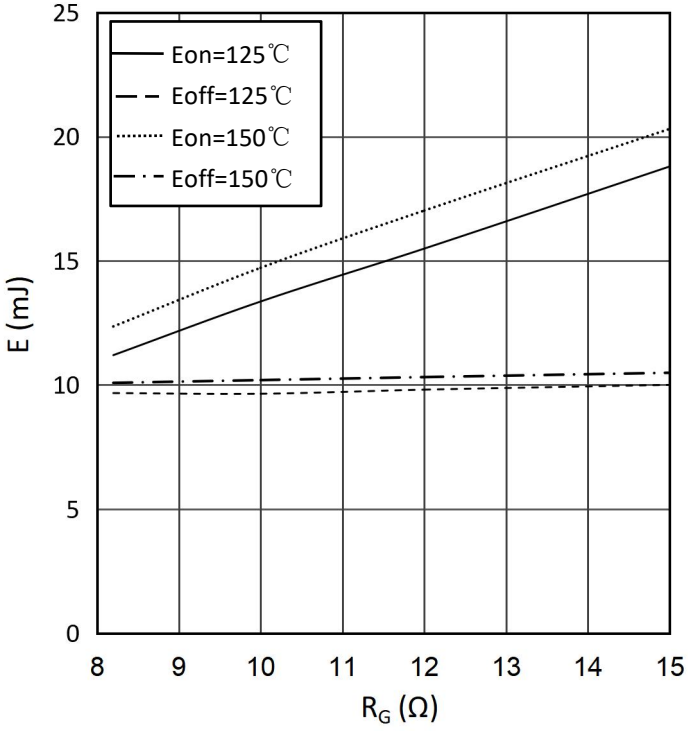
$V_{GE} = \pm 15V$, $R_{Gon} = 10\Omega$, $R_{Goff} = 10\Omega$, $V_{CE} = 600V$



switching losses IGBT,Inverter(typical)

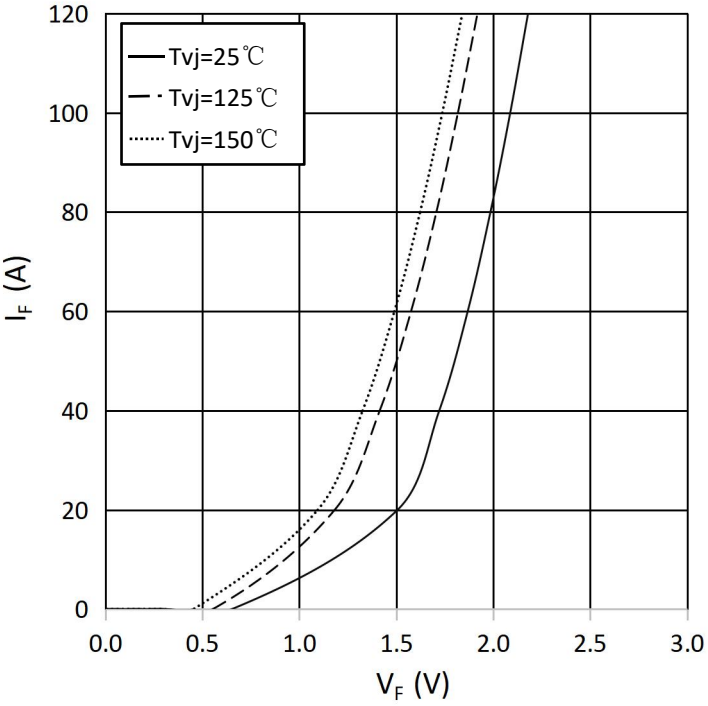
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$

$V_{GE} = \pm 15V$, $I_C = 150A$, $V_{CE} = 600V$



forward characteristic of Diode, Inverter (typical)

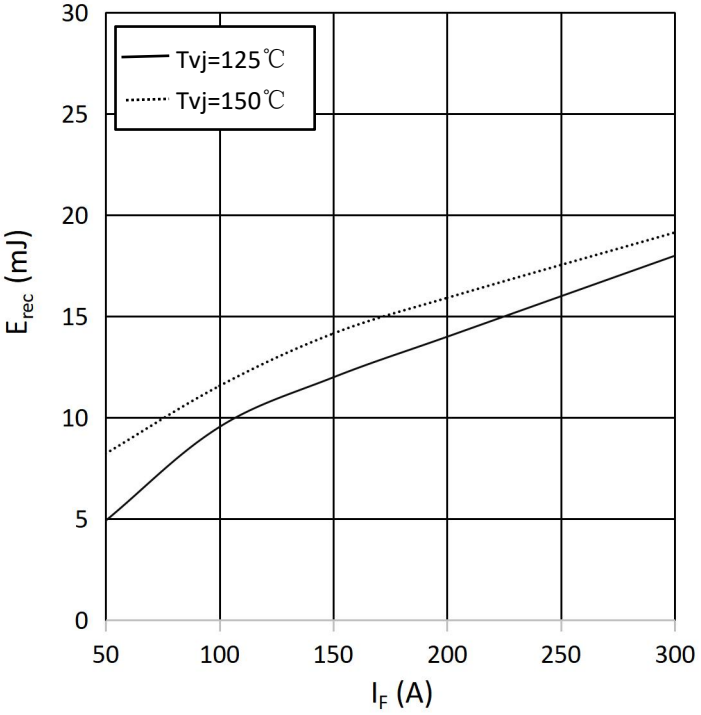
$I_F = f(V_F)$



switching losses Diode, Inverter (typical)

$E_{rec} = f(I_F)$

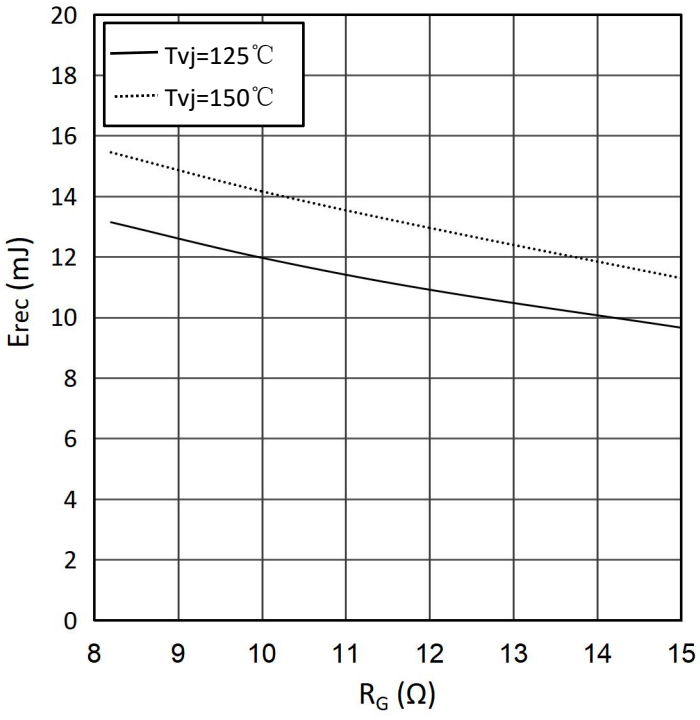
R_{Gon}=10Ω, V_{CE}=600V



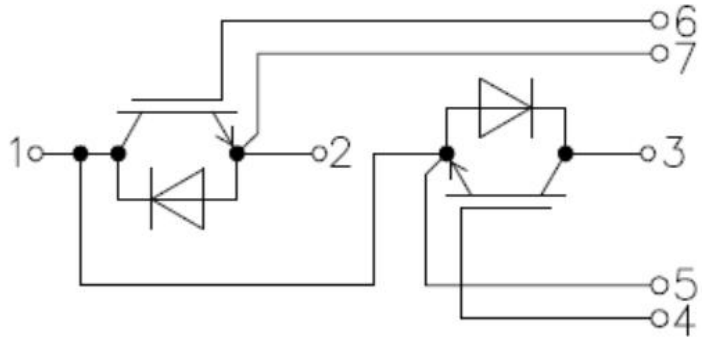
switching losses Diode, Inverter (typical)

$E_{rec} = f(R_G)$

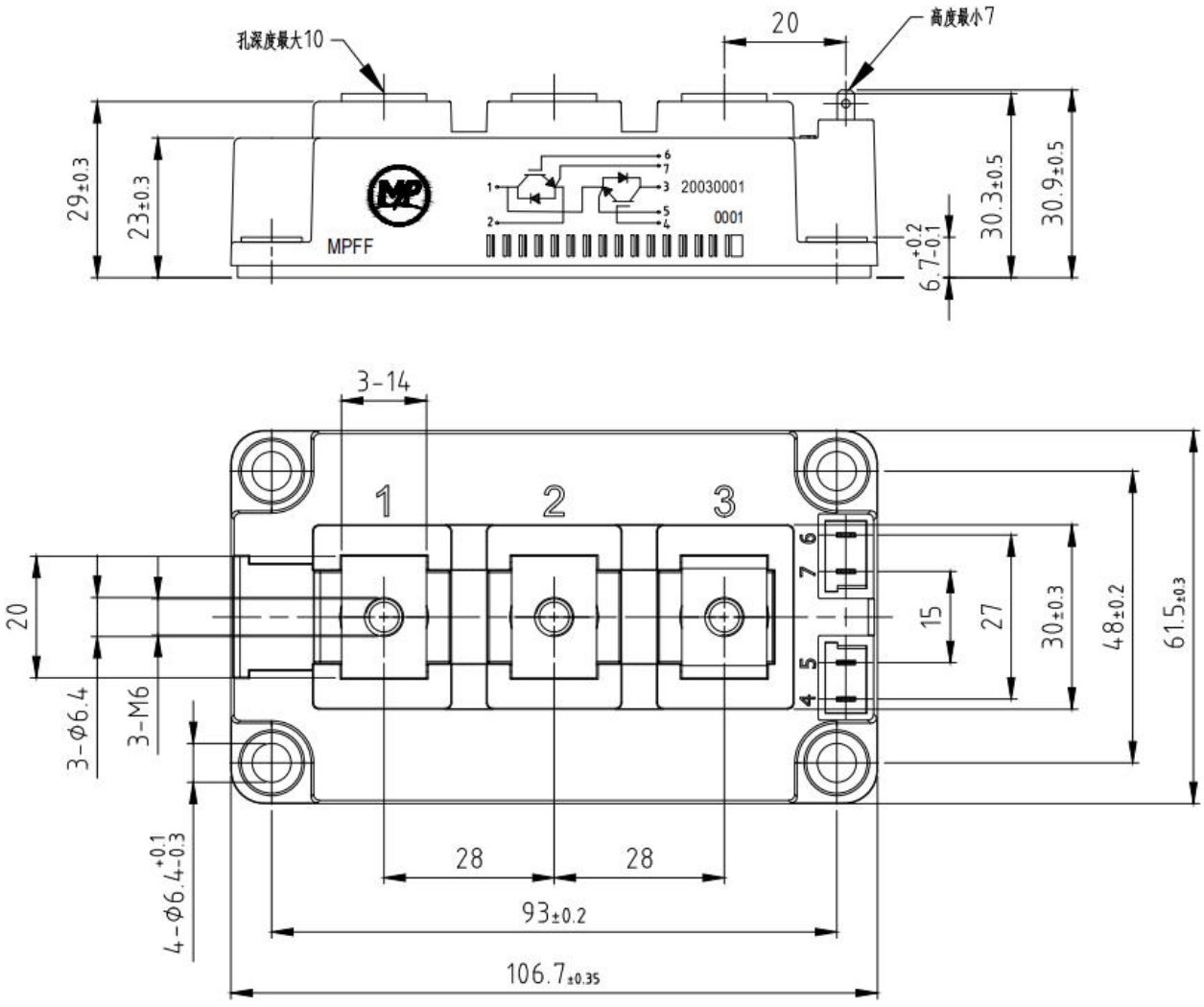
I_F=150A, V_{CE}=600V



Circuit diagram headline



Package outlines（Unit：mm）



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