QMFF200R12EFF

1200V 200A IGBT Module

Electrical Features

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

Typical Applications

- Frequency converter
- UPS

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℃	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℃	10	us
P_{tot}	Total power dissipation	T_C=25℃ ,T_{vj}= 175℃	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℃		-	-	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=7.4mA,V_{CE}=V_{GE},T_{vj}=25℃		5	6	7	V
V_{CEsat}	Collector-emitter saturation voltage	I_C=200A V_{GE}= 15V	T_{vj}=25℃	-	1.80	2.4	V
			T_{vj}= 125℃	-	2.01	-	
			T_{vj}= 150℃	-	2.09	-	
C_{ies}	Input capacitance	V_{CE}=25V,V_{GE}=0V f=1MHz,T_{vj}=25℃		-	15.6	-	nF
C_{res}	Reverse transfer capacitance			-	0.48	-	
Q_G	Gate charge	V_{CC}=600V, I_C=200A, V_{GE}= 15V		-	1.2	-	uC

$t_{d(on)}$	Turn-on delay time	V_{CC}=600V, I_C=200A, V_{GE}=±15V, $R_{G(on)}$=3.9 Ω, $R_{G(off)}$=3.9 Ω, Inductive load	T_{vj}=25°C	_	220.8	_	ns
			T_{vj}= 125°C	_	225.6	_	
			T_{vj}= 150°C	_	211.2	_	
t_r	Rise time		T_{vj}=25°C	_	57.7	_	
			T_{vj}= 125°C	_	67.7	_	
			T_{vj}= 150°C	_	74.1	_	
$t_{d(off)}$	Turn-off delay time		T_{vj}=25°C	_	345.0	_	
			T_{vj}= 125°C	_	413.3	_	
			T_{vj}= 150°C	_	405.8	_	
t_f	Fall time		T_{vj}=25°C	_	175.4	_	
			T_{vj}= 125°C	_	214.9	_	
			T_{vj}= 150°C	_	270.4	_	
E_{on}	Turn-on energy (per pulse)		T_{vj}=25°C	_	15.4	_	mJ
			T_{vj}= 125°C	_	23.1	_	
			T_{vj}= 150°C	_	25.4	_	
E_{off}	Turn-off energy (per pulse)		T_{vj}=25°C	_	13.2	_	
			T_{vj}= 125°C	_	17.2	_	
			T_{vj}= 150°C	_	18.9	_	
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)		_	0.078	_	K/W
T_{vjop}	Temperature under switching conditions			-40		150	°C

Diode， Inverter

Maximum Rated Values

Symbol	Item	Conditions	Rating	Unit
V_{RRM}	Repetitive peak reverse voltage	T_{vj}=25°C	1200	V
I_F	Forward current,DC		200	A
I_{FRM}	Repetitive peak forward current	t_p= 1ms	400	A

Characteristic Values

V_F	Continuous forward voltage	I_F=200A V_{GE}=0V	T_{vj}=25°C	_	1.73	_	V
			T_{vj}= 125°C	_	1.44	_	
			T_{vj}= 150°C	_	1.38	_	
I_{RM}	Peak reverse recovery current	V_R=600V I_F=200A di_F/dt=-4375A/μs	T_{vj}=25°C	_	189	_	A
			T_{vj}= 125°C	_	281	_	
			T_{vj}= 150°C	_	295	_	
t_{rr}	Reverse recovery time		T_{vj}=25°C	_	113.4	_	ns
			T_{vj}= 125°C	_	207.9	_	
			T_{vj}= 150°C	_	224.1	_	
Q_r	Repetitive peak forward current		T_{vj}=25°C	_	15.5	_	μC
			T_{vj}= 125°C	_	39.4	_	
			T_{vj}= 150°C	_	45.7	_	
E_{rec}	Recovered charge		T_{vj}=25°C	_	7.7	_	mJ
			T_{vj}= 125°C	_	18.5	_	
			T_{vj}= 150°C	_	21.4	_	

R_{thJC}	Thermal resistance, junction to case	per diode	-	-	0 2	K/W
R_{thCH}	Thermalresistance,case to heatsink	per IGBT/ λgrease= 1W/(m·K)	-	0. 14	-	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

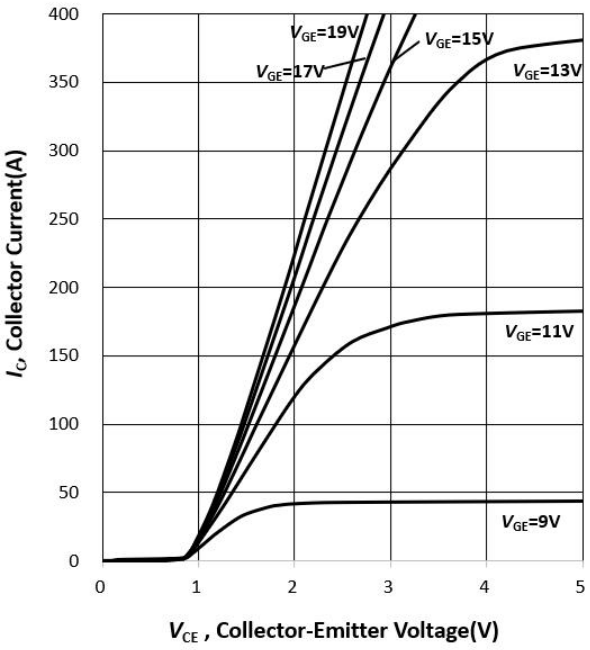


Figure 1 IGBT output characteristic
(T_{vj}=25℃)

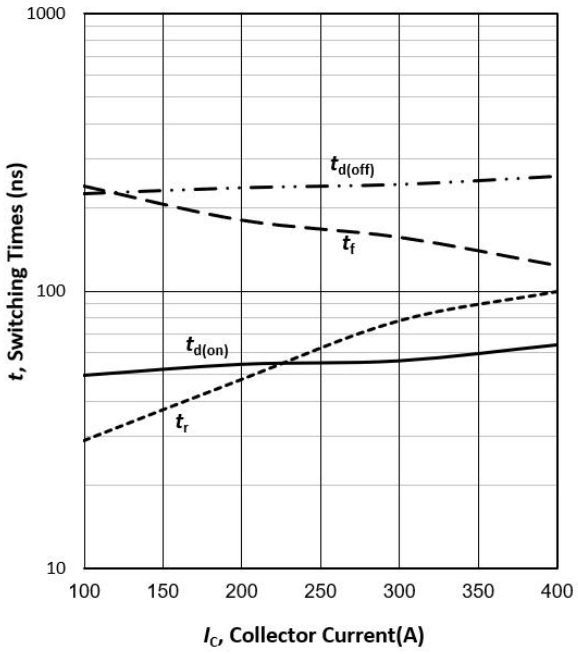


Figure 2 IGBT switching times as a function of collector current
(inductive load, T_{vj}=25℃, V_{CE}=600V, V_{GE}=-15/15V, R_G=2.5Ω)

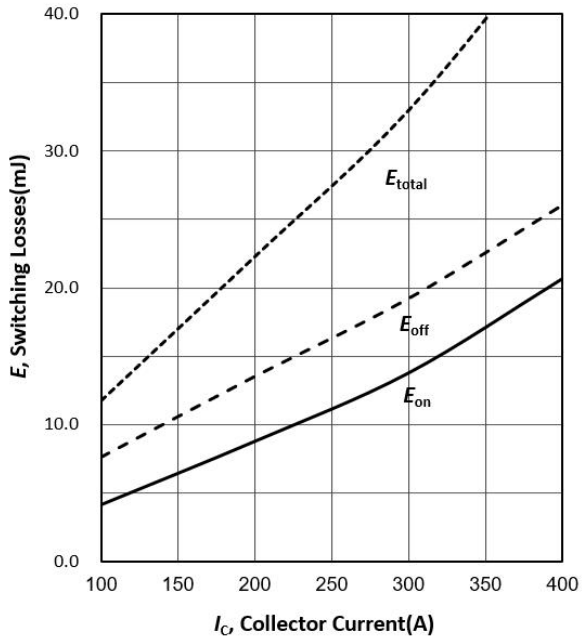


Figure 3 IGBT switching energy losses as a function of collector current
(inductive load, T_{vj}=25℃, V_{CE}=600V, V_{GE}=- 15/ 15V, R_G=2.5Ω)

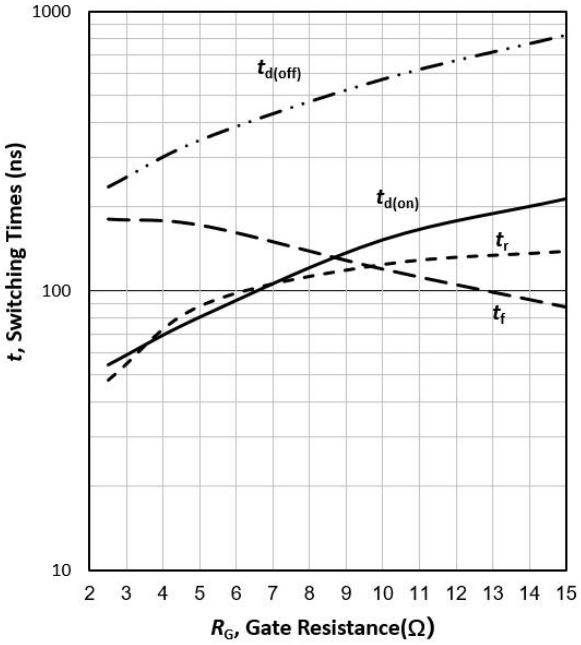


Figure 4 IGBT switching times as a function of gate resistor
(inductive load, T_{vj}=25℃, V_{CE}=600V, V_{GE}=- 15/ 15V, I_C=200A)

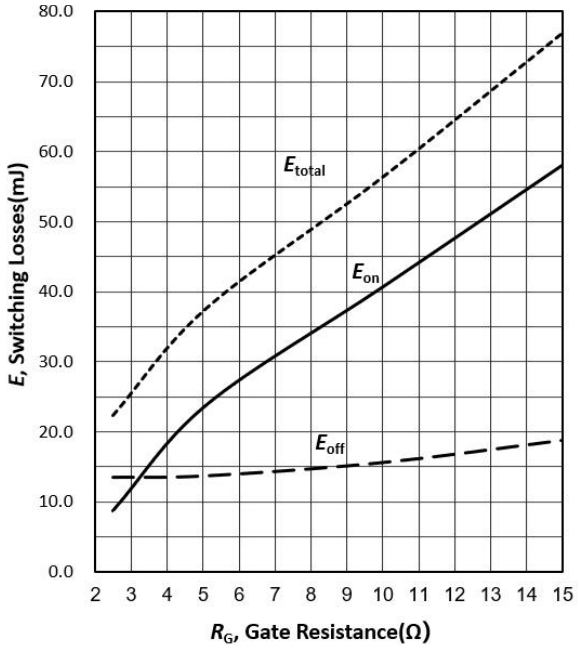


Figure 5 IGBT switching energy losses as a function of gate resistor
(inductive load, T_{vj}=25℃, V_{CE}=600V, V_{GE}=-15/ 15V, I_C=200A)

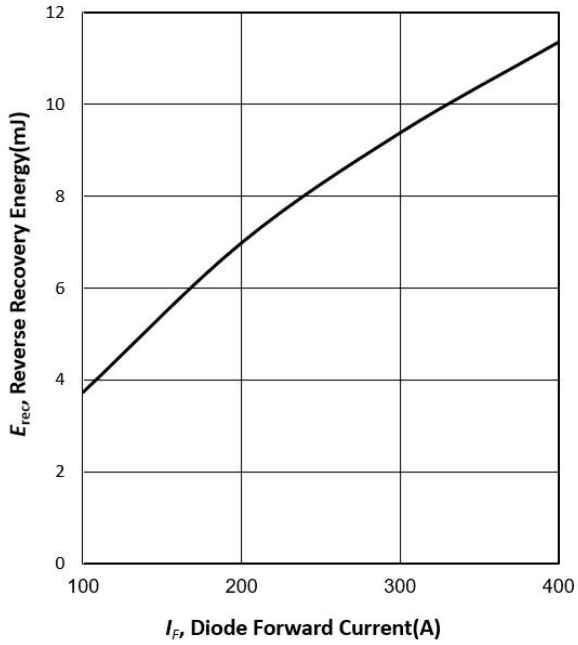


Figure 6 Diode reverse recovery energy as a function of forward current
(T_{vj}=25℃,V_{CE}=600V, R_G=2.5Ω)

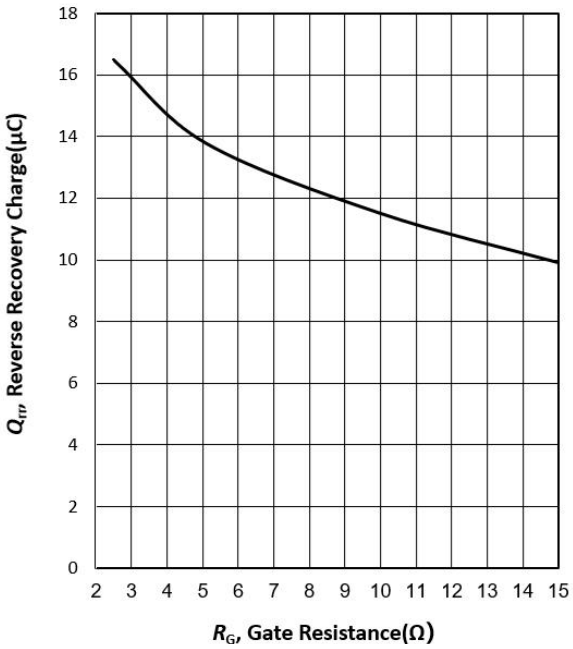


Figure 7 Diode reverse recovery charge as a function of gate resistor
(T_{vj}=25℃,V_{CE}=600V, I_F=200A)

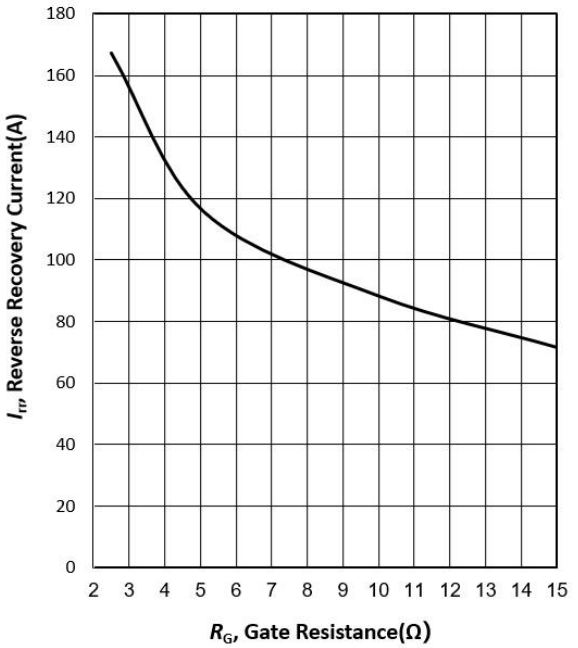
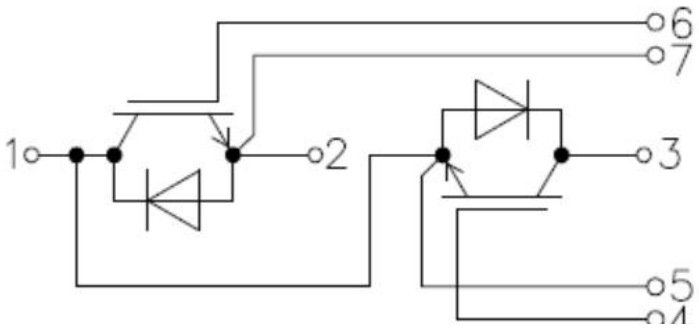
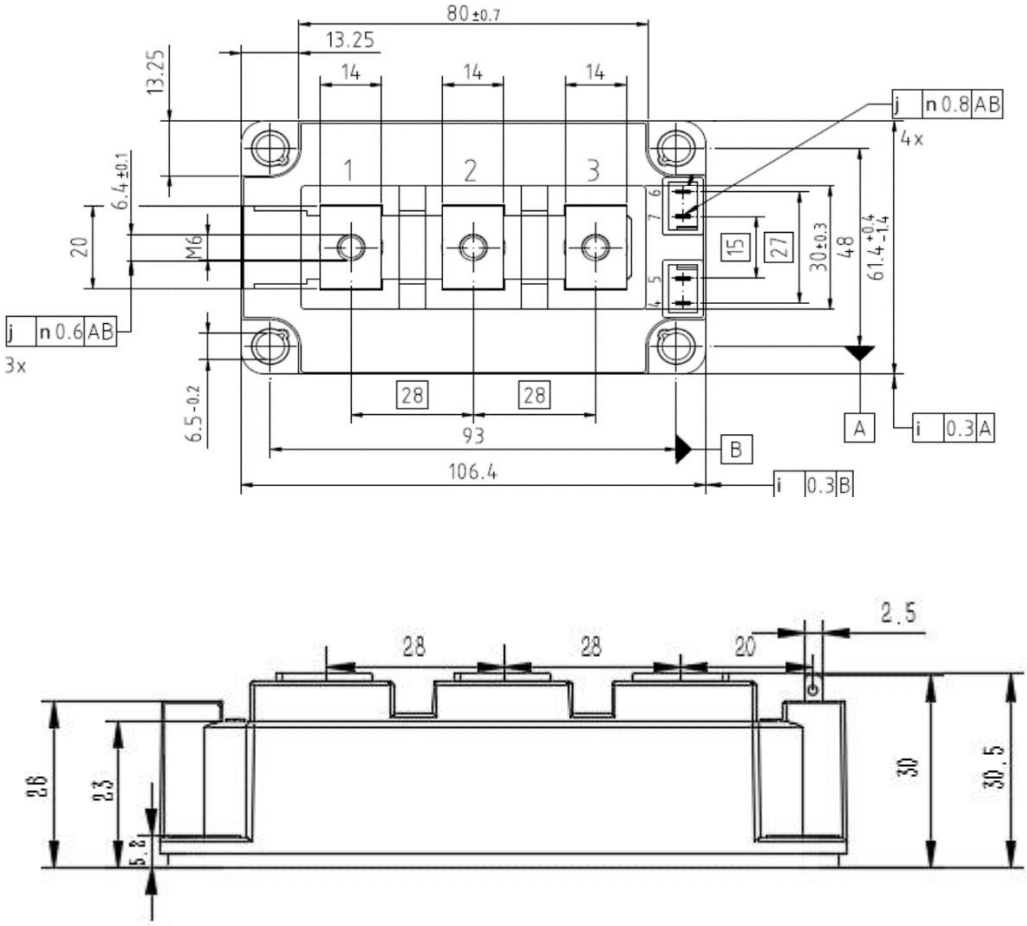


Figure 8 Diode peak reverse recovery current as a function of gate resistor
(T_{vj}=25℃,V_{CE}=600V, I_F=200A)

Circuit diagram headline



Package outlines （Unit：mm）



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