QMFF150R12AF

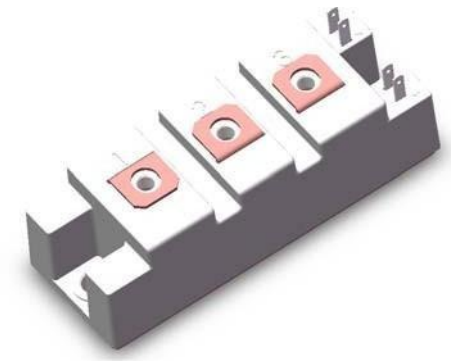
1200V 150A IGBT module

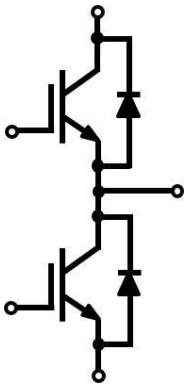
Electrical Features

- Trench/Fieldstop IGBT
- Fast switching speed, saturation voltage drop, saturation voltage drop to positive temperature coefficient
- Short circuit withstand time 10μs
- Including anti-parallel FWD
- High reliability and thermal stability, good Item consistency

Typical Applications

- Inverter welding machine
- Induction heating





IGBT，Inverter（Tvj=25℃）
Maximum Rated Values

Item	Conditions	Symbol	Values	Unit
Collector-emitter voltage	T_{vj}=25℃	V_{CES}	1200	V
Collector current,DC	T_C=100℃, T_{vjmax}=175℃	I_{Cnom}	150	A
Repetitive peak collector current	t_p=1ms	I_{CRM}	300	
Gate-emitter voltage		V_{GES}	±20	V
Short circuit withstand time	V_{GE}=15V, V_{CC}=600V, T_{vj}≤150°C	t_{SC}	10	μs
Total power dissipation	T_C=25℃, T_{vjmax}=175℃	P_{tot}	789	W

Characteristics Values

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Collector-emitter saturation voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=150A T_{vj}=25°C	-	2.0	2.4	V
Gate-emitter threshold voltage	$V_{GE(th)}$	I_C=5.7mA, V_{CE}=V_{GE}	5	6.0	7.0	
Collector-emitter cut-off current	I_{CES}	V_{CE}=1200V, V_{GE}=0V T_{vj}=25°C	-	-	1	mA
Gate leakage current	I_{GES}	V_{CE}=0V, V_{GE}=20V	-	-	250	nA
Input capacitance	C_{iss}	V_{CE}=25V, f=1MHz	-	9.67	-	nF
Revers transfer capacitance	C_{rss}		-	0.30	-	
Gate charge	Q_G	V_{CC}=600V, I_C=150A, V_{GE}=15V	-	569	-	nC
Turn-on delay time	$t_{d(on)}$	T_{vj}=25°C, V_{CC}=600V, I_C=150A, V_{GE}=±15V, R_G=5.1Ω, Inductive load	-	82	-	ns
Rise time	t_r		-	42	-	
Turn-off delay time	$t_{d(off)}$		-	295	-	
Fall time	t_f		-	160	-	
Turn-on energy (per pulse)	E_{on}		-	3.6	-	mJ
Turn-off energy (per pulse)	E_{off}		-	8.7	-	
Total switching energy	E_{ts}		-	12.3	-	
Thermal resistance,junction to case	R_{thJC}	per IGBT	-	-	0.19	K/W
Temperature under switching conditions	$T_{vj\ op}$		-40	-	150	°C

Diode，Inverter（Tvj=25℃）
Characteristic Values

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Continuous forward voltage	V_F	V_{GE}=0V, I_F=75A T_{vj}=25℃	-	1.8	2.2	V
Reverse recovery time	t_{rr}	T_{vj}=25℃, V_R=600V, I_F=75A, di_F/dt=-4600A/μs	-	87	-	ns
Reverse recovery charge	Q_{rr}		-	6.0	-	μC
Reverse recovery loss	E_{rec}		-	2.2	-	mJ
Diode peak reverse recovery current	I_{rrm}		-	140	-	A
Temperature under switching conditions	$T_{vj\ op}$		-40	-	150	℃

Maximum Rated Values

Item	Conditions	Symbol	Values	Unit
Repetitive peak reverse voltage	T_{vj}=25℃	V_{RRM}	1200	V
Forward current,DC		I_F	75	A
Repetitive peak forward current	t_p=1ms	I_{FRM}	300	

Module

Item	Conditions	Symbol	Values			Unit
Isolation voltage	RMS, f = 50 Hz, t = 1 min	V_{ISOL}	2500			V
Material of module baseplate			Cu			
Internal isolation	Basic insulation(class 1, IEC 61140)		Al_2O_3			
Creepage distance	Terminals to heat sinks Terminal-to-terminal		17.0 20.0			mm
Clearance	Terminals to heat sinks Terminal-to-terminal		17.0 9.5			mm
			Min.	**Typ.**	**Max.**	
Storage temperature		T_{stg}	-40	-	125	℃
Module mounting torque	Screw M6	M	3.0	-	5.0	Nm
Terminal connection torque	Screw M5	M	2.5	-	5.0	Nm
Weight		G	-	150	-	g

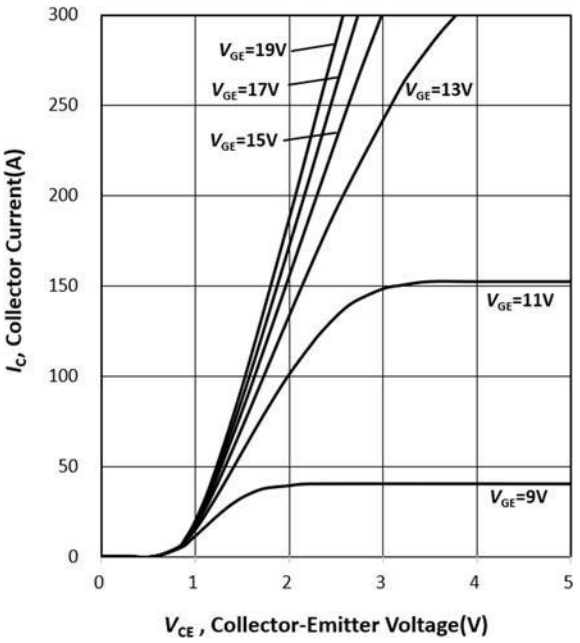


Figure 1 IGBT output characteristics（T_{vj}=25℃）

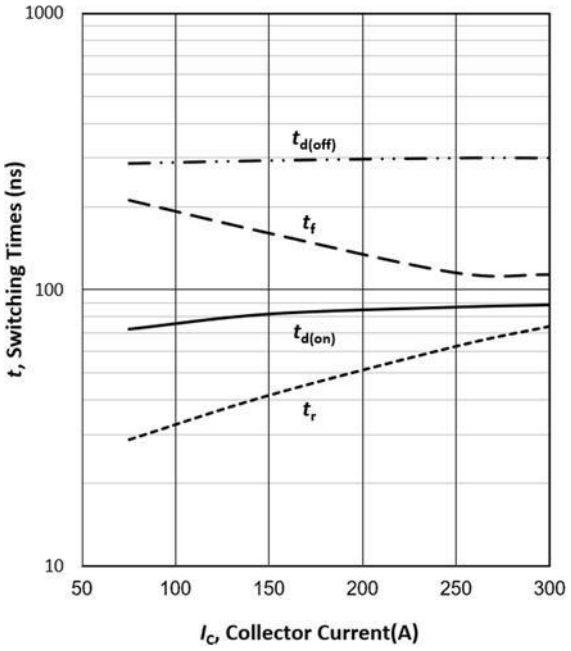


Figure 2 Switching time vs. collector current

(Inductive load, T_{vj}=25℃,
V_{CE}=600V, V_{GE}=-15/15V, R_G=5.1Ω)

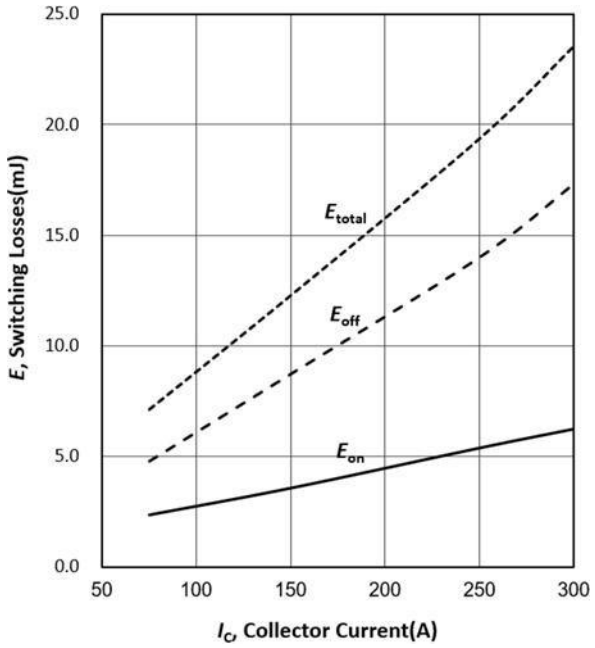


Figure 3 IGBT switching losses vs. collector current

(Inductive load, T_{vj}=25℃,
V_{CE}=600V, V_{GE}=-15/15V, R_G=5.1Ω)

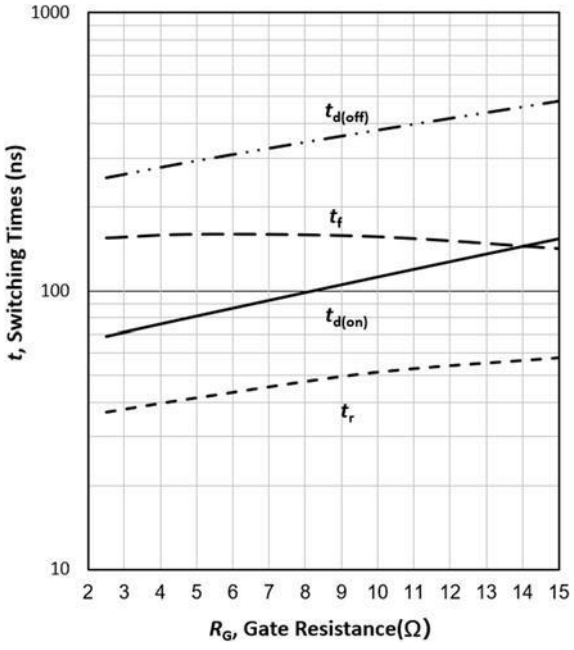


Figure 4 IGBT switching time vs. gate resistance

(Inductive load, T_{vj}=25℃,
V_{CE}=600V, V_{GE}=-15/15V, I_C=150A)

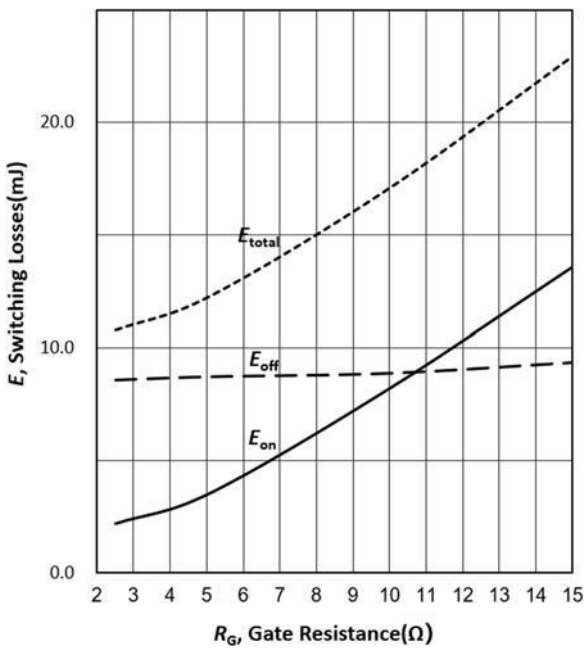


Figure 5 IGBT switching losses vs. gate resistance

(Inductive load, T_{vj}=25°C, V_{CE}=600V, V_{GE}=-15/15V, I_C=150A)

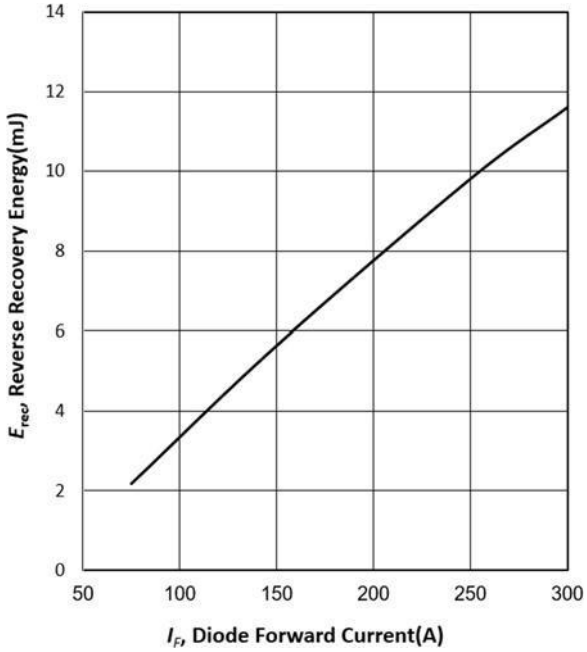


Figure 6 Diode reverse recovery loss vs. forward current

(T_{vj}=25°C, V_{CE}=600V, R_G=5.1Ω)

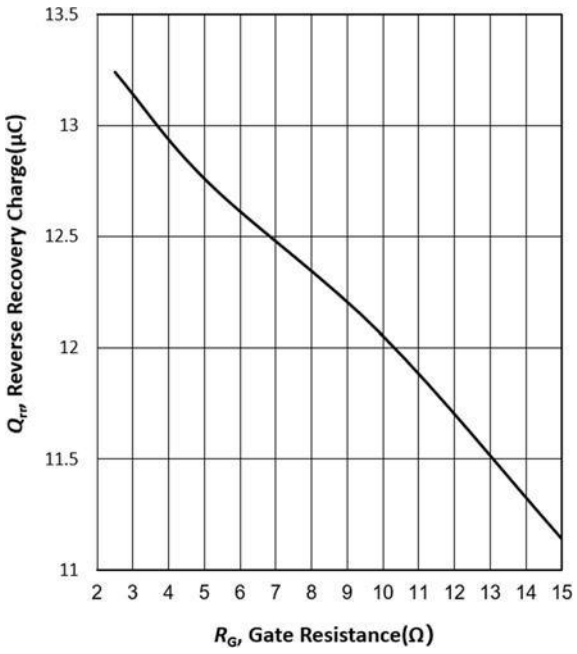


Figure 7 Diode reverse recovery charge vs. gate resistance

(T_{vj}=25°C, V_{CE}=600V, I_F=150A)

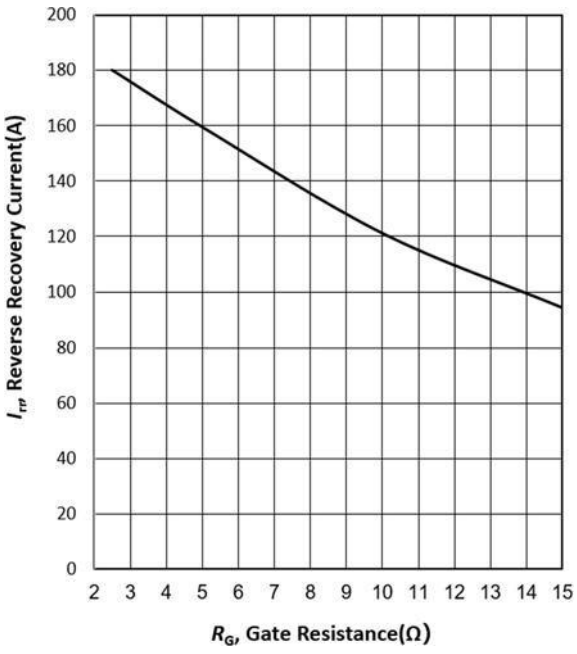
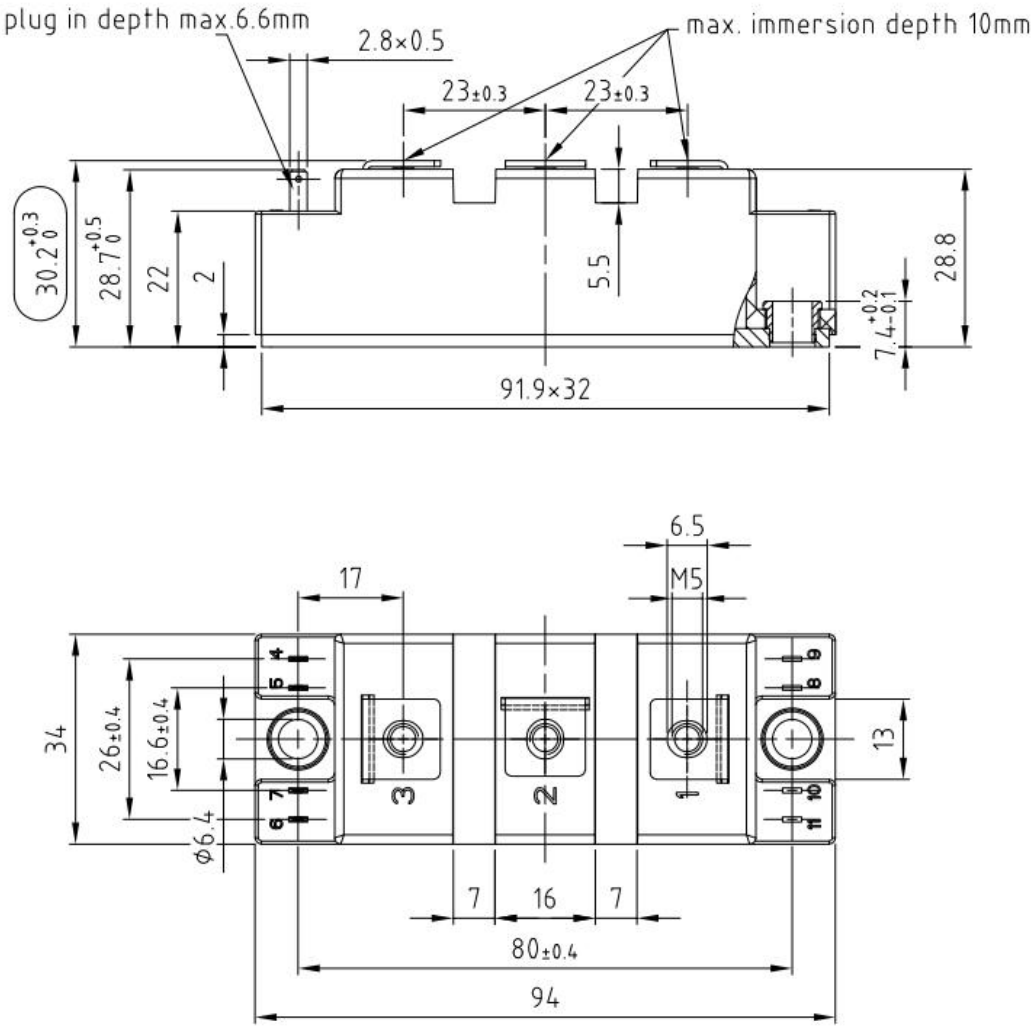


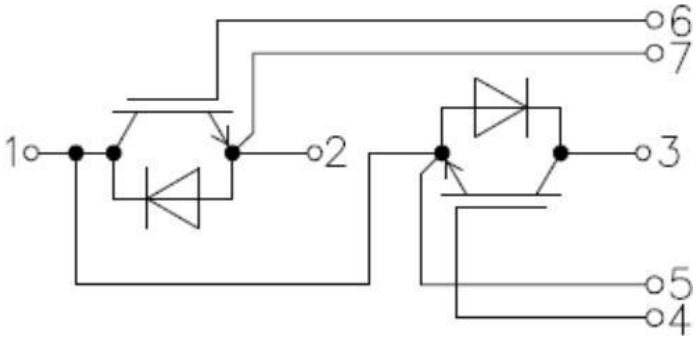
Figure 8 Diode reverse recovery peak current vs. gate resistance

(T_{vj}=25°C, V_{CE}=600V, I_F=150A)

Package outlines（Unit：mm）



Circuit diagram headline



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