JMG450HF12G3S1

Trench FS IGBT

Features

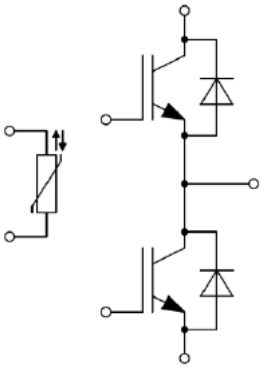
- Short Circuit Rated 10μs
- Low Stray Inductance
- Low Saturation Voltage
- Ultra Low loss
- HI-REL Power Terminals
- Lead Free, Compliant With RoHS Requirement

Product Summary

Parameter	Value	Unit
V_{CES}	1200	V
I_C(@ T_C= 100℃)	450	A
I_{CRM}(@ t_P= 1ms)	900	A
$V_{CE(sat)}$(Typ)	1.75	V

Applications

- Industrial Inverters
- Servo Applications
- SMPS UPS
- Induction Heating
- Welde



IGBT, Absolute Maximum Ratings (@ T_C = 25°C unless otherwise specified)

Parameter	Conditions	Symbol	Values	Unit
Collector-emitter voltage	Tvj = 25°C	V_{CES}	1200	V
Gate-emitter peak voltage	Tvj = 25°C	V_{GES}	±20	V
Continuous collector current	T_C = 25°C	I_C	698	A
	T_C = 100°C	$I_{C\ nom}$	450	
Repetitive peak collector current	t_P = 1ms	I_{CRM}	900	A
Total power dissipation	T_C = 25°C, Tvj max = 125°C	P_{tot}	2272	W

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IGBT, Electrical Characteristics (@ T_C = 25°C unless otherwise specified)

Parameter	Conditions		Symbol	Values			Unit
				Min.	Typ.	Max.	
Collector-emitter saturation voltage	I_C = 450A, V_{GE} = 15V	T_{vj} = 25°C	$V_{CE(sat)}$		1.75	2.10	V
		T_{vj} = 125°C			2.00		
Gate threshold voltage	V_{CE} = V_{GE}, I_C = 6mA		$V_{GE(th)}$	5.20	5.80	6.40	V
Collector leakage current	V_{GE} = 0V, V_{CE} =1200V		I_{CES}			3	mA
Gate-emitter leakage current	V_{CE} = 0V, V_{GE} = ±20V		I_{GES}			400	nA
Input capacitance	f = 1MKHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0V		C_{ies}		28		nF
Output capacitance			C_{oes}		1.55		nF
Turn-on delay time, inductive load	V_{CC} = 600V, I_C = 450A, R_G = 1.3Ω, V_{GE} = ±15V, T_{vj} = 25℃		$t_{d(on)}$		0.190		ns
Rise time, inductive load			t_r		0.060		ns
Turn-off delay time, inductive load			$t_{d(off)}$		0.490		ns
Fall time, inductive load			t_f		0.080		ns
Turn-on energy loss per pulse			E_{on}		15		mJ
Turn-off energy loss per pulse			E_{off}		38		mJ
Turn-on delay time, inductive load	V_{CC} = 600V, I_C = 450A, R_G =1.3Ω, V_{GE} = ±15V, T_{vj} = 125℃		$t_{d(on)}$		0.220		ns
Rise time, inductive load			t_r		0.070		ns
Turn-off delay time, inductive load			$t_{d(off)}$		0.580		ns
Fall time, inductive load			t_f		0.110		ns
Turn-on energy loss per pulse			E_{on}		26		mJ
Turn-off energy loss per pulse			E_{off}		55.5		mJ
SC data	tp≤10us，V_{GE}=15V，V_{CC}=800V, V_{CEM}≤1200V, T_{vj}=125℃		Isc		1800		A
Gate charge	V_{GE}=-15…+15V		Q_G		3.3		uC
Thermal resistance, junction to case	per IGBT		$R_{th(j-c)}$			0.066	K/W
Temperature under switching conditions			$T_{vj\ op}$	-40		150	℃

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FRED, Absolute Maximum Ratings (@ T_C = 25°C unless otherwise specified)

Parameter	Conditions	Symbol	Values	Unit
Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1200	V
Continuous DC forward current		$I_{F(AV)}$	450	A
Repetitive peak forward current	t_P = 1ms	I_{FRM}	900	A
I^2t value for fusing	T_{vj} =150°C, t_P = 10ms, V_R = 0V	I^2t	28500	A^2s

FRED, Electrical Characteristics (@ T_C = 25°C unless otherwise specified)

Parameter	Conditions		Symbol	Values			Unit
				Min.	Typ.	Max.	
Forward voltage	I_F = 450A,	T_{vj} = 25°C	V_F		1.65	2.10	V
		T_{vj} = 125°C			1.6		
Peak reverse recovery current	I_F = 450A, di/dt = 7000A/μs, V_R = 600V, V_{GE} = -15V	T_{vj} = 25°C	I_{RM}		450		A
		T_{vj} = 125°C			550		
Recovered charge		T_{vj} = 25°C	Q_{rr}		48		μC
		T_{vj} = 125°C			92		
Reverse Recovery energy		T_{vj} = 25°C	Erec		26.5		mJ
		T_{vj} = 125°C			48.5		
Thermal resistance, junction to case	per diode		$R_{th(j-c)}$			0.100	K/W
Temperature under switching conditions			$T_{vj\ op}$	-40		150	℃

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NTC-Thermistor Characteristics (@ T_C = 25°C unless otherwise specified)

Parameter	Conditions	Symbol	Values			Unit
			Min.	Typ.	Max.	
Rated resistance	TC=25℃	R_{25}		5		KΩ
Deviation of R100	TC = 100°C, R100 = 493 Ω	△R/R	-5		5	%
Power dissipation	TC = 25°C	P_{25}			20	mW
B-value	R2 = R25 exp [B25/50(1/T2 - 1/(298,15 K))]	$B_{25/50}$		3375		K
B-value	R2 = R25 exp [B25/80(1/T2 - 1/(298,15 K))]	$B_{25/80}$		3411		K
B-value	R2 = R25 exp [B25/100(1/T2 - 1/(298,15 K))]	$B_{25/100}$		3433		K

Module Characteristics

Parameter	Conditions	Symbol	Values			Unit
			Min.	Typ.	Max.	
Isolation voltage (All terminals shorted)	f = 50Hz,1minute	V_{iso}	2.5			kV
Maximum junction temperature		T_J			175	℃
Thermal resistance, case to heatsink	per module	$R_{th(c-s)}$		0.009		K/W
Storage temperature		T_{stg}	-40		125	℃
Mounting torque	M5	M	3		6	N·m
Terminal connection torque	M6	M	3		6	N·m

Ordering Information

Device	Marking	Package	Weight	Inner Box	Per Carton
JMG450HF12G3S1	JMG450HF12G3S1	G3	345g/PCS	8PCS	40PCS

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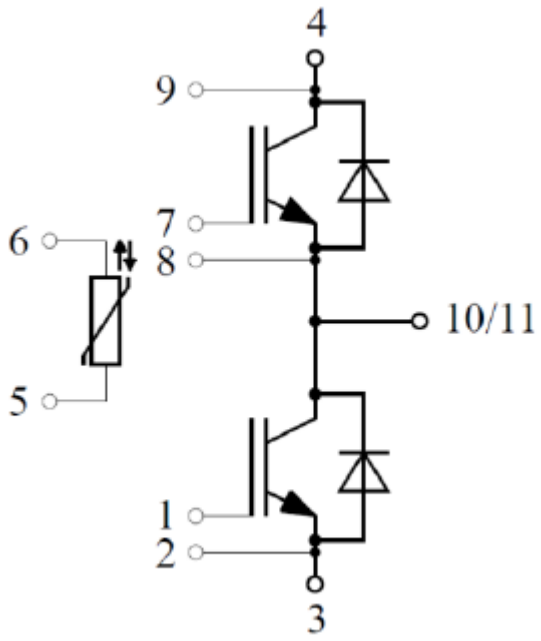
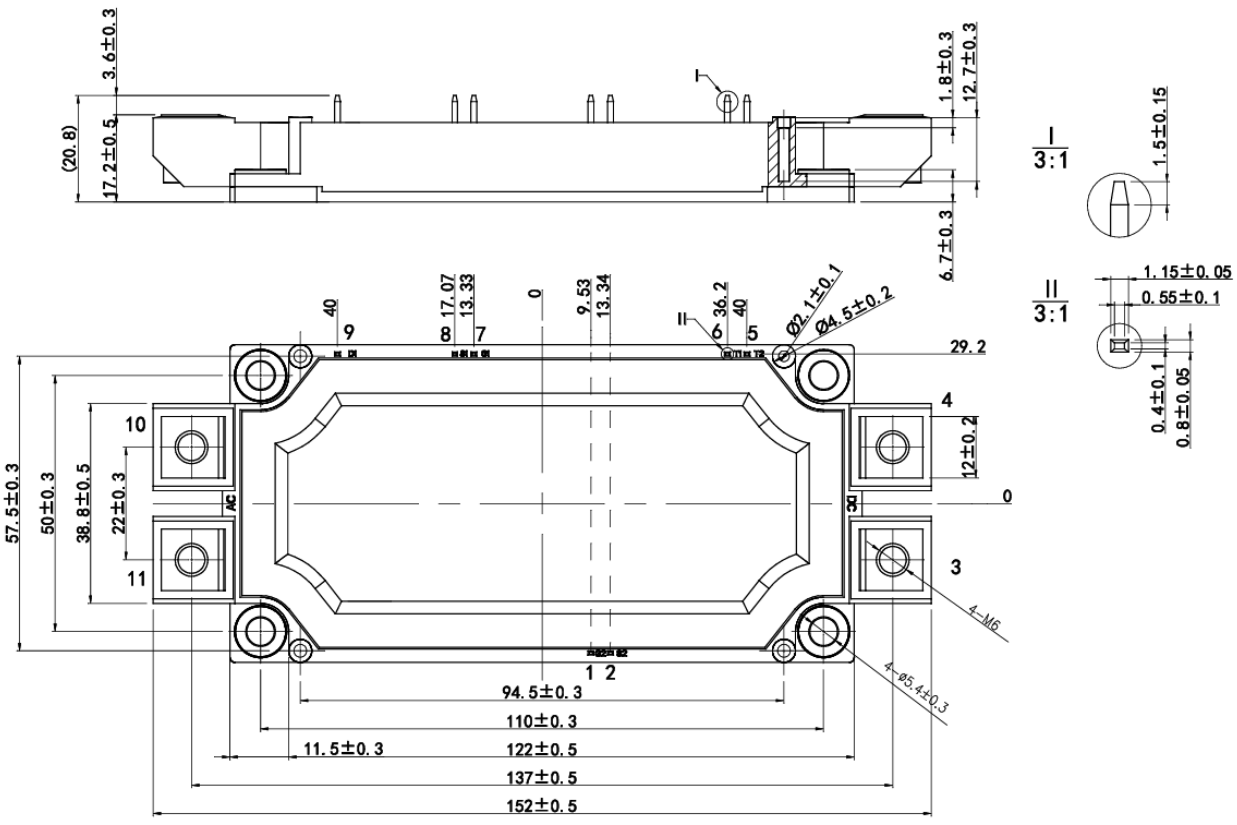
Circuit Diagram



Package Outlines (mm)



Unit of measurement: mm

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