



JMG75HF12G1S1

Trench FS IGBT

Features

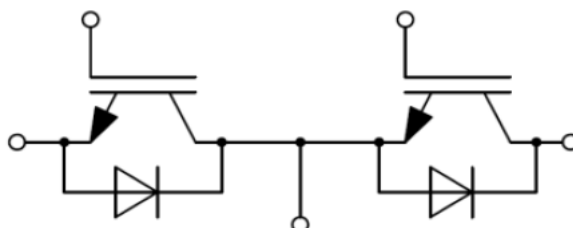
- Short Circuit Rated 10 μ s
- Low Stray Inductance
- Low Saturation Voltage
- Ultra Low loss
- HI-REL Power Terminals
- Lead Free, Compliant with RoHS Requirement

Applications

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

Product Summary

Parameter	Value	Unit
V_{CES}	1200	V
$I_C(@ T_C = 100^\circ\text{C})$	75	A
$I_{CRM}(@ t_P = 1\text{ms})$	150	A
$V_{CE(sat)}(\text{Typ})$	1.70	V



IGBT, Absolute Maximum Ratings (@ $T_C = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Conditions	Symbol	Values	Unit
Collector-emitter voltage	$T_{vj} = 25^\circ\text{C}$	V_{CES}	1200	V
Gate-emitter peak voltage	$T_{vj} = 25^\circ\text{C}$	V_{GES}	± 20	V
Continuous collector current	$T_C = 25^\circ\text{C}$	I_C	125	A
	$T_C = 100^\circ\text{C}$	$I_{C\text{ nom}}$	75	
Repetitive peak collector current	$t_P = 1\text{ms}$	I_{CRM}	150	A
Total power dissipation	$T_C = 25^\circ\text{C}, T_{vj\text{ max}} = 175^\circ\text{C}$	P_{tot}	441	W

**IGBT, Electrical Characteristics (@ $T_C = 25^\circ\text{C}$ unless otherwise specified)**

Parameter	Conditions		Symbol	Values			Unit
				Min.	Typ.	Max.	
Collector-emitter saturation voltage	$I_C = 75\text{A}$, $V_{GE} = 15\text{V}$	$T_{vj} = 25^\circ\text{C}$	$V_{CE(sat)}$		1.70	2.15	V
		$T_{vj} = 125^\circ\text{C}$			2.00		
Gate-emitter threshold Voltage	$V_{CE} = V_{GE}$, $I_C = 6\text{mA}$		$V_{GE(th)}$	5.0	5.7	6.5	V
Collector leakage current	$V_{CE} = 0\text{V}$, $V_{GE} = \pm 20\text{V}$		I_{CES}			5	mA
Gate-emitter leakage Current	$V_{CE} = 0\text{V}$, $V_{GE} = \pm 20\text{V}$		I_{GES}			400	nA
Input capacitance	$f = 1\text{MHz}$, $T_{vj} = 25^\circ\text{C}$, $V_{CE} = 30\text{V}$, $V_{GE} = 0\text{V}$		C_{ies}		7.15		nF
Output capacitance			C_{oes}		0.23		nF
Turn-on delay time, inductive load	$V_{CC} = 600\text{V}$, $I_C = 75\text{A}$, $R_G = 11\Omega$, $V_{GE} = \pm 15\text{V}$, $T_{vj} = 25^\circ\text{C}$		$t_{d(on)}$		137		ns
Rise time, inductive load			t_r		70		ns
Turn-off delay time, inductive load			$t_{d(off)}$		296		ns
Fall time, inductive load			t_f		86		ns
Turn-on energy loss per pulse			E_{on}		8.49		mJ
Turn-off energy loss per pulse			E_{off}		4.06		mJ
Turn-on delay time, inductive load	$V_{CC} = 600\text{V}$, $I_C = 75\text{A}$, $R_G = 11\Omega$, $V_{GE} = \pm 15\text{V}$, $T_{vj} = 125^\circ\text{C}$		$t_{d(on)}$		144		ns
Rise time, inductive load			t_r		81		ns
Turn-off delay time, inductive load			$t_{d(off)}$		332		ns
Fall time, inductive load			t_f		121		ns
Turn-on energy loss per pulse			E_{on}		12.54		mJ
Turn-off energy loss per pulse			E_{off}		5.25		mJ
SC Data	$t_p \leq 10\mu\text{s}$, $V_{GE} = 15\text{V}$, $V_{CC} = 800\text{V}$, $V_{CEM} \leq 1200\text{V}$, $T_{vj} = 125^\circ\text{C}$		I_{sc}		300		A
Thermal resistance, junction to case	per IGBT		$R_{th(j-c)}$			0.34	K/W
Temperature under switching conditions			$T_{vj op}$	-40		150	$^\circ\text{C}$

**FRED, Absolute Maximum Ratings (@ $T_C = 25^\circ\text{C}$ unless otherwise specified)**

Parameter	Conditions	Symbol	Values	Unit
Repetitive peak reverse voltage	$T_{vj} = 25^\circ\text{C}$	V_{RRM}	1200	V
Continuous DC forward current		$I_{F(AV)}$	75	A
Repetitive peak forward current	$t_P = 1\text{ms}$	I_{FRM}	150	A

FRED, Electrical Characteristics (@ $T_C = 25^\circ\text{C}$ unless otherwise specified)

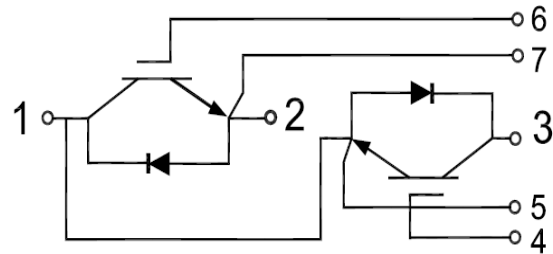
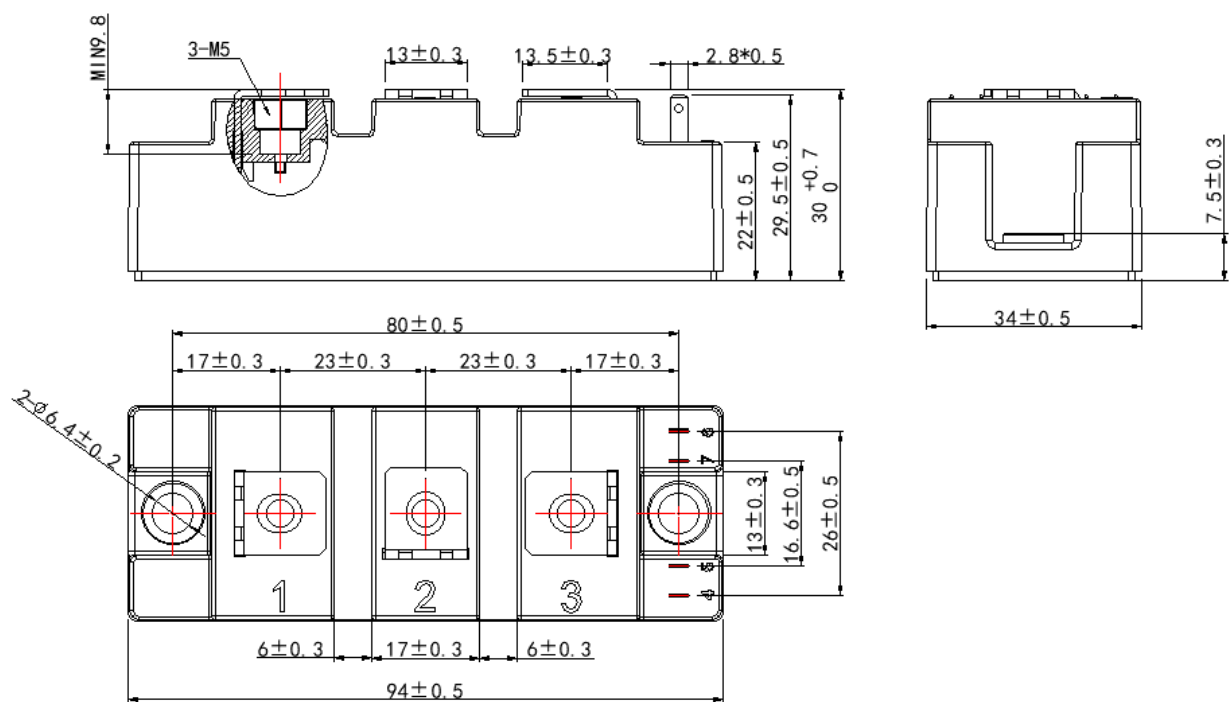
Parameter	Conditions		Symbol	Values			Unit		
				Min.	Typ.	Max.			
Forward voltage	$I_F = 75A,$	$T_{vj} = 25^{\circ}C$	V_F		2.00	2.15	V		
		$T_{vj} = 125^{\circ}C$			1.60				
Peak reverse recovery current	$I_F = 75A,$ $di/dt = 800A/\mu s,$ $V_R = 600V,$ $V_{GE} = -15V$	$T_{vj} = 25^{\circ}C$	I_{RM}		29		A		
		$T_{vj} = 125^{\circ}C$			39				
Reverse recovery charge		$T_{vj} = 25^{\circ}C$	Q_{rr}		2.60		μC		
		$T_{vj} = 125^{\circ}C$			7.68				
Reverse recovery energy				$T_{vj} = 25^{\circ}C$	E_{rec}		0.71		mJ
				$T_{vj} = 125^{\circ}C$			2.11		
Thermal resistance, junction to case	per diode		$R_{th(j-c)}$			0.559	K/W		
Temperature under switching conditions			$T_{vj\ op}$	-40		150	$^{\circ}C$		

**Module Characteristics**

Parameter	Conditions	Symbol	Values			Unit
			Min.	Typ.	Max.	
Isolation voltage (All terminals shorted)	f = 50Hz, 1minute	V_{iso}	3.0			kV
Maximum junction temperature		T_J			175	°C
Thermal resistance, case to heatsink	per Module	$R_{th(c-s)}$		0.05		K/W
Storage temperature		T_{stg}	-40		125	°C
Mounting torque	M5	M	2.5		5.0	N·m
Terminal connection torque	M6	M	3.0		5.0	N·m

Ordering Information

Device	Marking	Package	Weight	Inner Box	Per Carton
JMG75HF12G1S1	JMG75HF12G1S1	G1(34mm)	160g/PCS	4 PCS	48 PCS

Circuit Diagram

Package Outlines (mm)


Unit of measurement: mm

Typical Electrical & Thermal Characteristics

Fig 1. IGBT Output Characteristics,
Inverter(typical) VGE=15 V

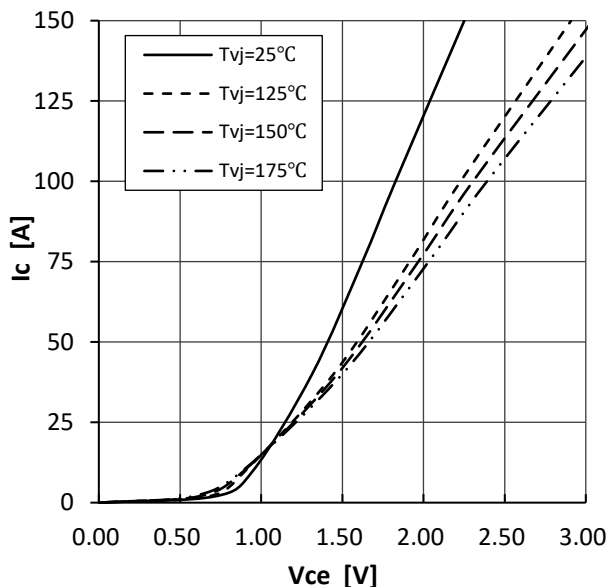


Fig 2. IGBT Output Characteristics,
Inverter(typical)

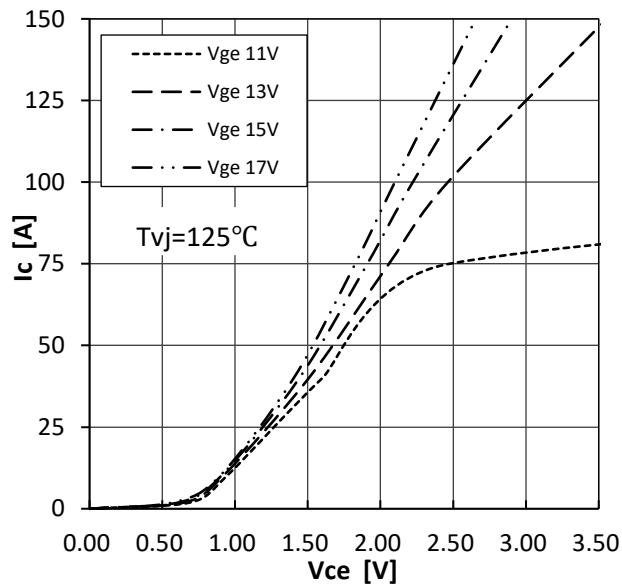


Fig 3. IGBT Switching Loss vs. Ic,
Inverter(typical)
Rg=11 Ω, VCE=600 V, VGE=±15 V

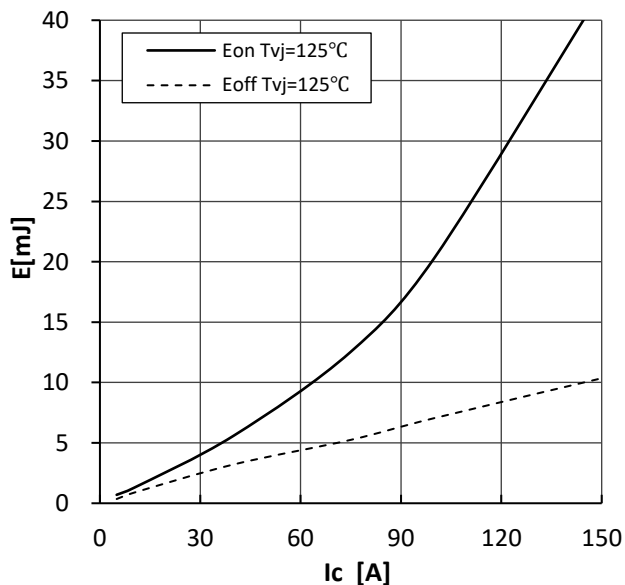


Fig 4. IGBT Switching Loss vs. Rg,
Inverter(typical)
Ic=75 A, VCE=600 V, VGE=±15 V

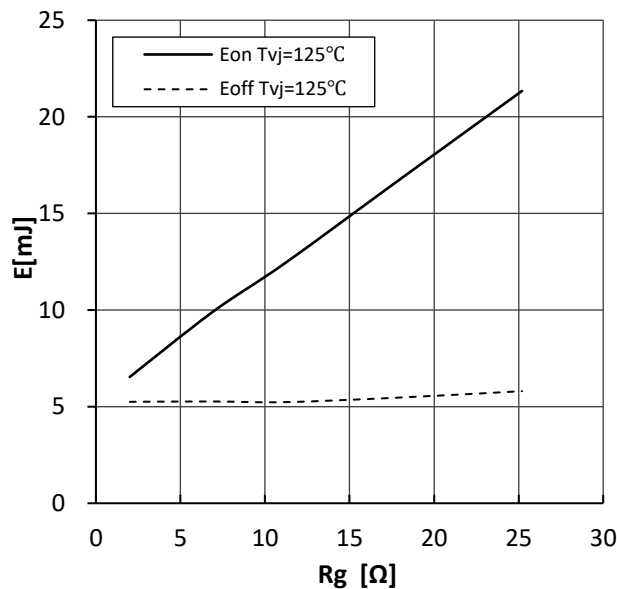


Fig 5. Reverse bias safe operating area, IGBT, Inverter(RBSOA)

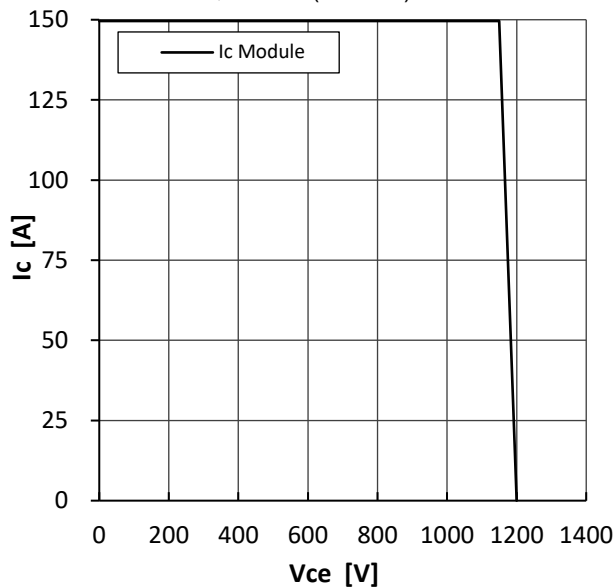


Fig 6. FRED Forward Characteristics, Inverter(typical)

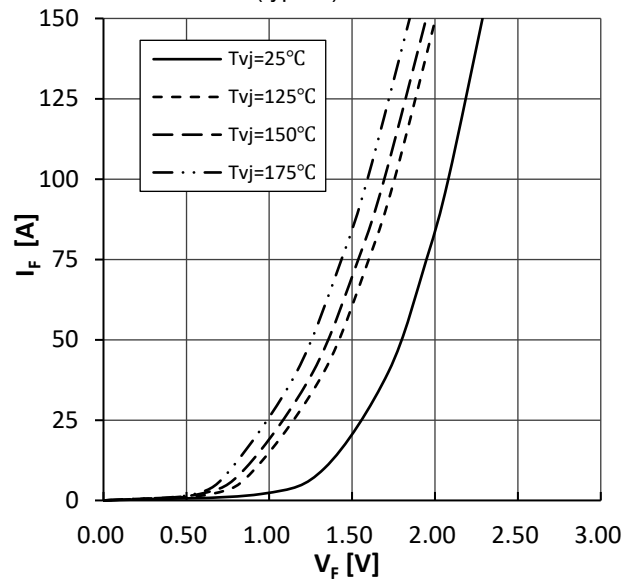


Fig 7. FRED FRED Switching Loss vs. Ic, Inverter(typical)
Rg=11 Ω , VCE=600 V

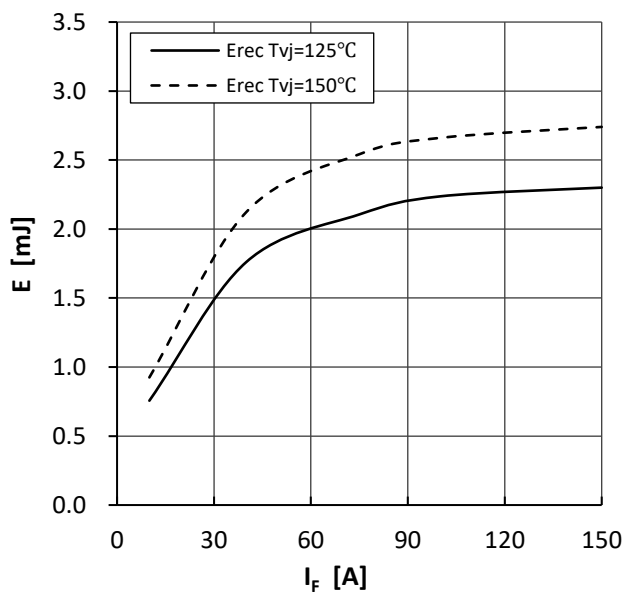
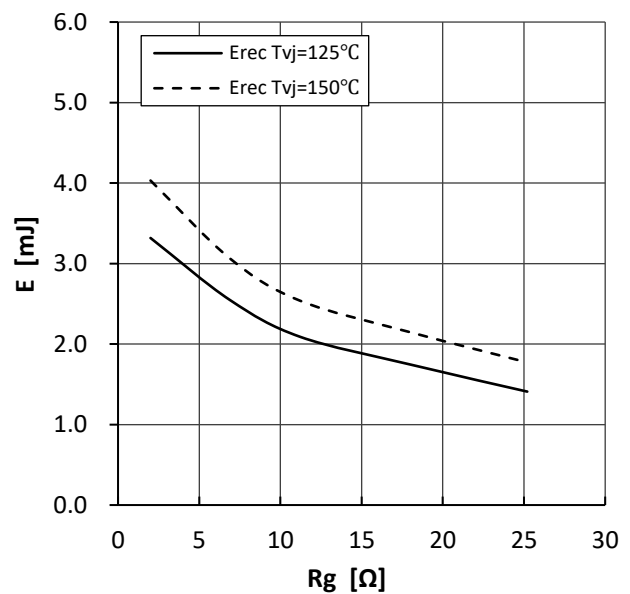


Fig 8. FRED Switching Loss vs. Rg, Inverter(typical)
Ic=75 A, VCE=600 V





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