

LEGM75BH120L1ST

IGBT Power Module

Features:

- $V_{CE}=1200V$ $I_C=75A$
- Low V_{CEsat}
- Maximum junction temperature 175°C
- Isolation Type Package

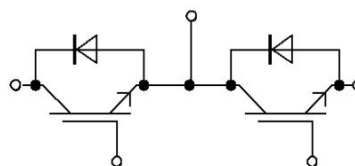
Applications:

- Motor Drives
- High Power Converters

Package Type & Internal Circuit



L1



Internal Circuit

Maximum Rated Values (IGBT Inverter)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CES}	Collector-emitter voltage	$V_{EC}=0V, I_C=1mA, T_{vj}=25\text{ }^{\circ}C$	1200	V
I_C	Continuous Collector Current	$T_C=100\text{ }^{\circ}C$	75	A
I_{CRM}	Peak Collector Current	$I_{CRM}=2I_C$	150	A
V_{GES}	Gate-Emitter Voltage	$T_{vj}=25\text{ }^{\circ}C$	± 20	V
P_{tot}	Total Power Dissipation	$T_C=25\text{ }^{\circ}C, T_{vjmax}=175\text{ }^{\circ}C$	536	W

Maximum Rated Values (IGBT Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=75\text{ A}, V_{GE}=15\text{ V}, T_{vj}=25\text{ }^{\circ}\text{C}$		1.48		V
		$I_C=75\text{ A}, V_{GE}=15\text{ V}, T_{vj}=150\text{ }^{\circ}\text{C}$		1.80		V
$V_{GE(th)}$	Gate Threshold Voltage	$I_C=3.5\text{ mA}, V_{CE}=V_{GE}, T_{vj}=25\text{ }^{\circ}\text{C}$	5.0	5.9	7.0	V
I_{CES}	Collector-Emitter Cut-off Current	$V_{CE}=1200\text{ V}, V_{GE}=0\text{ V}, T_{vj}=25\text{ }^{\circ}\text{C}$			1	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{CE}=0\text{ V}, V_{GE}=15\text{ V}, T_{vj}=25\text{ }^{\circ}\text{C}$			450	nA
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	$I_C=75\text{ A}, V_{CE}=600\text{ V}$ $V_{GE}=\pm 15\text{ V}$ $R_G=10\text{ }\Omega$ $T_{vj}=25\text{ }^{\circ}\text{C}$		67.2		ns
t_r	Rise Time, Inductive Load			39.8		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			315		ns
t_f	Fall Time, Inductive Load			72		ns
E_{on}	Turn-on Energy Loss per Pulse			3.76		mJ
E_{off}	Energy Loss per Pulse			3.74		mJ
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	$I_C=75\text{ A}, V_{CE}=600\text{ V}$ $V_{GE}=\pm 15\text{ V}$ $R_G=10\text{ }\Omega$ $T_{vj}=150\text{ }^{\circ}\text{C}$		65		ns
t_r	Rise Time, Inductive Load			40		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			357		ns
t_f	Fall Time, Inductive Load			107		ns
E_{on}	Turn-on Energy Loss per Pulse			5.11		mJ
E_{off}	Energy Loss per Pulse			5.13		mJ
R_{thJC}	Thermal resistance, junction to case	per IGBT			0.28	K/W
$T_{vj\text{ op}}$	Temperature under switching conditions		-40		150	$^{\circ}\text{C}$
I_{SC}	SC data	$V_{GE} \leq 15\text{ V}, V_{CC} = 600\text{ V}$ $V_{CEmax} = V_{CES} - L_{sCE} \cdot di/dt$ $t_p \leq 10\text{ }\mu\text{s}, T_{vj} = 150\text{ }^{\circ}\text{C}$		375		A

Maximum Rated Values (Diode Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	$T_{vj} = 25\text{ }^{\circ}\text{C}$		1200		V
I_F	Continuous DC Forward Current	$T_C = 100\text{ }^{\circ}\text{C}$		30		A
I_{FRM}	Repetitive Peak Forward Current	$t_p = 1\text{ ms}$		60		A

Characteristic Values (Diode Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F = 30\text{ A}, V_{CE} = 0\text{ V}, T_{vj} = 25\text{ }^{\circ}\text{C}$		1.86		V
		$I_F = 30\text{ A}, V_{CE} = 0\text{ V}, T_{vj} = 150\text{ }^{\circ}\text{C}$		1.52		V
I_{rr}	Peak reverse recovery current	$I_F = 30\text{ A}, V_R = 600\text{ V}$ $-di/dt = 1460\text{ A/us}$ $T_{vj} = 25\text{ }^{\circ}\text{C}$		58.4		A
Q_r	Recovered Charge			3.31		μC
E_{rec}	Reverse Recovery Energy			1.1		mJ
I_{rr}	Peak reverse recovery current	$I_F = 30\text{ A}, V_R = 600\text{ V}$ $-di/dt = 1460\text{ A/us}$ $T_{vj} = 150\text{ }^{\circ}\text{C}$		72		A
Q_r	Recovered Charge			7.41		μC
E_{rec}	Reverse Recovery Energy			2.79		mJ
R_{thJC}	Thermal resistance, junction to case	per Diode			1.2	K/W
$T_{vj\text{ op}}$	Operating Junction Temperature		-40		150	$^{\circ}\text{C}$

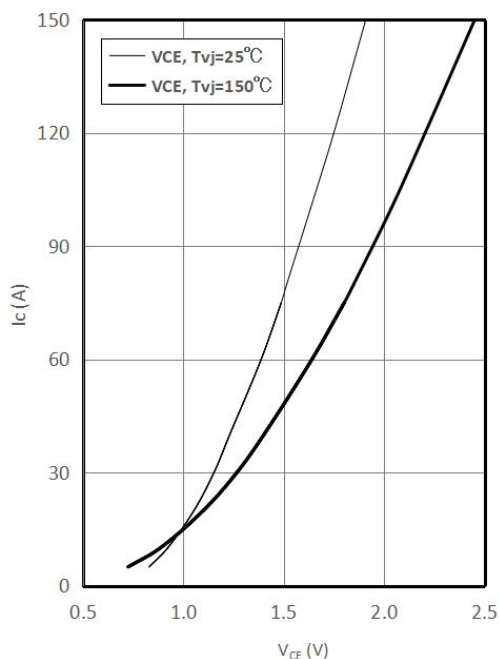
Module Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{isol}	Isolation voltage	$t = 1\text{ min}, f = 50\text{ Hz}$	2500			V
T_{stg}	Storage Temperature		-40		125	$^{\circ}\text{C}$
M_t	Module Electrodes Torque	Recommended(M5)	2.5		5.0	N·m
M_s	Module-to-Sink Torque	Recommended(M6)	3.0		6.0	N·m
G	Weight of Module			160		g

Output characteristic of IGBT, Inverter (typical)

$$I_c = f(V_{CE})$$

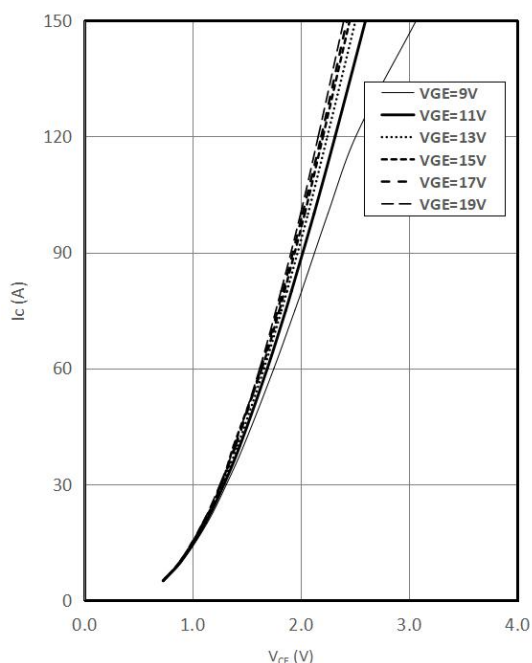
$$V_{GE} = 15V$$



Output characteristic of IGBT, Inverter (typical)

$$I_c = f(V_{CE})$$

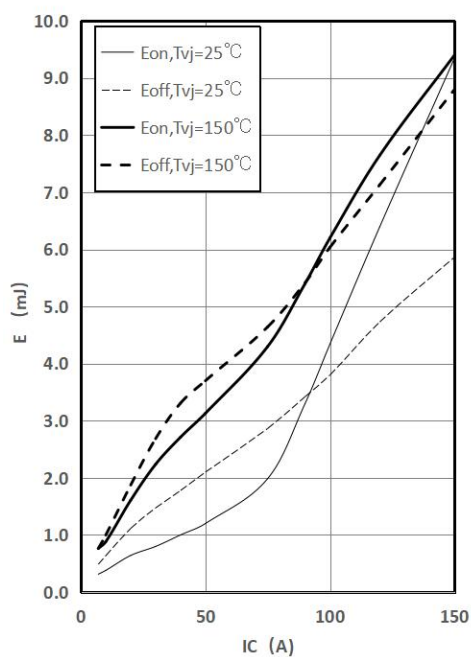
$$T_{vj} = 150^{\circ}C$$



Switching losses of IGBT, Inverter (typical)

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

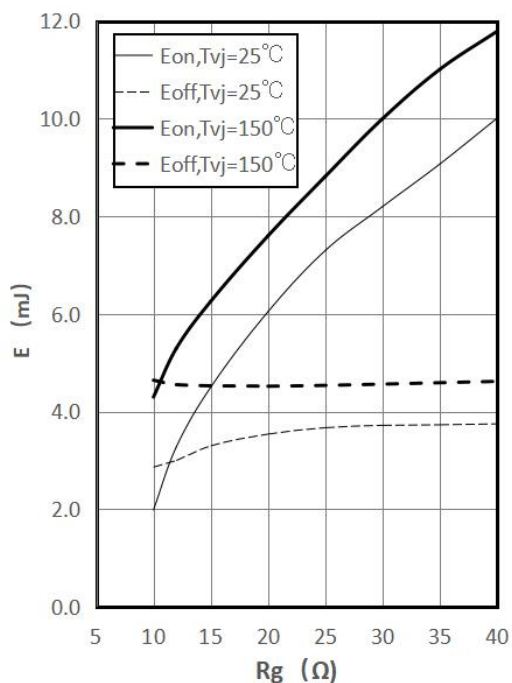
$$V_{GE} = \pm 15V, R_G = 10 \Omega, V_{CE} = 600V$$



Switching losses of IGBT, Inverter (typical)

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

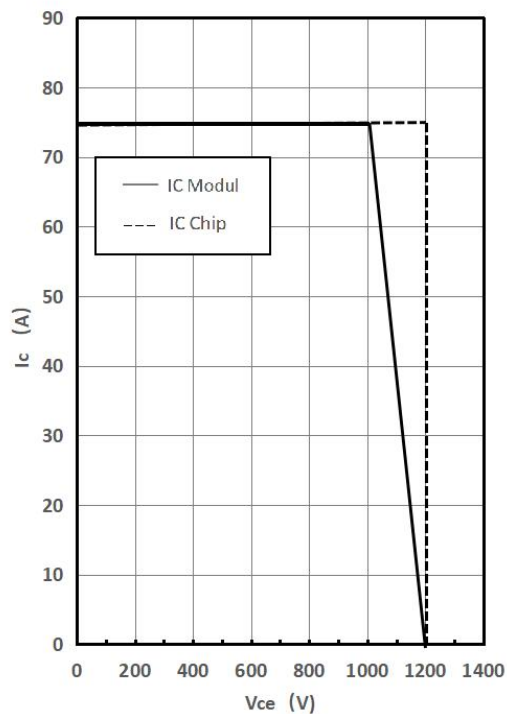
$$V_{GE} = \pm 15V, I_c = 75 A, V_{CE} = 600V$$



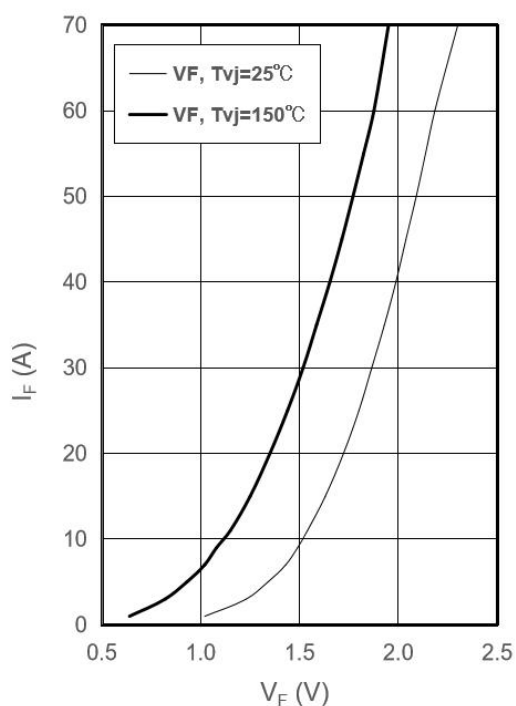
RBSOA IGBT, Inverter (typical)

$$I_C = f(V_{CE})$$

$$V_{GE} = \pm 15V$$

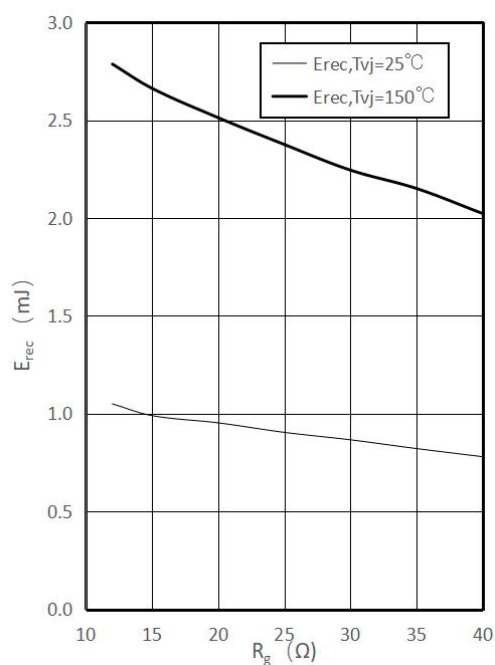

Forward characteristic of Diode, Inverter (typical)

$$I_F = f(V_F)$$


Switching losses of Diode, Inverter (typical)

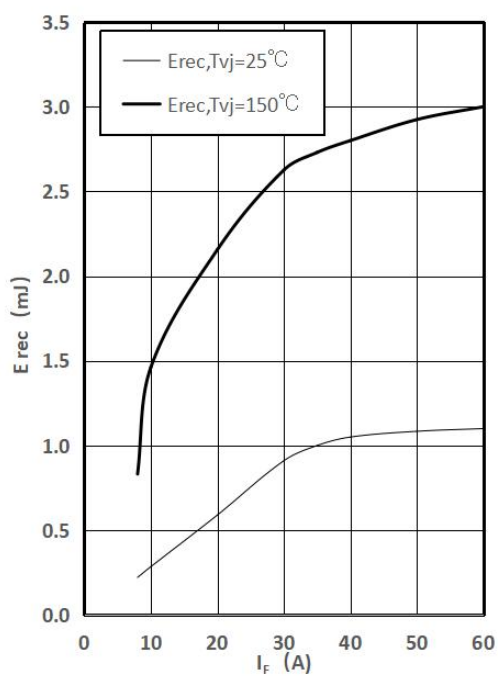
$$E_{rec} = f(R_G)$$

$$I_F = 30A, V_{CE} = 600V$$

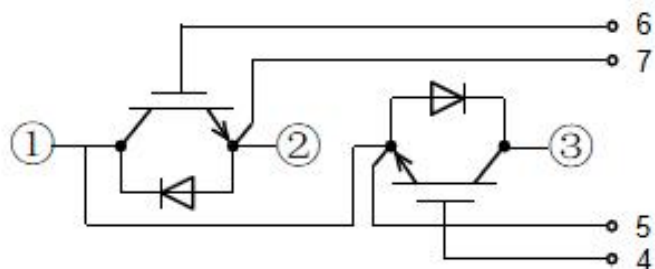

Switching losses of Diode, Inverter (typical)

$$E_{rec} = f(I_F)$$

$$R_G = 10 \Omega, V_{CE} = 600V$$

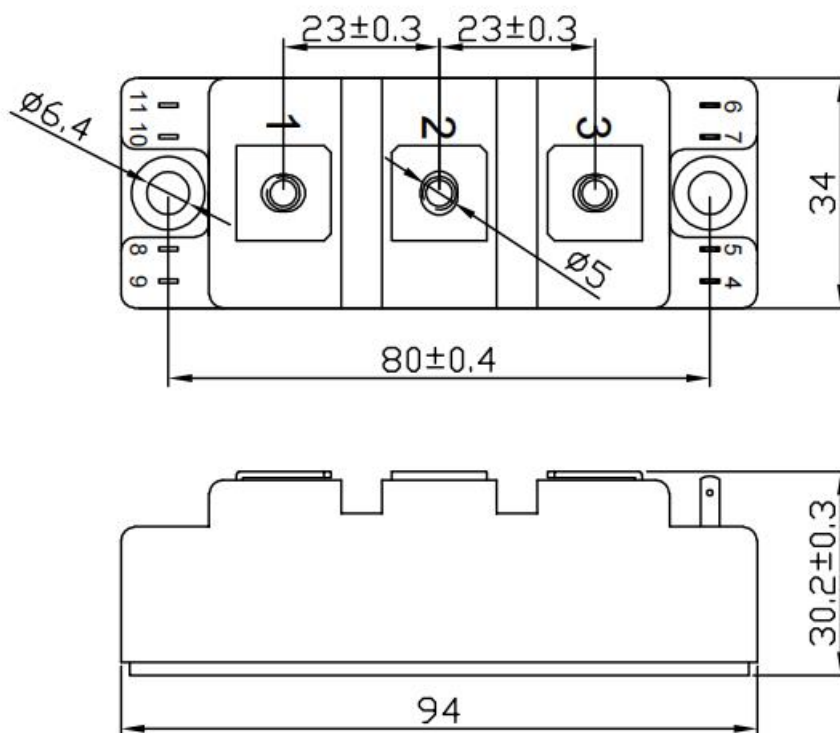


Circuit Diagram



Package Dimensions

(Dimensions in Millimeters)



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