LEGM450BH120L6H

IGBT Power Module

Features:

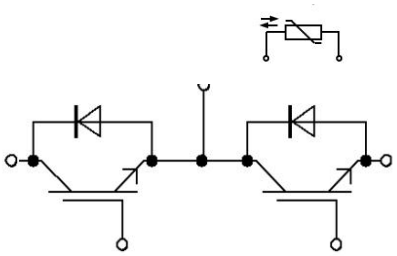
- V_{CE}=1200V I_C=450A
- Low $V_{CE(sat)}$
- V_{CEsat} with positive temperature coefficient
- Maximum junction temperature 175℃
- Isolation Type Package

Applications:

- The inverter
- Motor control and drives

Package Type & Internal Circuit

L6



Internal Circuit

Maximum Rated Values (IGBT Inverter)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CES}	Collector-emitter voltage	T_{vj}=25 ℃	1200	V
I_C	Continuous Collector Current	T_C=100 ℃	450	A
I_{CRM}	Peak Collector Current	I_{CRM}=2I_C	900	A
V_{GES}	Gate-Emitter Voltage	T_{vj}=25 ℃	±30	V
P_{tot}	Total Power Dissipation	T_C=25 ℃,T_{vjmax}=175 ℃	200	W

Maximum Rated Values (IGBT Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=450 A, V_{GE}=15 V, T_{vj}=25 ℃		1.8	2.3	V
		I_C=450 A, V_{GE}=15 V, T_{vj}=150 ℃		2.20	2.7	V
$V_{GE(th)}$	Gate Threshold Voltage	I_C=5.0 mA,V_{CE}=V_{GE},T_{vj}= 25 ℃	5.2	6	6.5	V
I_{CES}	Collector-Emitter Cut-off Current	V_{CE}=1200 V, V_{GE}=0 V, T_{vj}=25 ℃			6.0	mA
I_{GES}	Gate-Emitter Leakage Current	V_{CE}=0 V, V_{GE}=15 V, T_{vj}=25 ℃			500	nA
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	I_C=450 A,V_{CE}=600 V V_{GE}=±15 V R_G=1Ω T_{vj}=25 ℃		106		ns
t_r	Rise Time, Inductive Load			66		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			408		ns
t_f	Fall Time, Inductive Load			160		ns
E_{on}	Turn-on Energy Loss per Pulse			15.3		mJ
E_{off}	Energy Loss per Pulse			41		mJ
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	I_C=450 A,V_{CE}=600 V V_{GE}=±15 V R_G=1 Ω T_{vj}=150 ℃		131		ns
t_r	Rise Time, Inductive Load			66		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			481		ns
t_f	Fall Time, Inductive Load			278		ns
E_{on}	Turn-on Energy Loss per Pulse			21		mJ
E_{off}	Energy Loss per Pulse			49.5		mJ
R_{thJC}	Thermal resistance, junction to case	per IGBT		0.058		K/W
$T_{vj\ op}$	Temperature under switching conditions		-40		150	℃
I_{sc}	SC	V_{GE}≤15V, V_{CE}=800V, t_p≤10μs, T_{vj}=150 ℃, V_{CEmax}=V_{CES}-L_{sCE} ·di/dt		1800		A

Maximum Rated Values (Diode Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	T_{vj}= 25 ℃		1200		V
I_F	Continuous DC Forward Current	T_C=100 ℃		450		A
I_{FRM}	Repetitive Peak Forward Current	t_P=1 ms		900		A
I^2t	I^2t Value	V_R=0 V, t_P=10 ms, T_{vj}=150 ℃		30000		A^2s

Characteristic Values (Diode Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	I_F=450 A, V_{CE}=0 V, T_{vj}=25 ℃		2.4	2.3	V
		I_F=450 A, V_{CE}=0 V, T_{vj}=150 ℃		2.28		V
t_{rr}	Reverse Recovery time	I_F=450 A,V_R=600 V -di/dt=1600 A/us T_{vj}=25 ℃		212		ns
Q_r	Recovered Charge			24		uC
E_{rec}	Reverse Recovery Energy			8.7		mJ
t_{rr}	Reverse Recovery time	I_F=450A,V_R=600 V -di/dt=1600 A/us T_{vj}=150 ℃		370		ns
Q_r	Recovered Charge			51		uC
E_{rec}	Reverse Recovery Energy			16.8		mJ
R_{thJC}	Thermal resistance, junction to case	per Diode			0.12	K/W
$T_{vj\ op}$	Operating Junction Temperature		-40		150	℃

Module Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{isol}	Isolation voltage	t=1min,f=50Hz	2500			V
T_{stg}	Storage Temperature		-40		150	℃
M_t	Module Electrodes Torque	Recommended(M6)	3.0		6.0	N·m
M_s	Module-to-Sink Torque	Recommended(M5)	3.0		6.0	N·m
G	Weight of Module			340		g

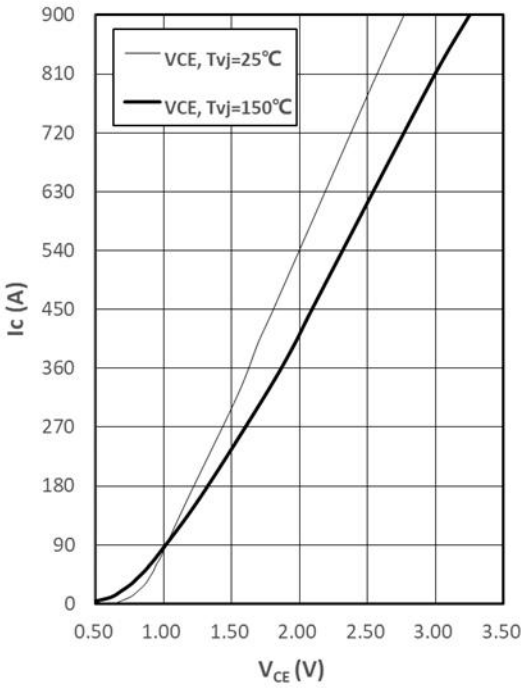
NTC-Thermistor (Characteristic Values)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R_{25}	Rated resistance	T_c=25 ℃		5		KΩ
ΔR/R	Deviation of R100	T_c=100 ℃	-5		5	%
P_{25}	Power dissipation	T_c=25 ℃			20	mW
$B_{25/50}$	B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298,15K))]$		3380		K
$B_{25/100}$	B-value	$R_2=R_{25}\exp[B_{25/100}(1/T_2-1/(298,15K))]$		3450		K

output characteristic of IGBT,Inverter (typical)

$I_c = f(V_{CE})$

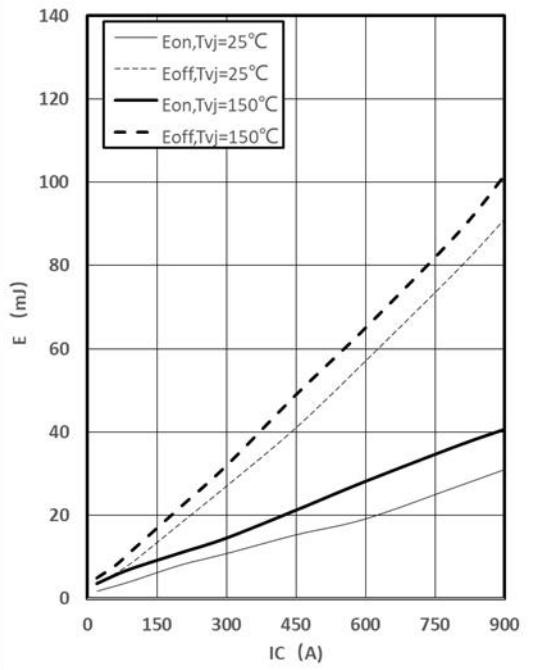
$V_{GE} = 15V$



switching time of IGBT,Inverter (typical)

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

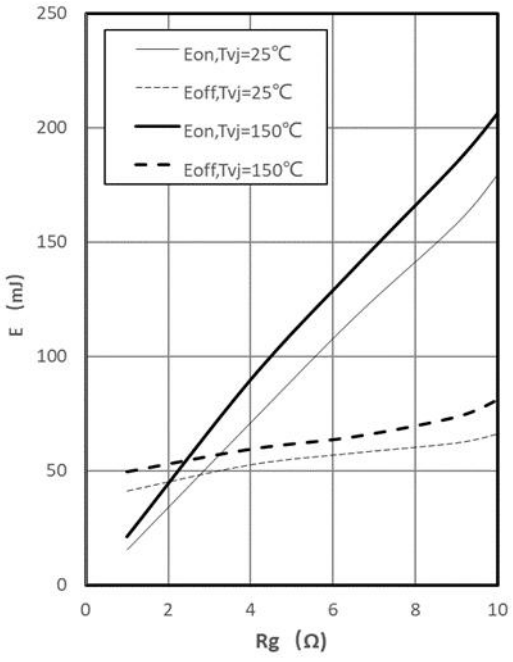
$V_{GE} = \pm 15V$, $R_G = 1\Omega$, $V_{CE} = 600V$



switching losses of IGBT,Inverter (typical)

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

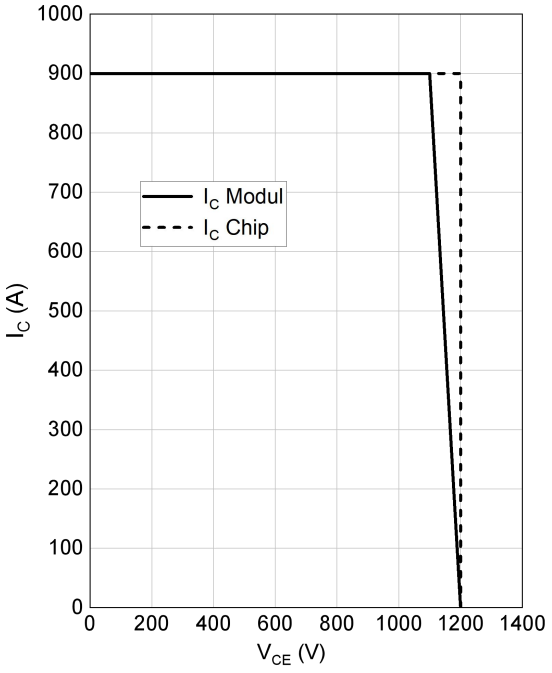
$V_{GE} = \pm 15V$, $I_C = 450A$, $V_{CE} = 600V$



RBSOA IGBT,Inverter (typical)

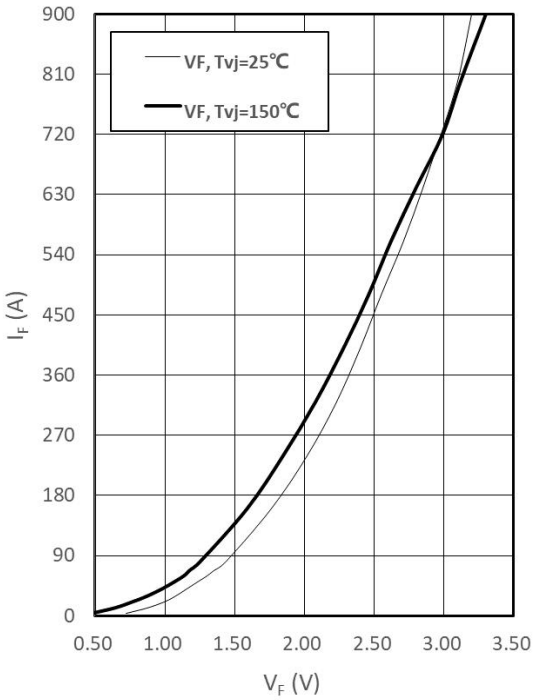
$I_C = f(V_{CE})$

$V_{GE} = \pm 15V$, $R_G = 1\Omega$, $T_{vj} = 125$ ℃



forward characteristic of Diode,Inverter (typical)

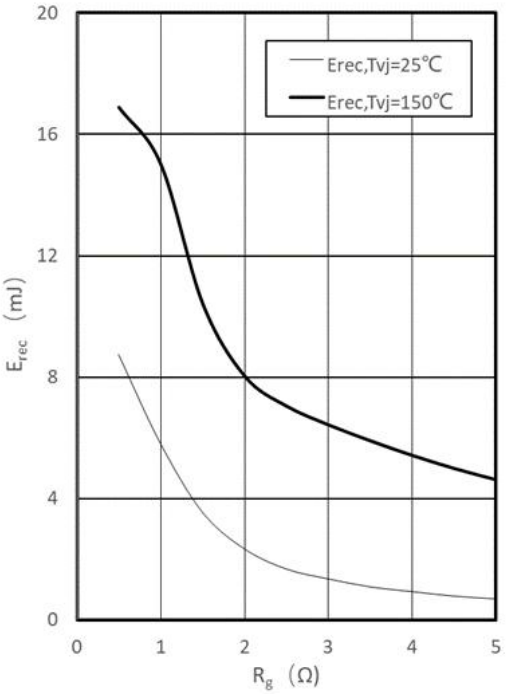
$I_F = f(V_F)$



switching losses of Diode, Inverter (typical)

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

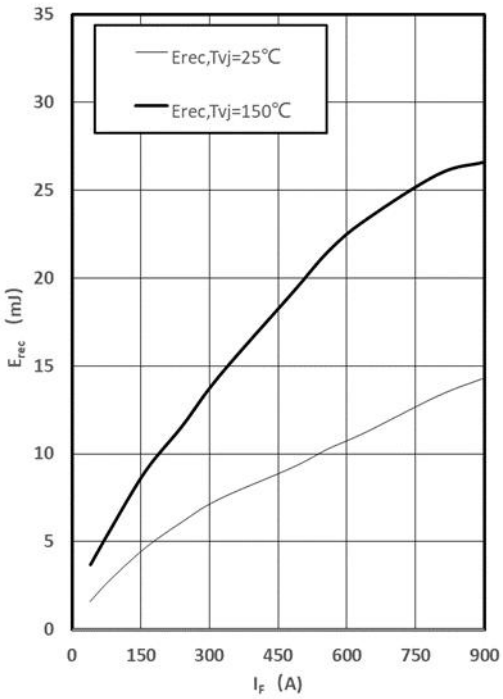
I_F = 450A，V_{CE} = 600V



switching losses of Diode, Inverter (typical)

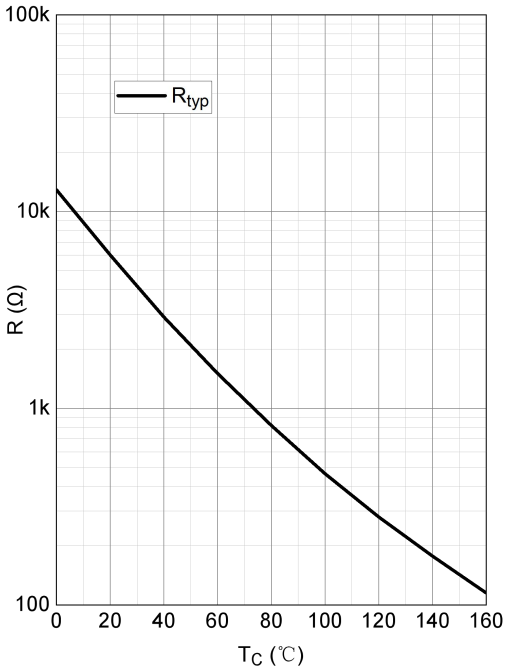
$E_{rec} = f(I_F)$,

R_G = 1Ω，V_{CE} = 600V

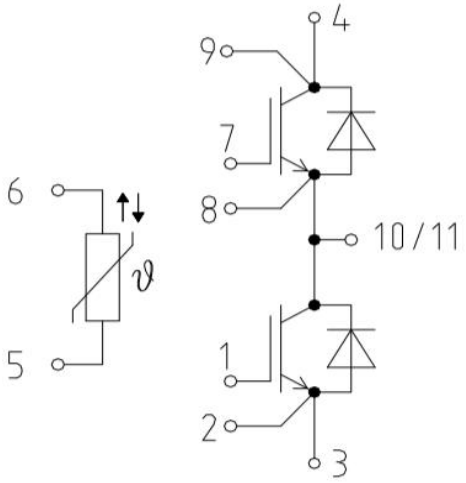


NTC-Thermistor-temperature characteristic (typical)

R = f (T)

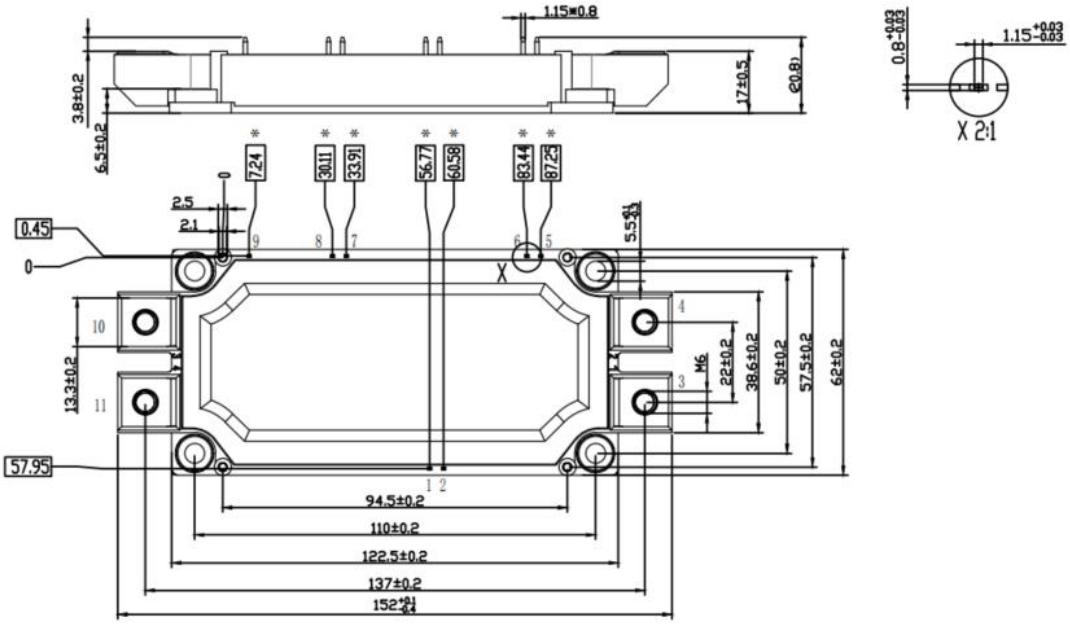


Circuit Diagram



Package Dimensions

(Dimensions in Millimeters)



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