

LEGM200BA120L2H

IGBT Power Module

Features

- $V_{CE}=1200V$ $I_C=200A$
- Low $V_{CE(sat)}$
- V_{CEsat} with positive temperature coefficient
- Maximum junction temperature $150^{\circ}C$
- Isolation Type Package

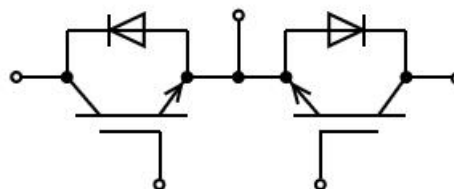
Applications

- The inverter
- Motor control and drives

Package Type & Internal Circuit



L2



Internal Circuit

Maximum Rated Values (IGBT Inverter)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CES}	Maximum Power Dissipation	$V_{EC}=0V, I_C=1mA, T_{vj}=25^{\circ}C$	1200	V
I_C	Continuous Collector Current	$T_C=100^{\circ}C$	200	A
I_{CRM}	Peak Collector Current	$I_{CRM}=2I_C$	400	A
V_{GES}	Gate-Emitter Voltage	$T_{vj}=25^{\circ}C$	± 30	V
P_{tot}	Total Power Dissipation	$T_C=25^{\circ}C, T_{vjmax}=150^{\circ}C$	950	W

Maximum Rated Values (IGBT Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=200\text{ A}, V_{GE}=15\text{ V}, T_{vj}=25\text{ }^{\circ}\text{C}$		1.80		V
		$I_C=200\text{ A}, V_{GE}=15\text{ V}, T_{vj}=125\text{ }^{\circ}\text{C}$		2.00		V
$V_{GE(th)}$	Gate Threshold Voltage	$I_C=5.0\text{ mA}, V_{CE}=V_{GE}, T_{vj}=25\text{ }^{\circ}\text{C}$		5.8		V
I_{CES}	Collector-Emitter Cut-off Current	$V_{CE}=1200\text{ V}, V_{GE}=0\text{ V}, T_{vj}=25\text{ }^{\circ}\text{C}$			3.0	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{CE}=0\text{ V}, V_{GE}=15\text{ V}, T_{vj}=25\text{ }^{\circ}\text{C}$			400	nA
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	$I_C=200\text{ A}, V_{CE}=600\text{ V}$ $V_{GE}=\pm 15\text{ V}$ $R_{Gon}=2\text{ }\Omega$ $T_{vj}=25\text{ }^{\circ}\text{C}$		159		ns
t_r	Rise Time, Inductive Load			64		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			361		ns
t_f	Fall Time, Inductive Load			107		ns
E_{on}	Turn-on Energy Loss per Pulse			13.1		mJ
E_{off}	Energy Loss per Pulse			14.5		mJ
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	$I_C=200\text{ A}, V_{CE}=600\text{ V}$ $V_{GE}=\pm 15\text{ V}$ $R_{Gon}=2\text{ }\Omega$ $T_{vj}=125\text{ }^{\circ}\text{C}$		170		ns
t_r	Rise Time, Inductive Load			68		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			431		ns
t_f	Fall Time, Inductive Load			241		ns
E_{on}	Turn-on Energy Loss per Pulse			14.1		mJ
E_{off}	Energy Loss per Pulse			22.7		mJ
R_{thJC}	Thermal resistance, junction to case	per IGBT			0.13	K/W
$T_{vj\text{ op}}$	Temperature under switching conditions		-40		125	$^{\circ}\text{C}$
I_{sc}	SC	$V_{GE}\leq 15\text{ V}, V_{CE}=600\text{ V},$ $t_p\leq 10\mu\text{s}, T_{vj}=125\text{ }^{\circ}\text{C},$ $V_{CEmax}=V_{CES}-L_{sCE}\cdot di/dt$		1100		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	$T_C = 100\text{ }^{\circ}\text{C}$		200		A
I_{FRM}	Repetitive Peak Forward Current	$t_P = 1\text{ ms}$		400		A
I^2t	I^2t Value	$V_R = 0\text{ V}$, $t_P = 10\text{ ms}$, $T_{vj} = 125\text{ }^{\circ}\text{C}$		7500		A^2s

Characteristic Values (Diode Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F = 200\text{ A}$, $V_{CE} = 0\text{ V}$, $T_{vj} = 25\text{ }^{\circ}\text{C}$		1.85		V
		$I_F = 200\text{ A}$, $V_{CE} = 0\text{ V}$, $T_{vj} = 125\text{ }^{\circ}\text{C}$		2.00		V
t_{rr}	Reverse Recovery time	$I_F = 200\text{ A}$, $V_R = 600\text{ V}$ $-di/dt = 1350\text{ A/us}$ $T_{vj} = 25\text{ }^{\circ}\text{C}$		144		ns
Q_r	Recovered Charge			18.4		μC
E_{rec}	Reverse Recovery Energy			9.8		mJ
t_{rr}	Reverse Recovery time	$I_F = 200\text{ A}$, $V_R = 600\text{ V}$ $-di/dt = 1350\text{ A/us}$ $T_{vj} = 125\text{ }^{\circ}\text{C}$		271		ns
Q_r	Recovered Charge			30.9		μC
E_{rec}	Reverse Recovery Energy			17.5		mJ
R_{thJC}	Thermal resistance, junction to case	per Diode			0.19	K/W
$T_{vj\text{ op}}$	Operating Junction Temperature		-40		125	$^{\circ}\text{C}$

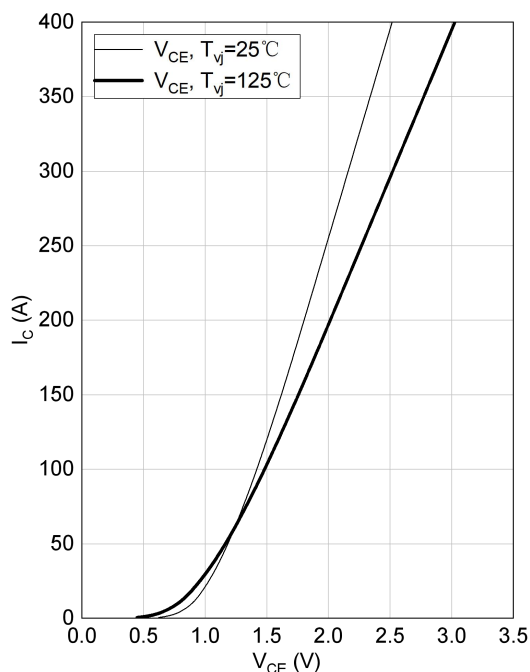
Module Characteristics

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(M6)	2.5		5.0	N·m
M_s	Module-to-Sink Torque	Recommended(M6)	3.0		6.0	N·m
G	Weight of Module			300		g

Output characteristic of IGBT, Inverter (typical)

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

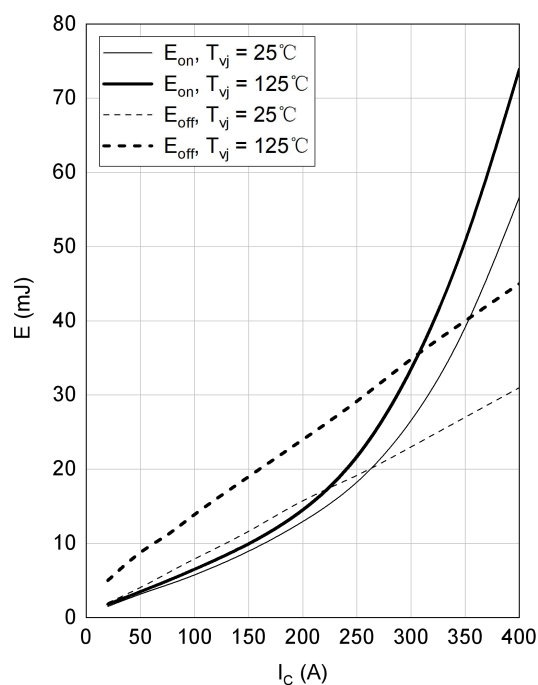
$$V_{GE} = 15V$$



Switching losses of IGBT, Inverter (typical)

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

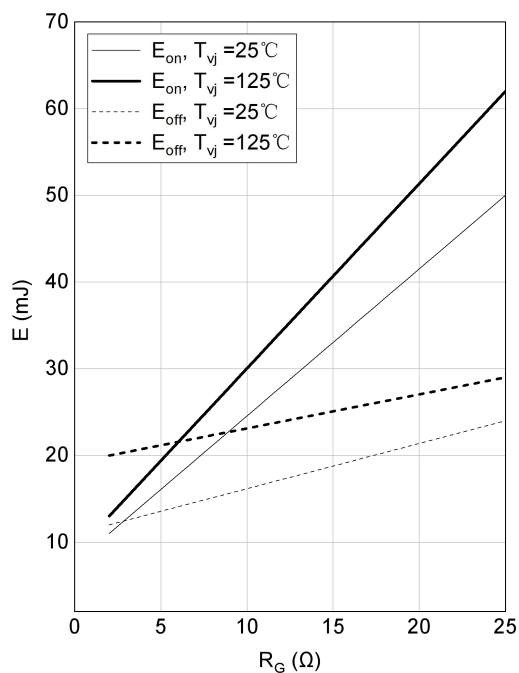
$$V_{GE} = \pm 15V, R_G = 2\Omega, V_{CE} = 600V$$



Switching losses of IGBT, Inverter (typical)

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

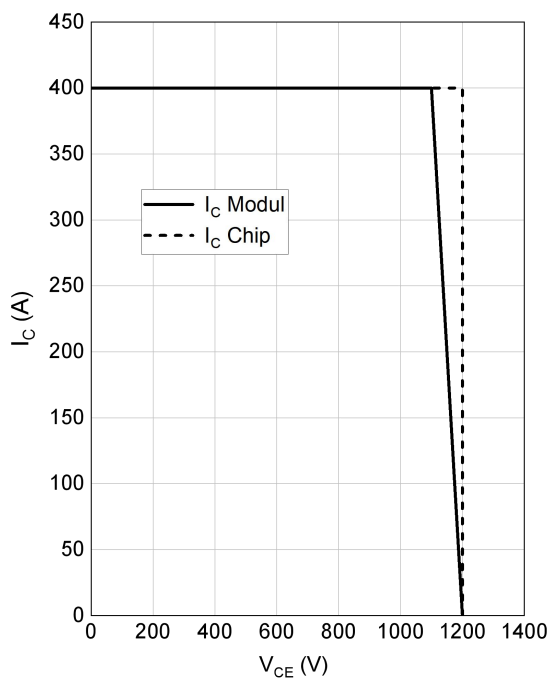
$$V_{GE} = \pm 15V, I_c = 200A, V_{CE} = 600V$$



RBSOA IGBT, Inverter (typical)

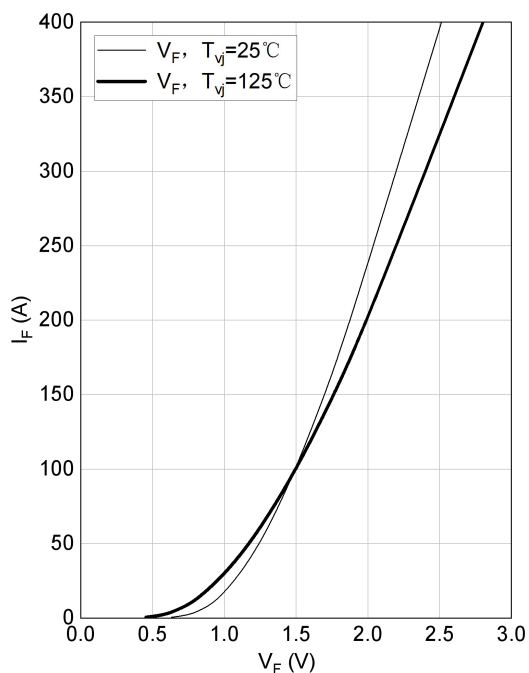
$$I_c = f(V_{CE})$$

$$V_{GE} = \pm 15V, R_{Goff} = 2\Omega, T_{vj} = 125^\circ C$$



Forward characteristic of Diode, Inverter (typical)

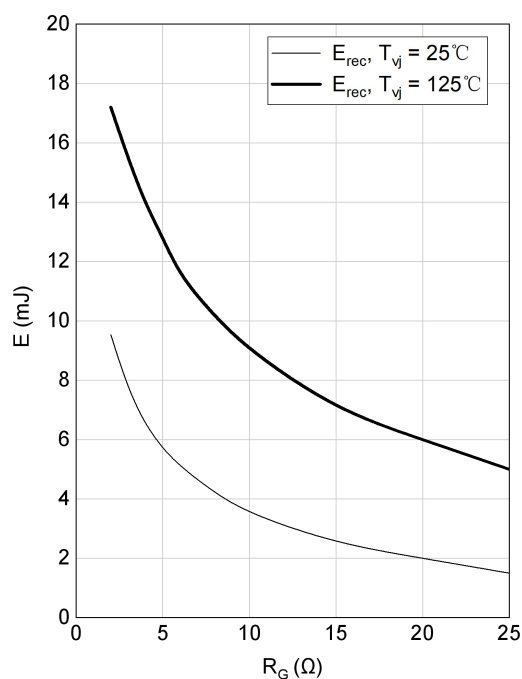
$$I_F = f(V_F)$$



Switching losses of Diode, Inverter (typical)

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

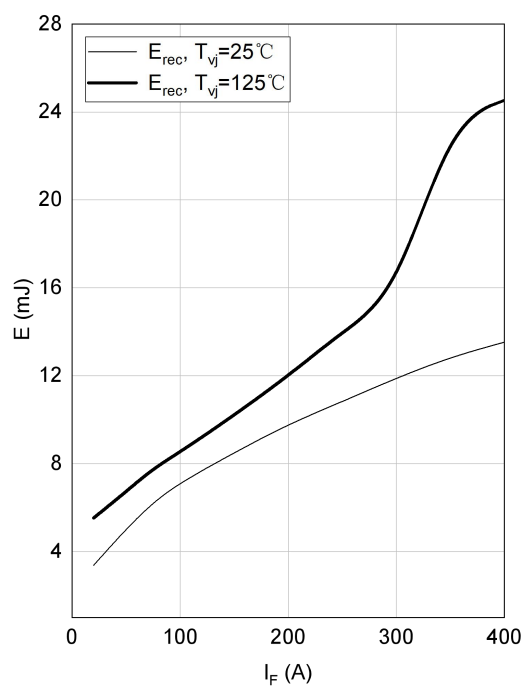
$$I_F = 200A, V_{CE} = 600V$$



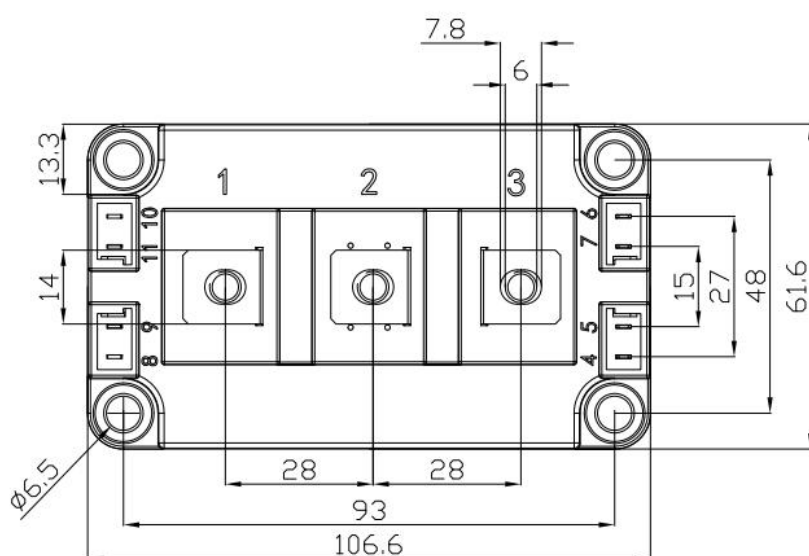
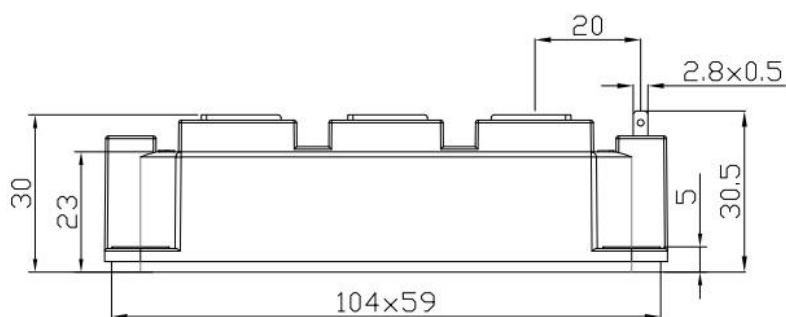
Switching losses of Diode, Inverter (typical)

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

$$R_{Gon} = 2\Omega, V_{CE} = 600V$$



(Dimensions in Millimeters)



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