

LEGM300CL120L2H

IGBT Power Module

Features

- $V_{CE}=1200V$ $I_C=300A$
- Low $V_{CE(sat)}$
- V_{CEsat} with positive temperature coefficient
- Maximum junction temperature 150°C
- Isolation Type Package

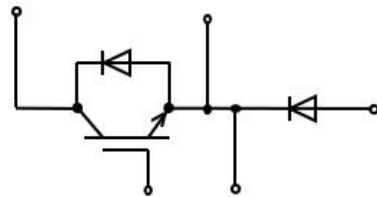
Applications

- The inverter
- Motor control and drives

Package Type & Internal Circuit



L2



Internal Circuit

Maximum Rated Values (IGBT Brake-Chopper)

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	$T_C=100^\circ C$	300	A
I_{CRM}	Peak Collector Current	$I_{CRM}=2I_C$	600	A
V_{GES}	Gate-Emitter Voltage	$T_{vj}=25^\circ C$	± 30	V
P_{tot}	Total Power Dissipation	$T_C=25^\circ C, T_{vjmax}=150^\circ C$	1300	W

Maximum Rated Values (IGBT Brake-Chopper)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit	
V _{CE(sat)}	Collector-Emitter Saturation Voltage	I _C =300 A, V _{GE} =15 V, T _{vj} =25 °C		1.85		V	
		I _C =300 A, V _{GE} =15 V, T _{vj} =125 °C		2.10		V	
V _{GE(th)}	Gate Threshold Voltage	I _C =5.0 mA, V _{CE} =V _{GE} , T _{vj} = 25 °C		5.6		V	
I _{CES}	Collector-Emitter Cut-off Current	V _{CE} =1200 V, V _{GE} =0 V, T _{vj} =25 °C			3.0	mA	
I _{GES}	Gate-Emitter Leakage Current	V _{CE} =0 V, V _{GE} =15 V, T _{vj} =25 °C			400	nA	
t _{d(on)}	Turn-on Delay Time, Inductive Load	I _C =300 A, V _{CE} =600 V V _{GE} =± 15 V R _G =2Ω T _{vj} =25 °C		180		ns	
t _r	Rise Time, Inductive Load			85		ns	
t _{d(off)}	Turn-off Delay Time, Inductive Load			460		ns	
t _f	Fall Time, Inductive Load			110		ns	
E _{on}	Turn-on Energy Loss per Pulse				21.4		mJ
E _{off}	Energy Loss per Pulse				26.9		mJ
t _{d(on)}	Turn-on Delay Time, Inductive Load		I _C =300 A, V _{CE} =600 V V _{GE} =± 15 V R _G =2Ω T _{vj} =125 °C		190		ns
t _r	Rise Time, Inductive Load				95		ns
t _{d(off)}	Turn-off Delay Time, Inductive Load				510		ns
t _f	Fall Time, Inductive Load				210		ns
E _{on}	Turn-on Energy Loss per Pulse				29		mJ
E _{off}	Energy Loss per Pulse				34.7		mJ
R _{thJC}	Thermal resistance, junction to case	per IGBT			0.091	K/W	
T _{vj op}	Temperature under switching conditions		-40		125	°C	
I _{sc}	SC	V _{GE} ≤15V, V _{CE} =600V, t _p ≤10μs, T _{vj} =125°C, V _{CEmax} =V _{CES} -L _{sCE} ·di/dt		1600		A	

Maximum Rated Values (Diode Chopper)

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	$T_C=100\text{ }^{\circ}\text{C}$		300		A
I_{FRM}	Repetitive Peak Forward Current	$t_p=1\text{ ms}$		600		A
I^2t	I^2t Value	$V_R=0\text{ V}, t_p=10\text{ ms}, T_{vj}=125\text{ }^{\circ}\text{C}$		18000		A^2s

Characteristic Values (Diode Chopper)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit	
V_F	Forward Voltage	$I_F=300\text{ A}, V_{CE}=0\text{ V}, T_{vj}=25\text{ }^{\circ}\text{C}$		1.85		V	
		$I_F=300\text{ A}, V_{CE}=0\text{ V}, T_{vj}=125\text{ }^{\circ}\text{C}$		2.00		V	
t_{rr}	Reverse Recovery time	$I_F=300\text{ A}, V_R=600\text{ V}$ $-di/dt=2800\text{ A/us}$		160		ns	
Q_r	Recovered Charge			19.8		μC	
E_{rec}	Reverse Recovery Energy		$T_{vj}=25\text{ }^{\circ}\text{C}$		7.8		mJ
t_{rr}	Reverse Recovery time	$I_F=300\text{ A}, V_R=600\text{ V}$ $-di/dt=2800\text{ A/us}$		400		ns	
			$T_{vj}=125\text{ }^{\circ}\text{C}$		39.9		μC
					16.8		mJ
R_{thJC}	Thermal resistance, junction to case	per Diode			0.143	K/W	
$T_{vj\text{ op}}$	Operating Junction Temperature		-40		125	$^{\circ}\text{C}$	

Maximum Rated Values (Diode Reverse)

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	$T_C=100\text{ }^{\circ}\text{C}$		300		A
I_{FRM}	Repetitive Peak Forward Current	$t_p=1\text{ ms}$		600		A
I^2t	I^2t Value	$V_R=0\text{ V}$, $t_p=10\text{ ms}$, $T_{vj}=125\text{ }^{\circ}\text{C}$		18000		A^2s

Characteristic Values (Diode Reverse)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=300\text{ A}$, $V_{CE}=0\text{ V}$, $T_{vj}=25\text{ }^{\circ}\text{C}$		1.85		V
		$I_F=300\text{ A}$, $V_{CE}=0\text{ V}$, $T_{vj}=125\text{ }^{\circ}\text{C}$		2.00		V
t_{rr}	Reverse Recovery time	$I_F=300\text{ A}$, $V_R=600\text{ V}$ $-di/dt=2800\text{ A/us}$		160		ns
Q_r	Recovered Charge			19.8		μC
E_{rec}	Reverse Recovery Energy		$T_{vj}=25\text{ }^{\circ}\text{C}$		7.8	
t_{rr}	Reverse Recovery time	$I_F=300\text{ A}$, $V_R=600\text{ V}$ $-di/dt=2800\text{ A/us}$		400		ns
			$T_{vj}=125\text{ }^{\circ}\text{C}$		39.9	
Q_r	Recovered Charge				16.8	
E_{rec}	Reverse Recovery Energy					
R_{thJC}	Thermal resistance, junction to case	per Diode			0.143	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, Brake-Chopper (typical)

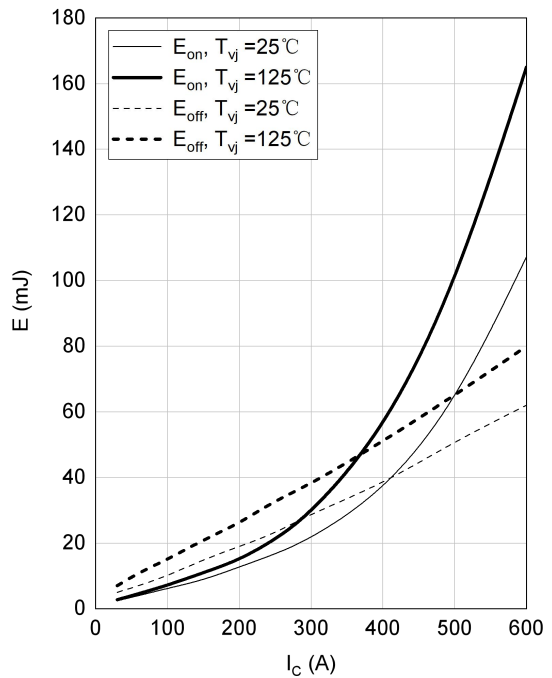
$$I_c = f(V_{CE})$$

$$V_{GE} = 15V$$


Switching losses of IGBT, Brake-Chopper (typical)

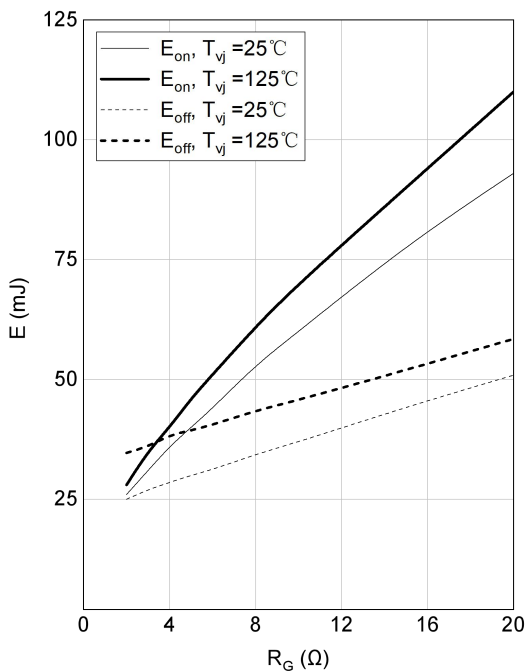
$$E_{on} = f(I_c), E_{off} = f(I_c)$$

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


Switching losses of IGBT, Brake-Chopper (typical)

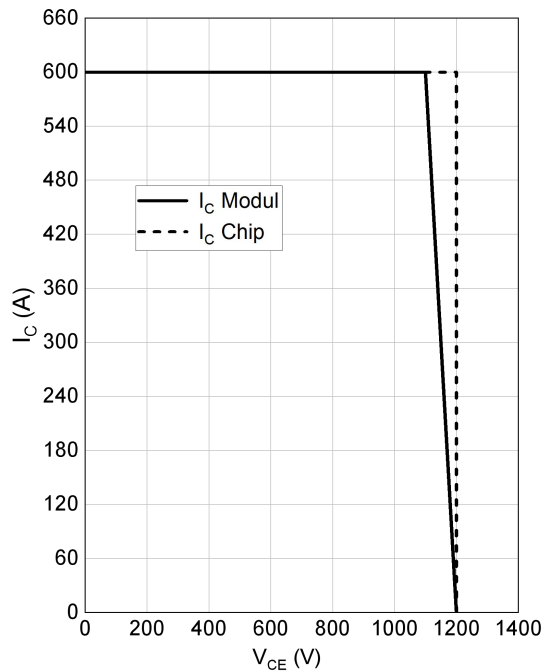
$$E_{on} = f(R_G), E_{off} = f(R_G)$$

$$V_{GE} = \pm 15V, I_c = 300A, V_{CE} = 600V$$


RBSOA IGBT, Brake-Chopper (typical)

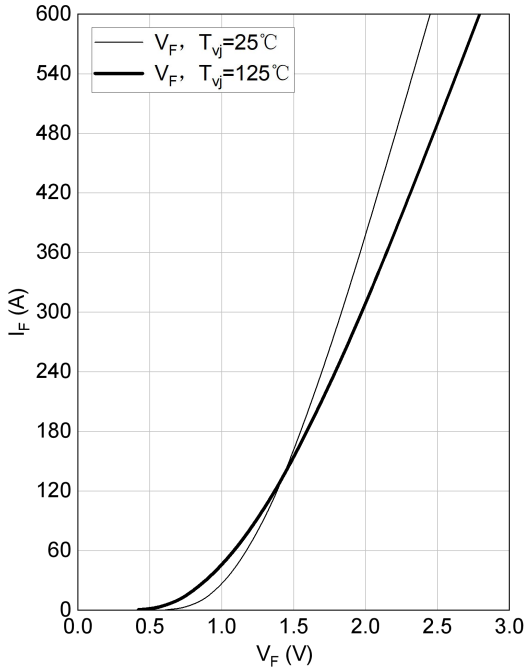
$$I_c = f(V_{CE})$$

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



Forward characteristic of Diode, Chopper (typical)

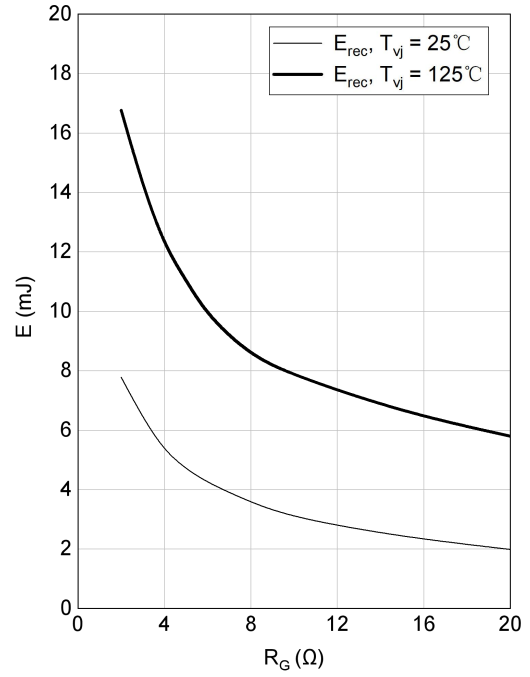
$I_F = f(V_F)$



Switching losses of Diode, Chopper (typical)

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

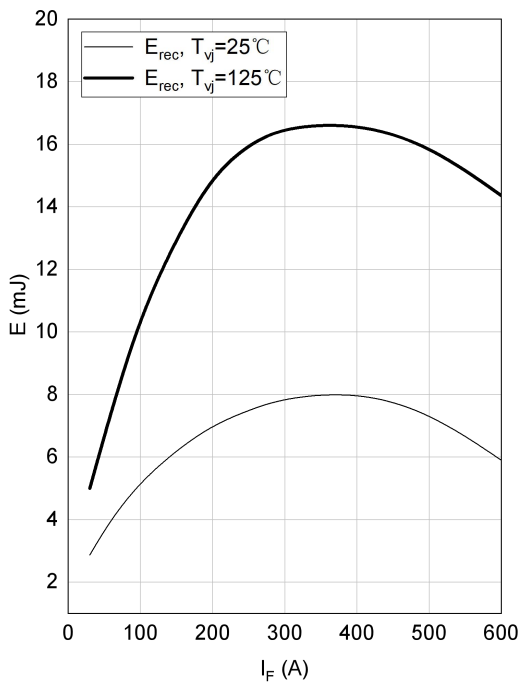
$I_F = 300A, V_{CE} = 600V$



Switching losses of Diode, Chopper (typical)

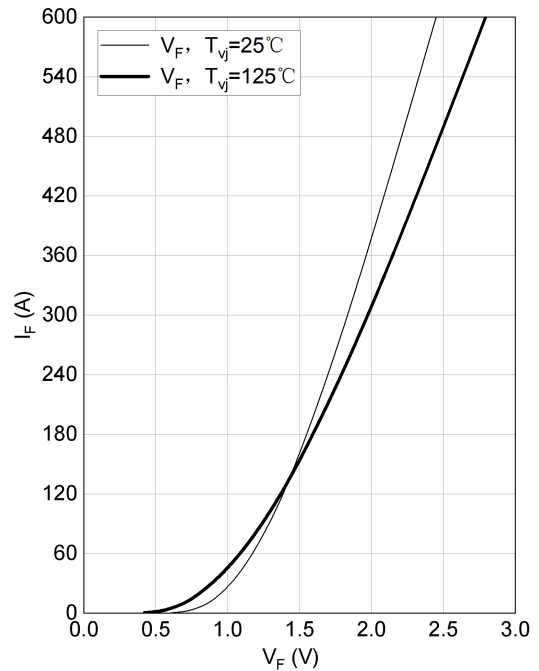
$E_{rec} = f(I_F)$,

$R_G = 2Ω, V_{CE} = 600V$

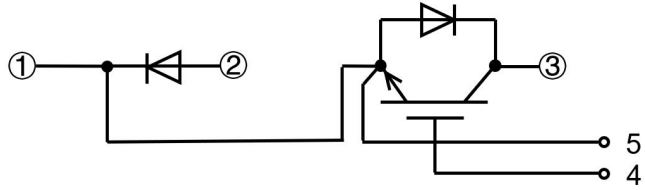


Forward characteristic of Diode, Reverse (typical)

$I_F = f(V_F)$

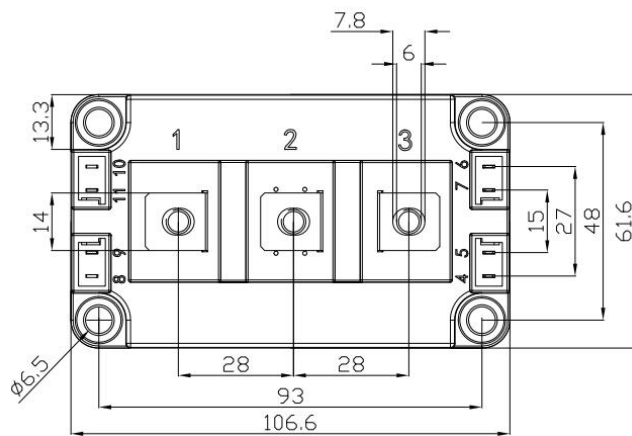
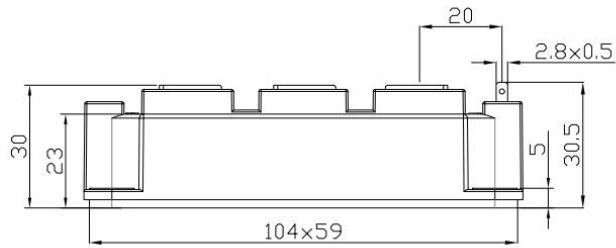


Circuit Diagram



Package Dimensions

(Dimensions in Millimeters)



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