

LEGM100CU120D3S

IGBT Power Module

Features:

- $V_{CE}=1200V$ $I_C=100A$
- Low $V_{CE(sat)}$
- V_{CEsat} with positive temperature coefficient
- Maximum junction temperature 175°C
- Isolation Type Package

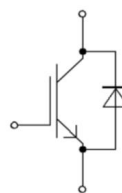
Applications:

- The inverter
- Motor control and drives

Package Type & Internal Circuit



D3



Internal Circuit

Maximum Rated Values (IGBT Inverter)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CES}	Collector-emitter voltage	$V_{EC}=0V, I_C=1mA, T_{vj}=25^{\circ}C$	1200	V
I_C	Continuous Collector Current	$T_C=100^{\circ}C$	100	A
I_{CRM}	Peak Collector Current	$I_{CRM}=2I_C$	200	A
V_{GES}	Gate-Emitter Voltage	$T_{vj}=25^{\circ}C$	± 30	V
P_{tot}	Total Power Dissipation	$T_C=25^{\circ}C, T_{vjmax}=150^{\circ}C$	494	W

Characteristics Values (IGBT)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=100A, V_{GE}=15V, T_{vj}=25^{\circ}C$		2.0	2.5	V
		$I_C=100A, V_{GE}=15V, T_{vj}=150^{\circ}C$		2.5		V
$V_{GE(th)}$	Gate Threshold Voltage	$I_C=5.0mA, V_{CE}=V_{GE}, T_{vj}=25^{\circ}C$	5.2	6	6.5	V
I_{CES}	Collector-Emitter Cut-off Current	$V_{CE}=1200V, V_{GE}=0V, T_{vj}=25^{\circ}C$			20	μA
I_{GES}	Gate-Emitter Leakage Current	$V_{CE}=0V, V_{GE}=15V, T_{vj}=25^{\circ}C$			200	nA
r_G	Integrated gate resister		-	4.2	-	Ω
C_{ies}	Input Capacitance	$V_{CE}=25V, V_{GE}=0V, f=1MHz$	-	9.65	-	nF
C_{oes}	Output Capacitance		-	492	-	pF
C_{res}	Reverse Transfer Capacitance		-	328	-	pF
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	$I_C=100A, V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=5\Omega$ $T_{vj}=25^{\circ}C$		134		ns
t_r	Rise Time, Inductive Load			65.9		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			343		ns
t_f	Fall Time, Inductive Load			43		ns
E_{on}	Turn-on Energy Loss per Pulse			7.1		mJ
E_{off}	Energy Loss per Pulse			6.1		mJ
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	$I_C=100A, V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=5\Omega$ $T_{vj}=150^{\circ}C$		388		ns
t_r	Rise Time, Inductive Load			130		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			131		ns
t_f	Fall Time, Inductive Load			64		ns
E_{on}	Turn-on Energy Loss per Pulse			8.5		mJ
E_{off}	Energy Loss per Pulse			8.7		mJ
R_{thJC}	Thermal resistance, junction to case	per IGBT			0.29	K/W
$T_{vj op}$	Temperature under switching conditions		-40		150	$^{\circ}C$
I_{SC}	SC data	$V_{GE} \leq 15V, V_{CC}=600V$ $V_{CEmax}=V_{CES}-L_{sCE} \cdot di/dt$ $t_p \leq 10\mu s, T_{vj}=150^{\circ}C$		400		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			20		A
I_{FRM}	Repetitive Peak Forward Current	$t_p=1\text{ ms}$		40		A
I^2t	I^2t Value	$V_R=0\text{ V}$, $t_p=8.3\text{ ms}$, $T_{vj}=150\text{ }^{\circ}\text{C}$		240		A ² s

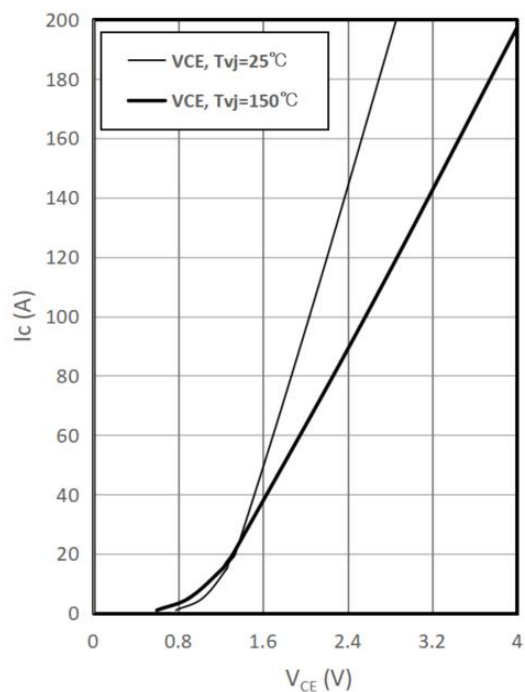
Characteristic Values (Diode Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=20\text{ A}$, $V_{CE}=0\text{ V}$, $T_{vj}=25\text{ }^{\circ}\text{C}$		2.0	2.5	V
		$I_F=20\text{ A}$, $V_{CE}=0\text{ V}$, $T_{vj}=150\text{ }^{\circ}\text{C}$		1.7	2.2	V
t_{rr}	Reverse Recovery time	$I_F=20\text{ A}$, $V_R=600\text{ V}$ -di/dt=100A/us $T_{vj}=25\text{ }^{\circ}\text{C}$ $V_{GE}=-15\text{ V}$		170		ns
Q_r	Recovered Charge			0.98		uC
E_{rec}	Reverse Recovery Energy			0.35		mJ
t_{rr}	Reverse Recovery time	$I_F=20\text{ A}$, $V_R=600\text{ V}$ -di/dt=100A/us $T_{vj}=150\text{ }^{\circ}\text{C}$ $V_{GE}=-15\text{ V}$		205		ns
Q_r	Recovered Charge			1.09		uC
E_{rec}	Reverse Recovery Energy			0.36		mJ
R_{thJC}	Thermal resistance, junction to case	per Diode			1.0	K/W
$T_{vj\text{ op}}$	Temperature under switching conditions		-40		125	$^{\circ}\text{C}$

Output characteristic of IGBT (typical)

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

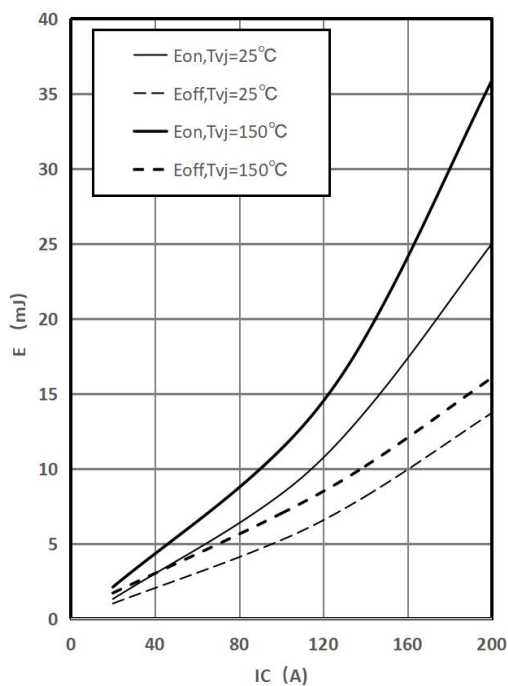
$$V_{GE} = 15V$$



Switching losses of IGBT (typical)

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

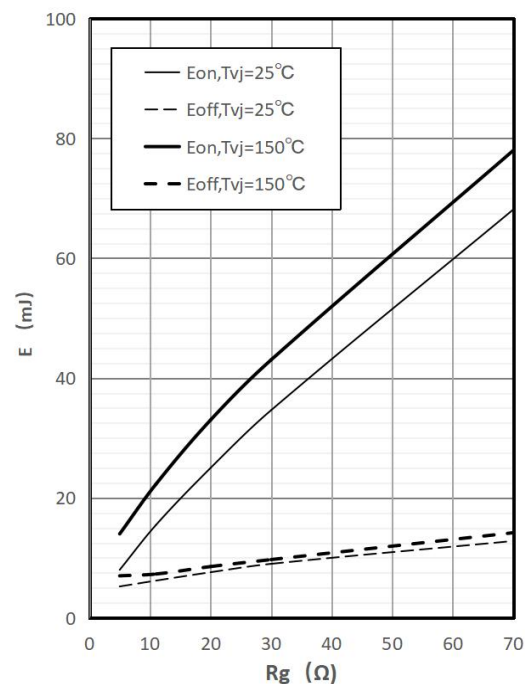
$$V_{GE} = \pm 15V, R_G = 5\Omega, V_{CE} = 600V$$



Switching losses of IGBT (typical)

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

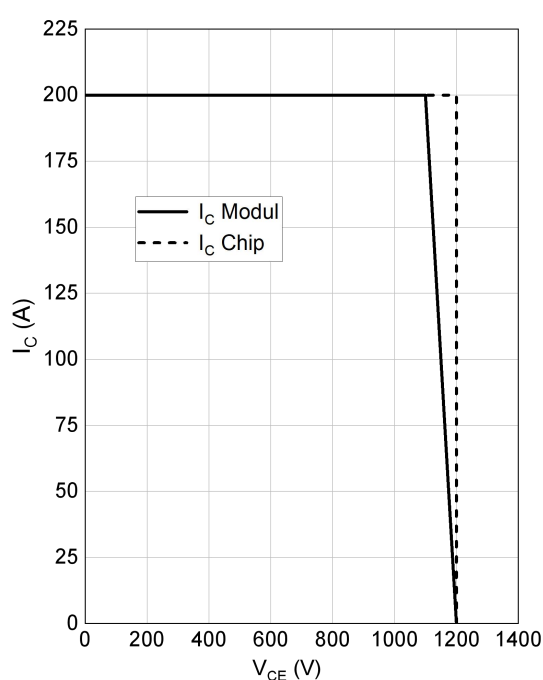
$$V_{GE} = \pm 15V, I_c = 100A, V_{CE} = 600V$$



RBSOA IGBT (typical)

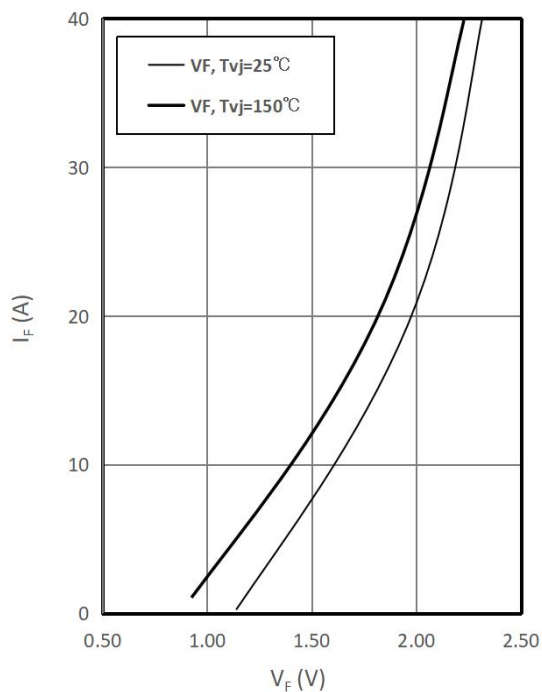
$$I_c = f(V_{CE})$$

$$V_{GE} = \pm 15V, R_{Goff} = 5\Omega, T_{vj} = 125^{\circ}C$$



Forward characteristic of Diode, Inverter (typical)

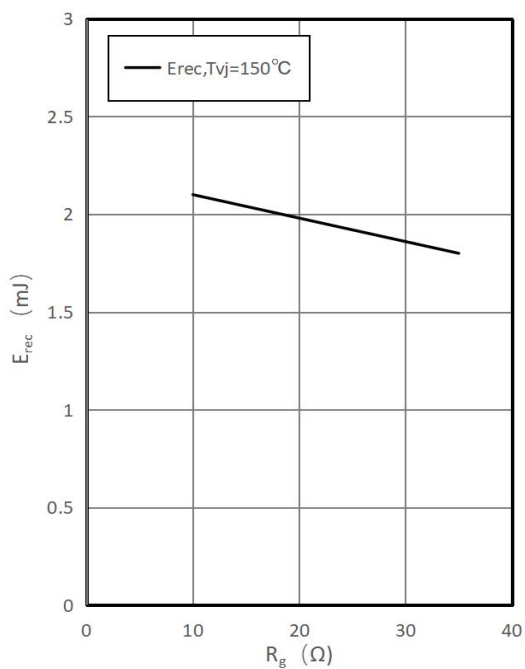
$$I_F = f(V_F)$$



Switching losses Diode, Inverter (typical)

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

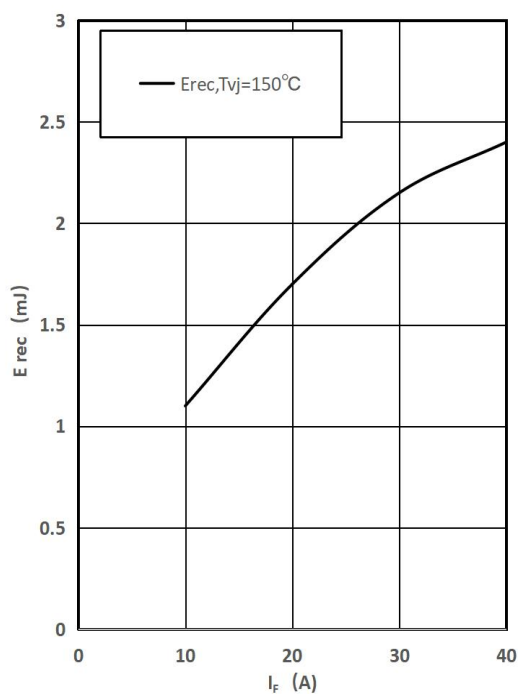
$$I_F = 20 \text{ A}, V_{CE} = 600 \text{ V}$$



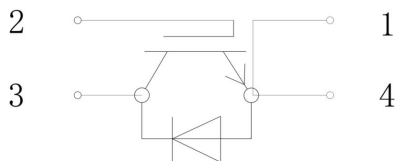
Switching losses Diode, Inverter (typical)

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

$$R_{Gon} = 36\Omega, V_{CE} = 600 \text{ V}$$

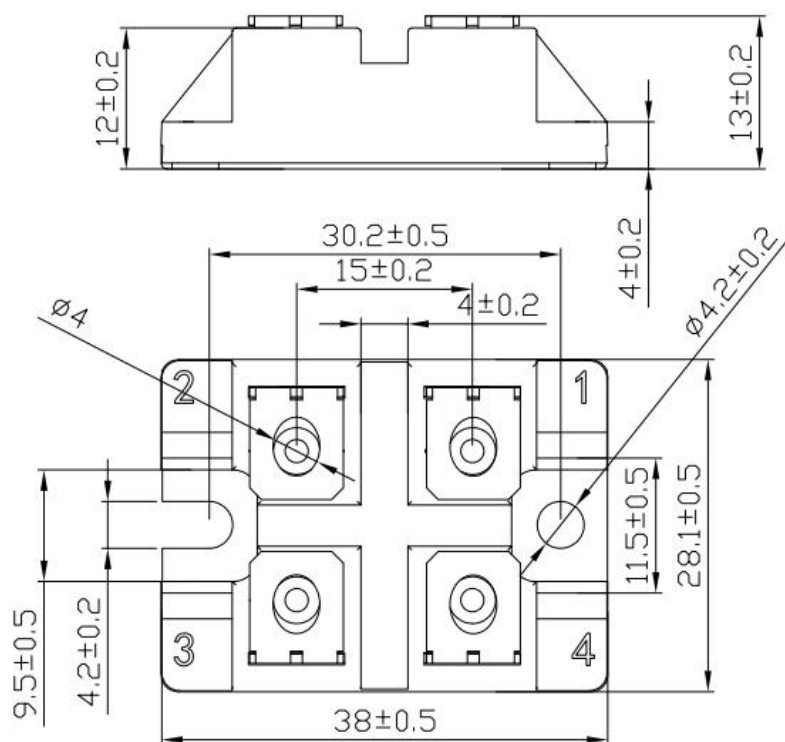


Circuit Diagram



Package Dimensions

(Dimensions in Millimeters)



DISCLAIMER

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.