

LEGM400CU120L7S

IGBT Power Module

Features:

- $V_{CE}=1200V$ $I_C=400A$
- Low $V_{CE(sat)}$
- V_{CEsat} with positive temperature coefficient
- Maximum junction temperature 150°C
- Isolation Type Package

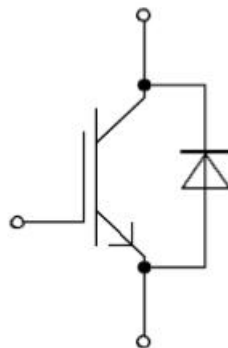
Applications:

- The inverter
- Motor control and drives
- UPS

Package Type & Internal Circuit



L7



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	$T_C=100\text{ }^{\circ}C$	400	A
I_{CRM}	Peak Collector Current	$I_{CRM}=2I_C$	800	A
V_{GES}	Gate-Emitter Voltage	$T_{vj}=25\text{ }^{\circ}C$	± 30	V
P_{tot}	Total Power Dissipation	$T_C=25^{\circ}C, T_{vjmax}=150\text{ }^{\circ}C$	1760	W

Maximum Rated Values (IGBT Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=400\text{ A}, V_{GE}=15\text{ V}, T_{vj}=25\text{ }^{\circ}\text{C}$		2.0	2.4	V
		$I_C=400\text{ A}, V_{GE}=15\text{ V}, T_{vj}=125\text{ }^{\circ}\text{C}$		2.5		V
$V_{GE(th)}$	Gate Threshold Voltage	$I_C=1.0\text{ mA}, V_{CE}=V_{GE}, T_{vj}=25\text{ }^{\circ}\text{C}$	5.2	6	6.5	V
I_{CES}	Collector-Emitter Cut-off Current	$V_{CE}=1200\text{ V}, V_{GE}=0\text{ V}, T_{vj}=25\text{ }^{\circ}\text{C}$			20	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{CE}=0\text{ V}, V_{GE}=15\text{ V}, T_{vj}=25\text{ }^{\circ}\text{C}$			200	nA
r_G	Integrated gate resister		-	1.05	-	Ω
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	$I_C=400\text{ A}, V_{CE}=600\text{ V}$ $V_{GE}=\pm 15\text{ V}$ $R_G=1.2\Omega$ $T_{vj}=25\text{ }^{\circ}\text{C}$		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			14.5		mJ
E_{off}	Energy Loss per Pulse			24.5		mJ
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	$I_C=400\text{ A}, V_{CE}=600\text{ V}$ $V_{GE}=\pm 15\text{ V}$ $R_G=1.2\Omega$ $T_{vj}=125\text{ }^{\circ}\text{C}$		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			33.3		mJ
E_{off}	Energy Loss per Pulse			34.6		mJ
R_{thJC}	Thermal resistance, junction to case	per IGBT			0.07	K/W
$T_{vj\text{ op}}$	Temperature under switching conditions		-40		125	$^{\circ}\text{C}$

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	$T_C=100\text{ }^{\circ}\text{C}$		400		A
I_{FRM}	Repetitive Peak Forward Current	$t_p=1\text{ ms}$		800		A

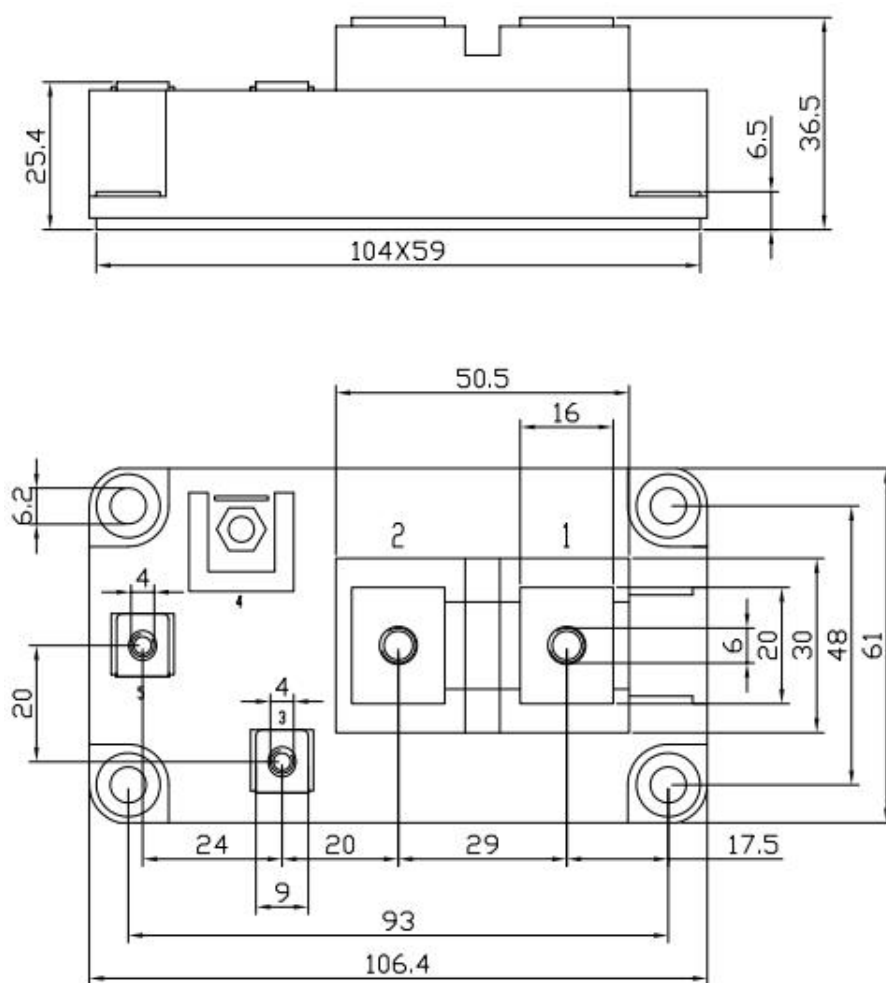
Characteristic Values (Diode Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=400\text{ A}, V_{CE}=0\text{ V}, T_{vj}=25\text{ }^{\circ}\text{C}$		1.89		V
		$I_F=400\text{ A}, V_{CE}=0\text{ V}, T_{vj}=125\text{ }^{\circ}\text{C}$		2.34		V
t_{rr}	Reverse Recovery time	$I_F=400\text{ A}, V_R=600\text{ V}$ -di/dt=5100 A/us $T_{vj}=25\text{ }^{\circ}\text{C}$		188		ns
Q_r	Recovered Charge			35		uC
E_{rec}	Reverse Recovery Energy			17		mJ
t_{rr}	Reverse Recovery time	$I_F=400\text{ A}, V_R=600\text{ V}$ -di/dt=5100 A/us $T_{vj}=125\text{ }^{\circ}\text{C}$		240		ns
Q_r	Recovered Charge			66		uC
E_{rec}	Reverse Recovery Energy			25.1		mJ
R_{thJC}	Thermal resistance, junction to case	per Diode			0.078	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) Recommended(M4)	3.0 1.1		6.0 2.0	N·m
M_s	Module-to-Sink Torque	Recommended(M6)	3.0		6.0	N·m
G	Weight of Module			330		g

(Dimensions in Millimeters)



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TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE