LEGM600CJ120L6H

IGBT Power Module

Features:

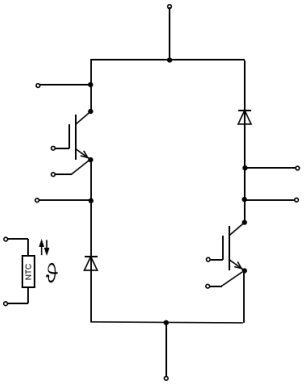
- V_{CE}=1200V I_C=600A
- Low $V_{CE(sat)}$
- V_{CEsat} with positive temperature coefficient
- Maximum junction temperature 175℃
- Isolation Type Package

Applications:

- Uninterruptible Power Supplies (UPS)
- Servo Applications
- Motor Drives

Package Type & Internal Circuit

L6



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 ℃	1200	V
I_C	Continuous Collector Current	T_C=100 ℃	600	A
I_{CRM}	Peak Collector Current	I_{CRM}=2I_C	1200	A
V_{GES}	Gate-Emitter Voltage	T_{vj}=25 ℃	±20	V
P_{tot}	Total Power Dissipation	T_C=25℃,T_{vjmax}=150 ℃	4290	W

Maximum Rated Values (IGBT Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=600 A, V_{GE}=15 V, T_{vj}=25 ℃		1.8	2.3	V
		I_C=600 A, V_{GE}=15 V, T_{vj}=150 ℃		2.0	2.5	V
$V_{GE(th)}$	Gate Threshold Voltage	I_C=8.0 mA,V_{CE}=V_{GE},T_{vj}= 25 ℃	5.2	6.2	6.5	V
I_{CES}	Collector-Emitter Cut-off Current	V_{CE}=1200 V, V_{GE}=0 V, T_{vj}=25 ℃			20	μA
I_{GES}	Gate-Emitter Leakage Current	V_{CE}=0 V, V_{GE}=15 V, T_{vj}=25 ℃			200	nA
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	I_C=600 A,V_{CE}=600 V V_{GE}=±15 V R_G=0.7Ω T_{vj}=25 ℃		106		ns
t_r	Rise Time, Inductive Load			61		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			410		ns
t_f	Fall Time, Inductive Load			151		ns
E_{on}	Turn-on Energy Loss per Pulse			24.3		mJ
E_{off}	Energy Loss per Pulse			55.1		mJ
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	I_C=600 A,V_{CE}=600 V V_{GE}=±15 V R_G=0.7Ω T_{vj}=150 ℃		122		ns
t_r	Rise Time, Inductive Load			64		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			461		ns
t_f	Fall Time, Inductive Load			330		ns
E_{on}	Turn-on Energy Loss per Pulse			30.3		mJ
E_{off}	Energy Loss per Pulse			62.1		mJ
R_{thJC}	Thermal resistance, junction to case	per IGBT			0.035	K/W
$T_{vj\ op}$	Temperature under switching conditions		-40		150	℃
I_{SC}	SC data	V_{GE} ≤15 V, V_{CC} = 900 V V_{CEmax} = V_{CES} -L_{sCE} ·di/dt t_P ≤ 10 μs, T_{vj} = 150 ℃		2500		A

Maximum Rated Values of Diode

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 ℃		600		A
I_{FRM}	Repetitive Peak Forward Current	t_P=1 ms		1200		A
I^2t	I^2t Value	V_R=0 V, t_P=10 ms, T_{vj}=125 ℃		48000		A^2s

Characteristic Values of Diode

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	I_F=600 A, V_{CE}=0 V, T_{vj}=25 ℃		2.5	2.7	V
		I_F=600 A, V_{CE}=0 V, T_{vj}=150 ℃		2.5		V
t_{rr}	Reverse Recovery time	I_F=600 A,V_R=600 V -di/dt=1350 A/us T_{vj}=25 ℃		220		ns
Q_r	Recovered Charge			29.5		uC
E_{rec}	Reverse Recovery Energy			11.5		mJ
t_{rr}	Reverse Recovery time	I_F=600 A,V_R=600 V -di/dt=1350 A/us T_{vj}=150 ℃		380		ns
Q_r	Recovered Charge			86		uC
E_{rec}	Reverse Recovery Energy			39		mJ
R_{thJC}	Thermal resistance, junction to case	per Diode			0.078	K/W
$T_{vj\ op}$	Operating Junction Temperature		-40		150	℃

Maximum Rated Values of Reverse Diode

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	T_{vj}= 25 ℃		1200		V
I_F	Continuous DC Forward Current			35		A
I_{FRM}	Repetitive Peak Forward Current	t_P=1 ms		70		A
I^2t	I^2t Value	V_R=0 V, t_P=10 ms, T_{vj}=125 ℃		220		A^2s

Characteristic Values of Reverse Diode

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	I_F=35 A, V_{CE}=0 V,T_{vj}= 25 ℃		1.9	2.5	V
		I_F=35 A, V_{CE}=0 V,T_{vj}=125 ℃		1.9		V
t_{rr}	Reverse Recovery time	I_F=35 A,V_R=600 V -di/dt=100A/us T_{vj}=25 ℃, V_{GE}=-15V		170		ns
Q_r	Recovered Charge			0.98		uC
E_{rec}	Reverse Recovery Energy			0.35		mJ
t_{rr}	Reverse Recovery time	I_F=35A,V_R=600 V -di/dt=100A/us T_{vj}=125 ℃ V_{GE}=-15V		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
$T_{vj\ op}$	Temperature under switching conditions		-40		125	℃

Module Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{isol}	Isolation voltage	t=1min,f=50Hz	4000			V
T_{stg}	Storage Temperature		-40		150	℃
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			350		g

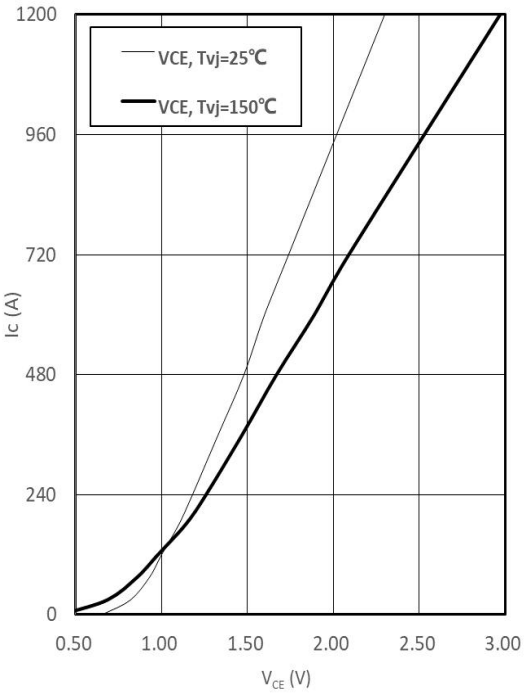
NTC-Thermistor (Characteristic Values)

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)

$I_c = f(V_{CE})$

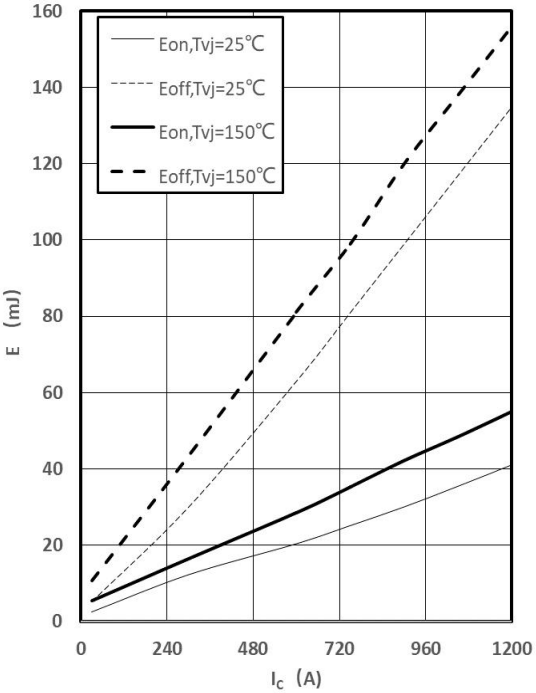
$V_{GE} = 15V$



switching losses of IGBT,Inverter (typical)

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

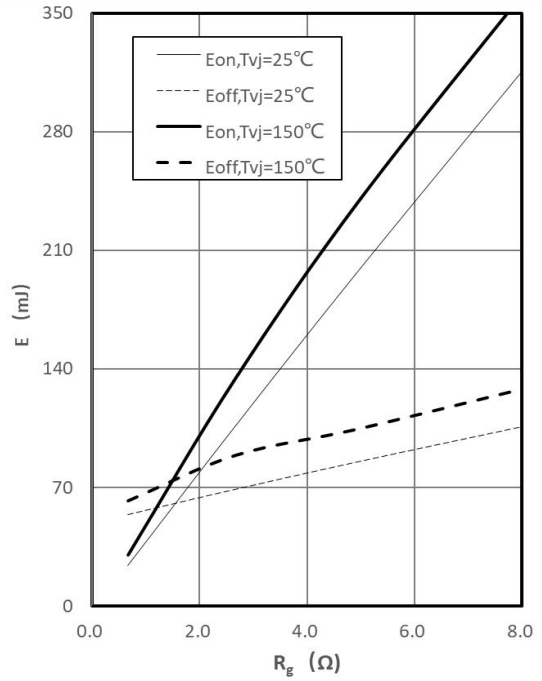
$V_{GE} = \pm 15V$, $R_G = 0.7\Omega$, $V_{CE} = 600V$



switching losses of IGBT,Inverter (typical)

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

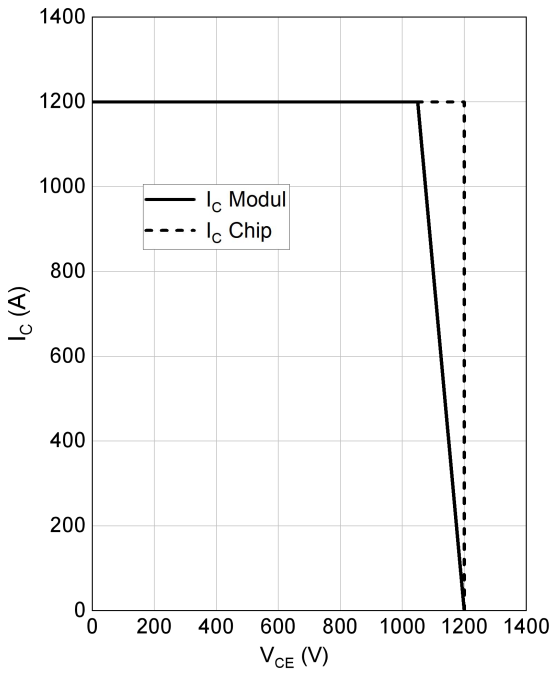
$V_{GE} = \pm 15V$, $I_C = 600A$, $V_{CE} = 600V$



RBSOA IGBT,Inverter (typical)

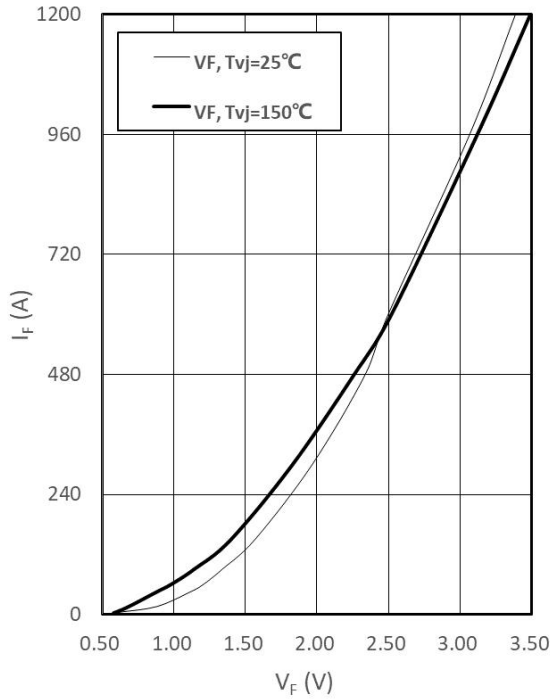
$I_C = f(V_{CE})$

$V_{GE} = \pm 15V$, $R_{Goff} = 0.7\Omega$, $T_{vj} = 150\ ^{\circ}C$



forward characteristic of Diode,Inverter (typical)

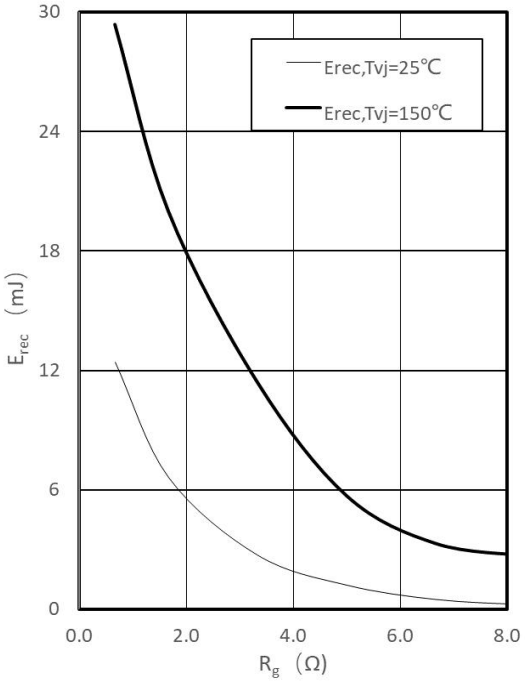
$I_F = f(V_F)$



switching losses of Diode, Inverter (typical)

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

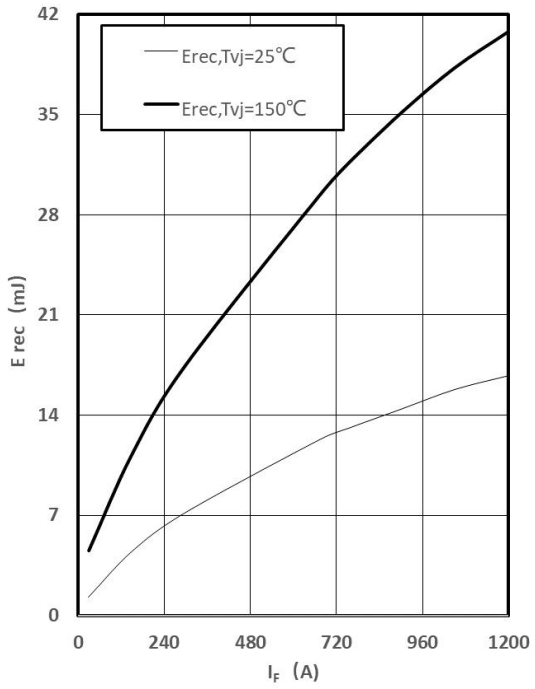
I_F =600A，V_{CE} = 600V



switching losess of Diode, Inverter (typical)

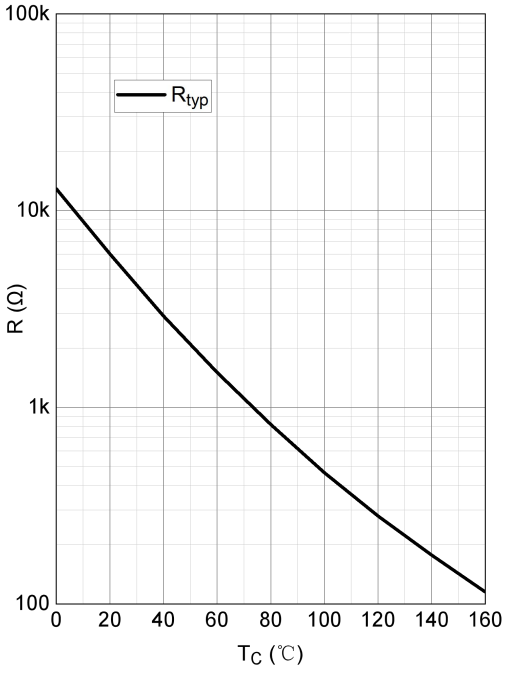
$E_{rec} = f(I_F)$,

R_{Gon} =0.7Ω，V_{CE} = 600V

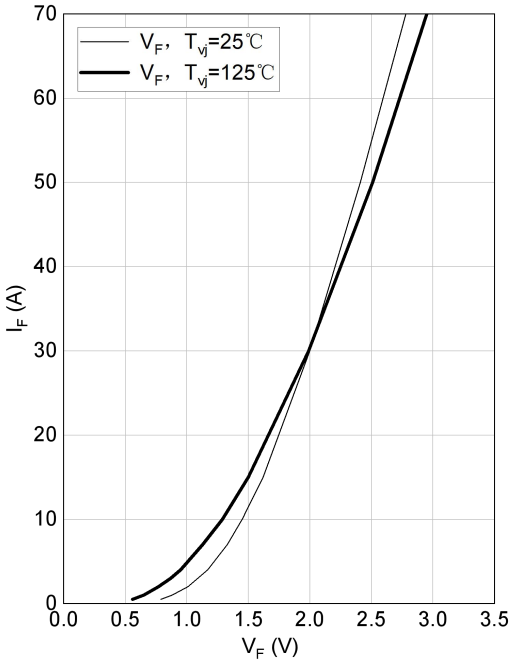


NTC-Thermistor-temperature characteristic (typical)

R = f (T)



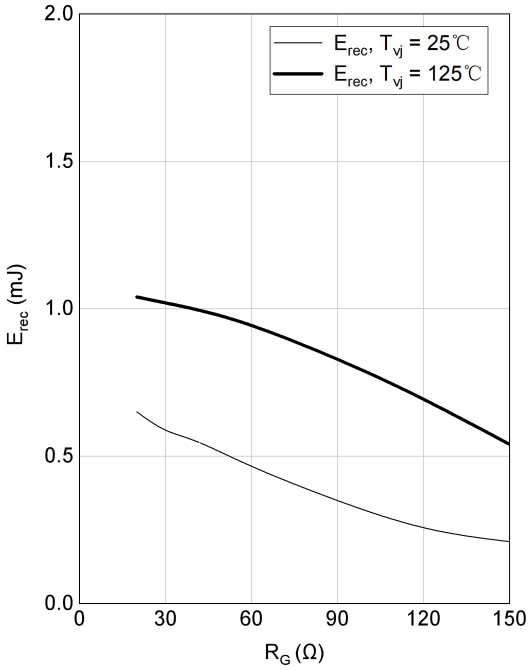
Forward characteristic of Diode,Inverter (typical)
$I_F = f(V_F)$



Switching losses of Diode, Inverter (typical)

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

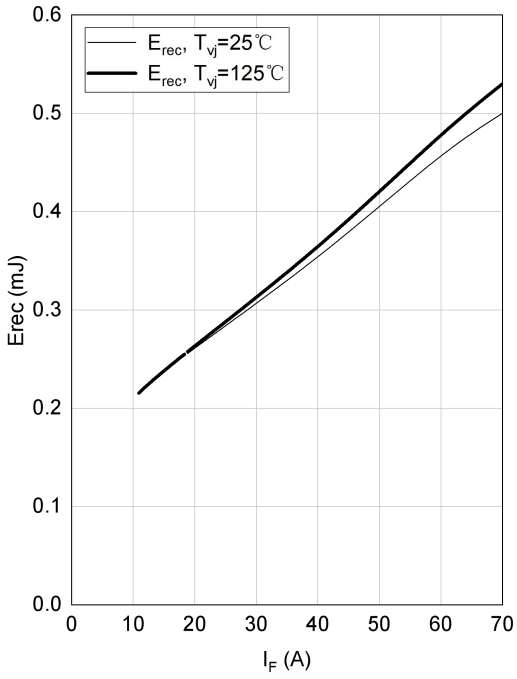
I_F = 35A，V_{CE} = 600V



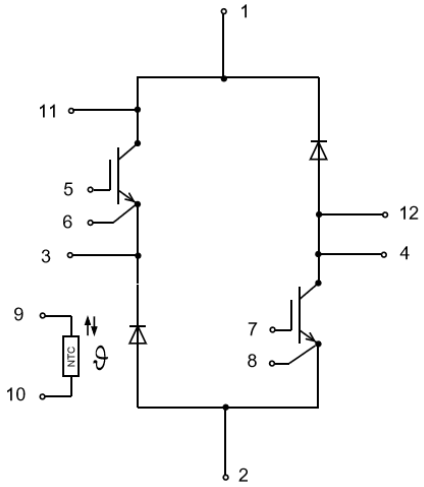
Switching losses of Diode, Inverter (typical)

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

R_{Gon} = 15Ω，V_{CE} = 600V

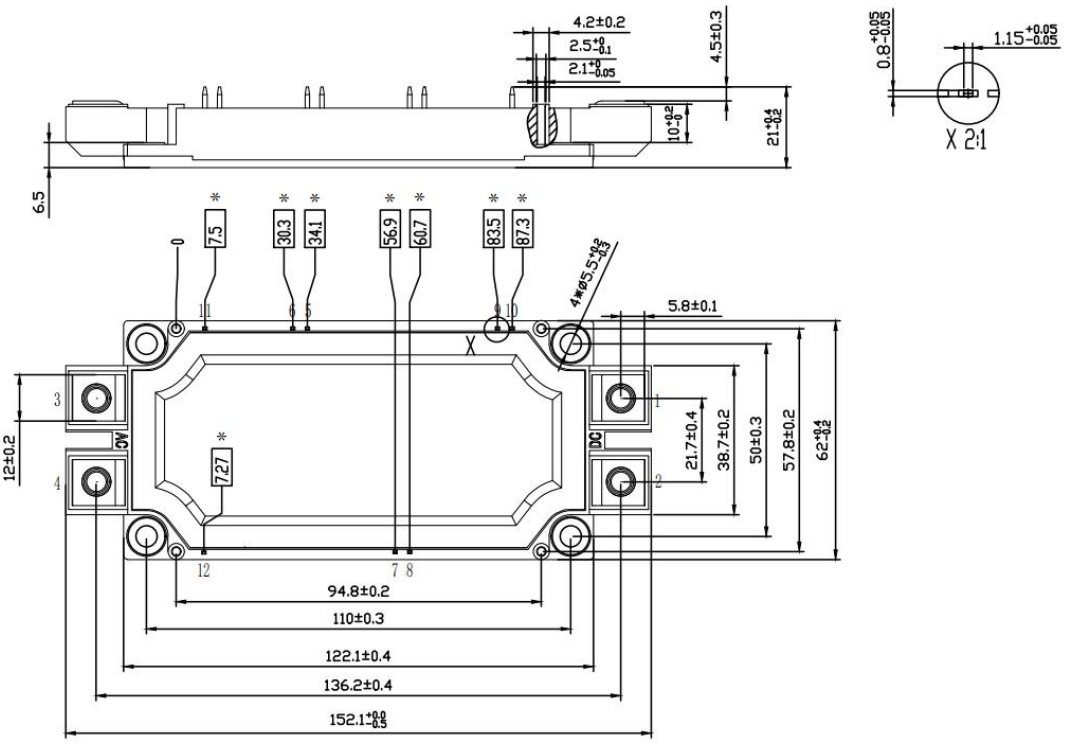


Circuit Diagram



Package Dimensions

(Dimensions in Millimeters)



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