

LEGM100BC70E2H

IGBT Power Module

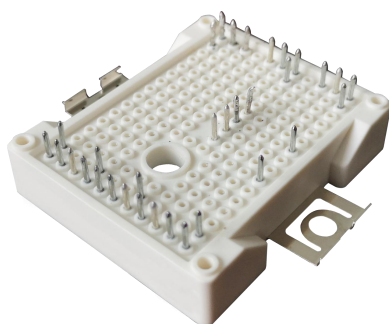
Features:

- $V_{CE}=700V$ $I_C=100A$
- Low $V_{CE(sat)}$
- V_{CEsat} with positive temperature coefficient
- Maximum junction temperature $150^{\circ}C$
- Isolation Type Package

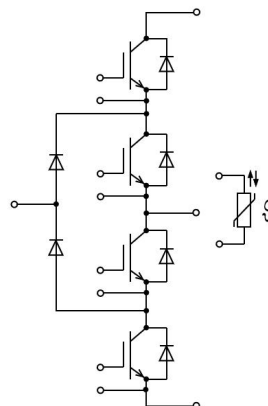
Applications:

- 3-Level-Applications
- Solar Applications
- UPS Systems

Package Type & Internal Circuit



E2



Internal Circuit

Maximum Rated Values (IGBT Inverter)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CES}	Maximum Power Dissipation	$V_{EC}=0V, I_C=1mA, T_{vj}=25^{\circ}C$	700	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	$T_{vj}=25^{\circ}C$	± 20	V
P_{tot}	Total Power Dissipation	$T_C=25^{\circ}C, T_{vjmax}=150^{\circ}C$	300	W

Maximum Rated Values (IGBT T1 T2 T3 T4)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=100A, V_{GE}=15V, T_{vj}=25^\circ C$		1.8	2.3	V
		$I_C=100A, V_{GE}=15V, T_{vj}=150^\circ C$		2.0		V
$V_{GE(th)}$	Gate Threshold Voltage	$I_C=2.0mA, V_{CE}=V_{GE}, T_{vj}=25^\circ C$	5.2	6	6.5	V
I_{CES}	Collector-Emitter Cut-off Current	$V_{CE}=700V, V_{GE}=0V, T_{vj}=25^\circ C$			1	μA
I_{GES}	Gate-Emitter Leakage Current	$V_{CE}=0V, V_{GE}=15V, T_{vj}=25^\circ C$			200	nA
$t_{d(on)}$	Turn-on Delay Time	$I_C=100A, V_{CE}=300V$ $V_{GE}=\pm 15V$ $R_G=1\Omega$ $T_{vj}=25^\circ C$		52.3		ns
t_r	Rise Time			41.0		ns
$t_{d(off)}$	Turn-off Delay Time			223		ns
t_f	Fall TimeLeakage Current			51		ns
Eon	Turn-on Switching Loss			0.5		mJ
Eoff	Turn-off Switching Loss			3.5		mJ
$t_{d(on)}$	Turn-on Delay Time	$I_C=100A, V_{CE}=300V$ $V_{GE}=\pm 15V$ $R_G=1\Omega$ $T_{vj}=150^\circ C$		52.6		ns
t_r	Rise Time			43.2		ns
$t_{d(off)}$	Turn-off Delay Time			251		ns
t_f	Fall TimeLeakage Current			121		ns
Eon	Turn-on Switching Loss			0.7		mJ
Eoff	Turn-off Switching Loss			4.5		mJ
R_{thJC}	Thermal resistance, junction to case	per IGBT			0.42	K/W
$T_{vj op}$	Temperature under switching conditions		-40		150	$^\circ C$
I_{SC}	SC data	$V_{GE} \leq 15V, V_{CC} = 360V$ $V_{CEmax} = V_{CES} - L_{sCE} \cdot di/dt$ $t_p \leq 10\mu s, T_{vj} = 150^\circ C$		700		A

Maximum Rated Values (Diode D1 D2 D3 D4)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	$T_{vj}=25\text{ }^{\circ}\text{C}$		700		V
I_F	Continuous DC Forward Current	$T_C=100\text{ }^{\circ}\text{C}$		100		A
I_{FRM}	Repetitive Peak Forward Current	$t_p=1\text{ ms}$		200		A

Characteristic Values (Diode Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=100\text{ A}, V_{CE}=0\text{ V}, T_{vj}=25\text{ }^{\circ}\text{C}$		1.7	2.2	V
		$I_F=100\text{ A}, V_{CE}=0\text{ V}, T_{vj}=150\text{ }^{\circ}\text{C}$		1.6		V
t_{rr}	Reverse Recovery time	$I_F=100\text{ A}, V_R=300\text{ V}$ $-di/dt=2800\text{ A/us}$ $T_{vj}=25\text{ }^{\circ}\text{C}$		170		ns
Q_r	Recovered Charge			7		uC
E_{rec}	Reverse Recovery Energy			0.7		mJ
t_{rr}	Reverse Recovery time	$I_F=100\text{ A}, V_R=300\text{ V}$ $-di/dt=2800\text{ A/us}$ $T_{vj}=150\text{ }^{\circ}\text{C}$		230		ns
Q_r	Recovered Charge			9.7		uC
E_{rec}	Reverse Recovery Energy			2.1		mJ
R_{thJC}	Thermal resistance, junction to case	per Diode			0.8	K/W
$T_{vj\text{ op}}$	Temperature under switching conditions		-40		150	$^{\circ}\text{C}$

Maximum Rated Values (Diode,D5-D6)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	$T_{vj}=25\text{ }^{\circ}\text{C}$		700		V
I_F	Continuous DC Forward Current	$T_C=100\text{ }^{\circ}\text{C}$		100		A
I_{FRM}	Repetitive Peak Forward Current	$t_p=1\text{ ms}$		200		A

Characteristic Values (Diode,D5-D6)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=100\text{ A}, V_{CE}=0\text{ V}, T_{vj}=25\text{ }^{\circ}\text{C}$		1.7	2.2	V
		$I_F=100\text{ A}, V_{CE}=0\text{ V}, T_{vj}=150\text{ }^{\circ}\text{C}$		1.6		V
t_{rr}	Reverse Recovery time	$I_F=100\text{ A}, V_R=300\text{ V}$ $-di/dt=2800\text{ A/us}$ $T_{vj}=25\text{ }^{\circ}\text{C}$		170		ns
Q_r	Recovered Charge			7		uC
E_{rec}	Reverse Recovery Energy			0.7		mJ
t_{rr}	Reverse Recovery time	$I_F=100\text{ A}, V_R=300\text{ V}$ $-di/dt=2800\text{ A/us}$ $T_{vj}=150\text{ }^{\circ}\text{C}$		230		ns
Q_r	Recovered Charge			9.7		uC
E_{rec}	Reverse Recovery Energy			2.1		mJ
R_{thJC}	Thermal resistance, junction to case	per Diode			0.8	K/W
$T_{vj\text{ op}}$	Temperature under switching conditions		-40		150	$^{\circ}\text{C}$

NTC-Thermistor (Characteristic Values)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R_{25}	Rated resistance	$T_c=25\text{ }^{\circ}\text{C}$		5		$K\Omega$
$\Delta R/R$	Deviation of R100	$T_c=100\text{ }^{\circ}\text{C}$	-5		5	%
P_{25}	Power dissipation	$T_c=25\text{ }^{\circ}\text{C}$		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

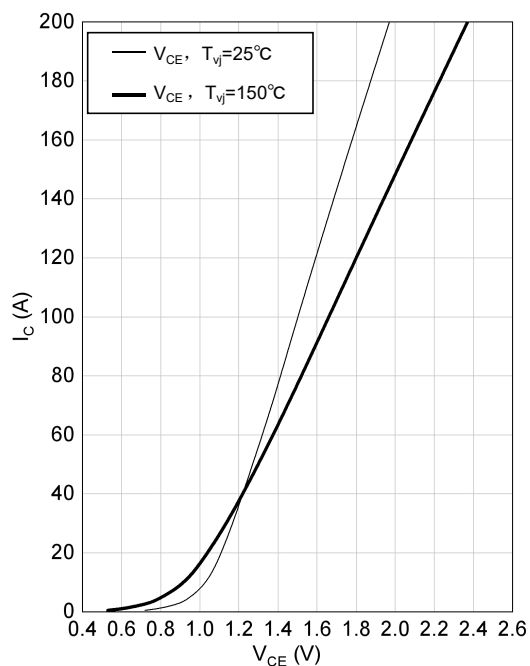
Module Characteristics

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		150	$^{\circ}\text{C}$
F	Mounting Force per Clamp		40		80	N
G	Weight of Module			40		g

output characteristic of IGBT, Inverter (typical)

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

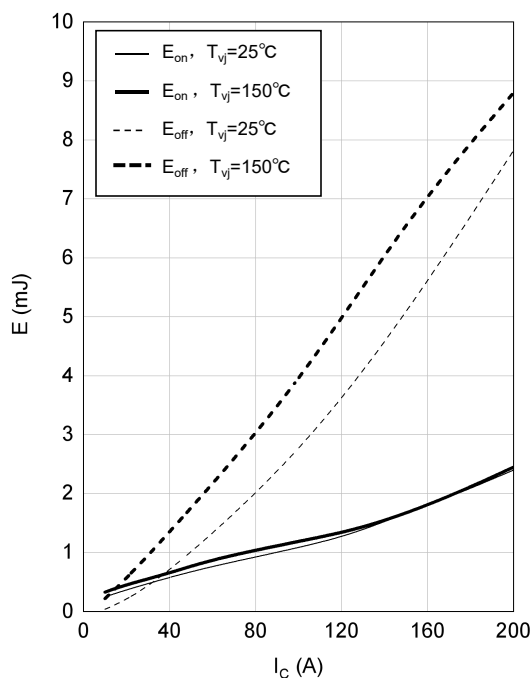
$$V_{GE} = 15V$$



switching losess of IGBT, Inverter (typical)

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

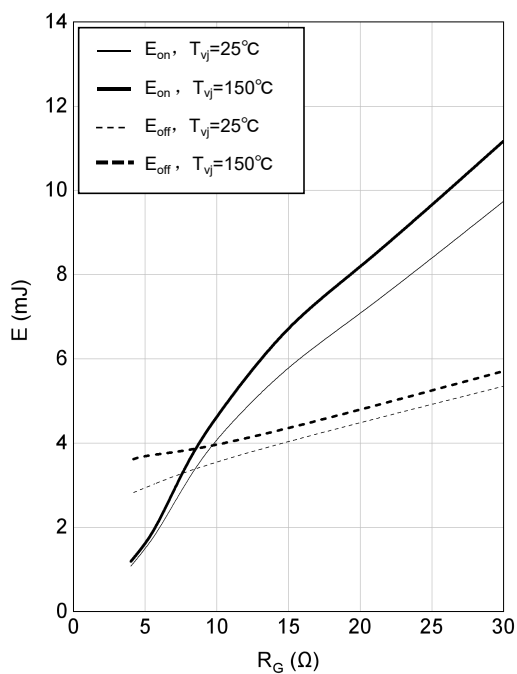
$$V_{GE} = \pm 15V, R_G = 1\Omega, V_{CE} = 300V$$



switching losess of IGBT, Inverter (typical)

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

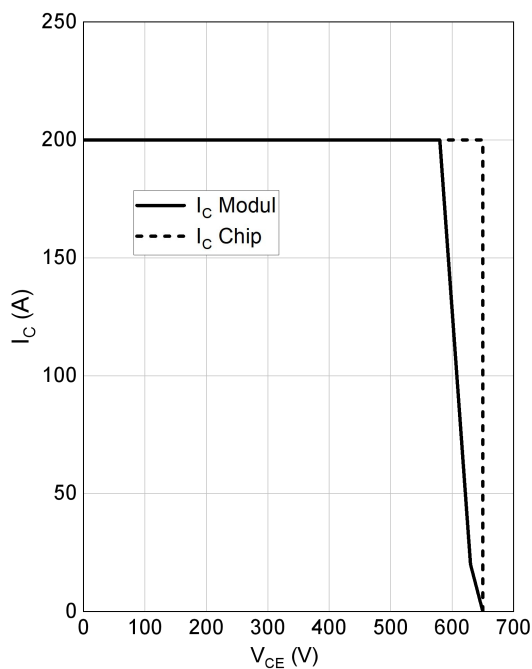
$$V_{GE} = \pm 15V, I_c = 100A, V_{CE} = 300V$$



RBSOA IGBT, Inverter (typical)

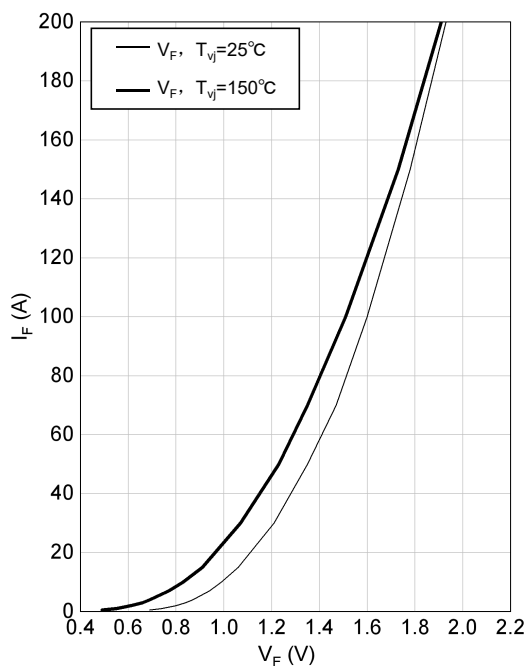
$$I_c = f(V_{CE})$$

$$V_{GE} = \pm 15V, R_G = 1\Omega, T_{vj} = 150^\circ C$$



forward characteristic of Diode, Inverter (typical)

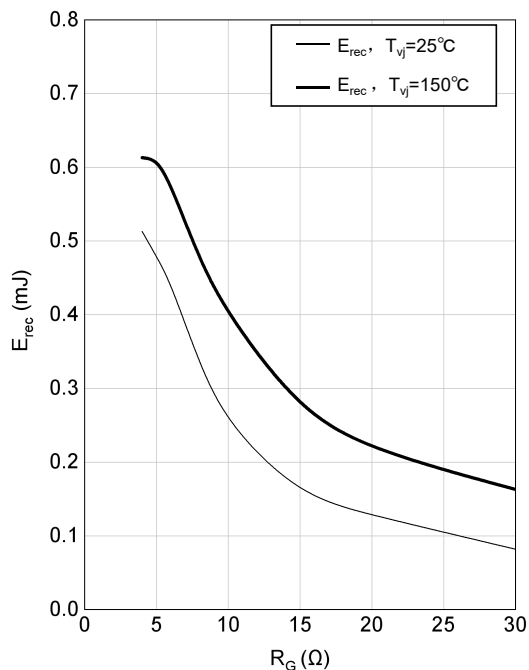
$$I_F = f(V_F)$$



switching losses of Diode, Inverter (typical)

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

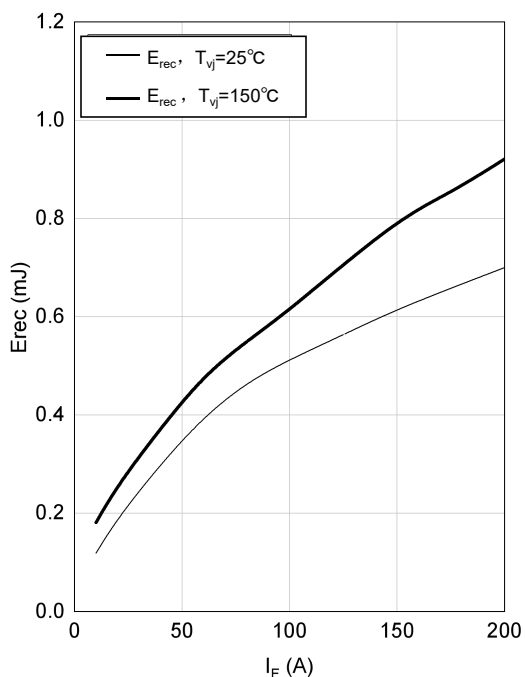
$$I_F = 100\text{A}, V_{CE} = 300\text{V}$$



switching loss of Diode, Inverter (typical)

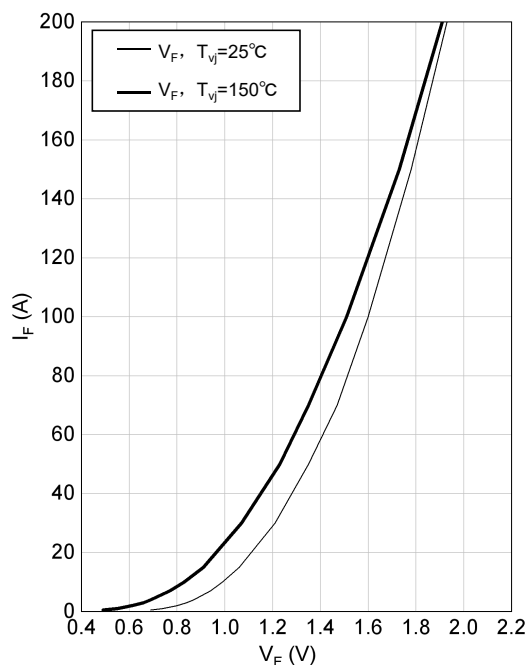
$$E_{rec} = f(I_F),$$

$$R_G = 1\Omega, V_{CE} = 300\text{V}$$



forward characteristic of Diode, D5-D6 (typical)

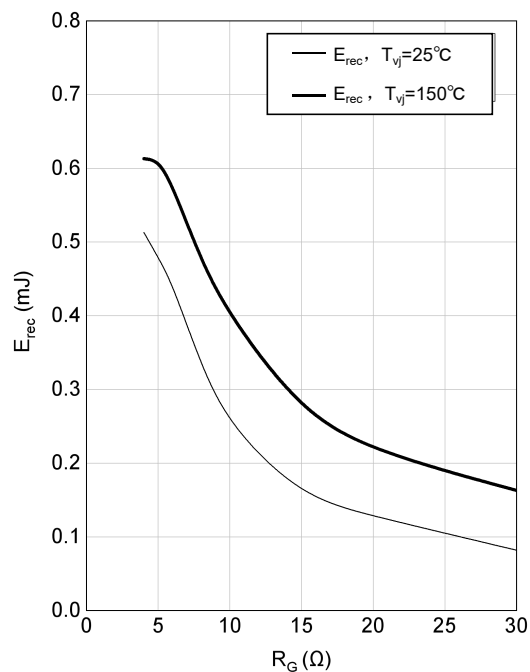
$$I_F = f(V_F)$$



switching losess of Diode,D5-D6 (typical)

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

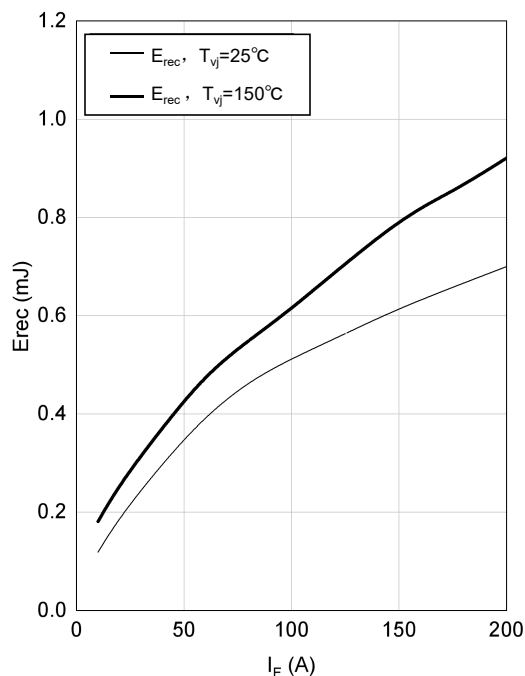
$$I_F = 100\text{A}, V_{\text{CE}} = 300\text{V}$$



switching losess of Diode,D5-D6 (typical)

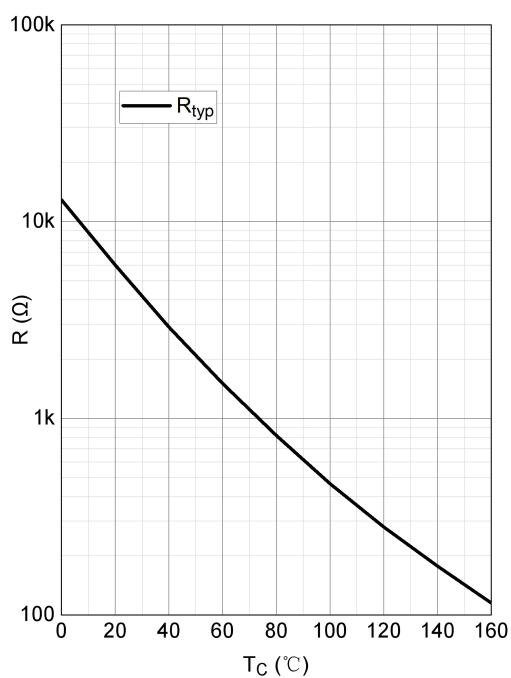
$$E_{\text{rec}} = f(I_F),$$

$$R_G = 1\Omega, V_{\text{CE}} = 300\text{V}$$

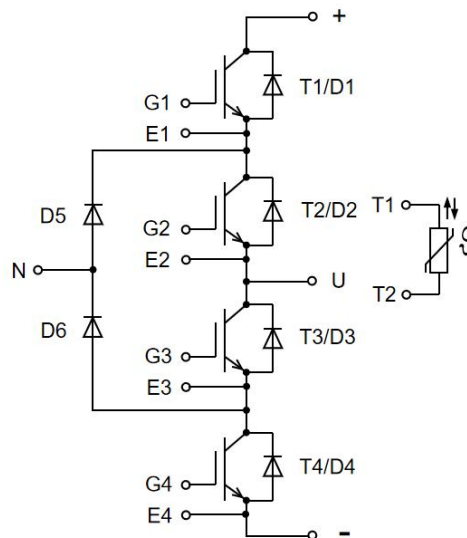


NTC-Thermistor-temperature characteristic (typical)

$$R = f(T)$$

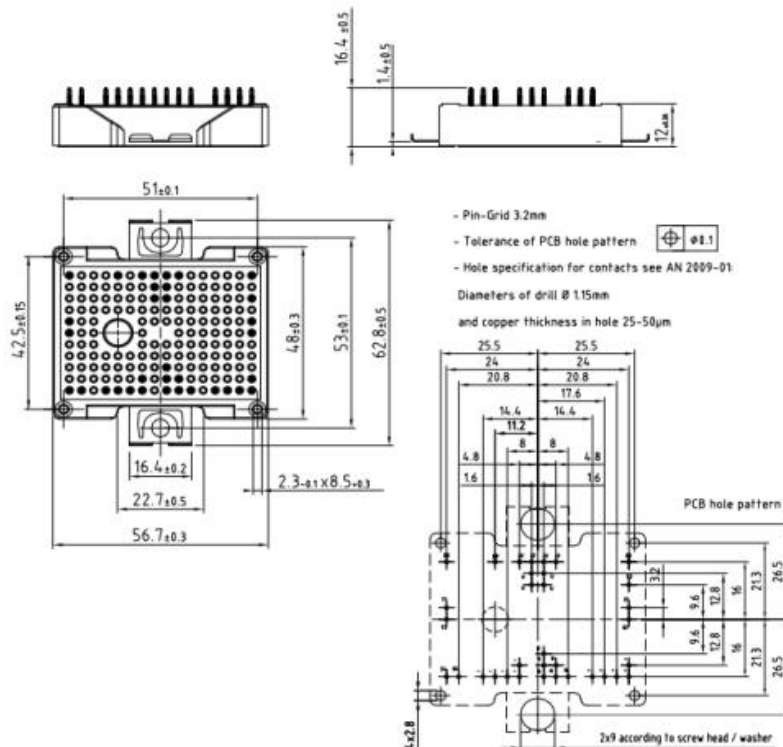


Circuit Diagram



Package Dimensions

(Dimensions in Millimeters)



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TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE