LEGM75BE120L5H

IGBT Power Module

Features:

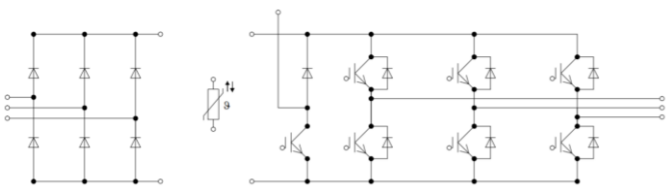
- V_{CE}=1200V I_C=75A
- Low $V_{CE(sat)}$
- V_{CEsat} with positive temperature coefficient
- Maximum junction temperature 150℃
- Isolation Type Package

Applications:

- The inverter
- Motor control and drives

Package Type & Internal Circuit

L5



Internal Circuit

Maximum Rated Values (IGBT Inverter)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CES}	Collector-emitter voltage	V_{EC}= 0 V,I_C= 1 mA,T_{vj}= 25℃	1200	V
I_C	Continuous Collector Current	T_C= 100 ℃	75	A
I_{CRM}	Peak Collector Current	I_{CRM}= 2 I_C	150	A
V_{GES}	Gate-Emitter Voltage	T_{vj}= 25 ℃	±30	V
P_{tot}	Total Power Dissipation	T_C= 25 ℃,T_{vjmax}= 150 ℃	350	W

Characteristics Values (IGBT Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=75 A, V_{GE}=15 V, T_{vj}=25 ℃		1.78		V
		I_C=75 A, V_{GE}=15 V, T_{vj}=125 ℃		1.97		V
$V_{GE(th)}$	Gate Threshold Voltage	I_C=5.0 mA,V_{CE}=V_{GE},T_{vj}= 25 ℃		5.8		V
I_{CES}	Collector-Emitter Cut-off Current	V_{CE}=1200 V, V_{GE}=0 V, T_{vj}=25 ℃			1.2	mA
I_{GES}	Gate-Emitter Leakage Current	V_{CE}=0 V, V_{GE}=15 V, T_{vj}=25 ℃			410	nA
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	I_C= 75 A,V_{CE}= 600 V V_{GE} =±15 V R_G = 2 Ω T_{vj} = 25 ℃		110		ns
t_r	Rise Time, Inductive Load			35		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			270		ns
t_f	Fall Time, Inductive Load			170		ns
E_{on}	Turn-on Energy Loss per Pulse			1.9		mJ
E_{off}	Energy Loss per Pulse			4.8		mJ
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	I_C = 75 A,V_{CE} = 600 V V_{GE} = ±15 V R_G = 2 Ω T_{vj}= 125 ℃		110		ns
t_r	Rise Time, Inductive Load			40		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			320		ns
t_f	Fall Time, Inductive Load			280		ns
E_{on}	Turn-on Energy Loss per Pulse			2.4		mJ
E_{off}	Energy Loss per Pulse			7.5		mJ
R_{thJC}	Thermal resistance, junction to case	per IGBT			0.35	K/W
$T_{vj\ op}$	Temperature under switching conditions		-40		125	℃
I_{SC}	SC data	V_{GE} ≤15 V, V_{CC} = 600 V V_{CEmax} = V_{CES} -L_{sCE} ·di/dt t_P ≤ 10 μs, T_{vj} = 125 ℃		400		A

Maximum Rated Values (Diode Inverter)

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 ℃		75		A
I_{FRM}	Repetitive Peak Forward Current	t_P= 1 ms		150		A
I^2t	I^2t Value	V_R= 0 V, t_P= 10 ms, T_{vj}= 125 ℃		1200		A^2s

Characteristic Values (Diode Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	I_F= 75 A, V_{CE}= 0 V, T_{vj}= 25 ℃		1.79		V
		I_F= 75 A, V_{CE}= 0 V, T_{vj}= 125 ℃		1.96		V
t_{rr}	Reverse Recovery time	I_F= 75 A,V_R= 600 V -di/dt = 2000 A/us T_{vj} = 25 ℃		100		ns
Q_r	Recovered Charge			15.6		uC
E_{rec}	Reverse Recovery Energy			0.5		mJ
t_{rr}	Reverse Recovery time	I_F= 75A,V_R= 600 V -di/dt = 2000 A/us T_{vj} = 125 ℃		120		ns
Q_r	Recovered Charge			23.4		uC
E_{rec}	Reverse Recovery Energy			1.3		mJ
R_{thJC}	Thermal resistance, junction to case	per Diode			0.65	K/W
$T_{vj\ op}$	Temperature under switching conditions		-40		125	℃

Maximum Rated Values (Diode Rectifier)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{RRM}	Repetitive peak reverse voltage	T_{vj}= 25 ℃		1800		V
I_{FRMSM}	Maximum RMS forward current per chip	T_c= 80 ℃		75		A
I_{RMSM}	Maximum RMS current at rectifier chip	T_c= 80 ℃		100		A
I_{FSM}	Surge forward current	t_p= 10ms T_{vj}= 25 ℃		600		A
I^2t	I^2t-value			1800		A^2S
I_{FSM}	Surge forward current	t_p= 10ms T_{vj}= 125 ℃		470		A
I^2t	I^2t-value			1100		A^2S

Characteristic Values (Diode Rectifier)

V_F	Forward voltage	T_{vj}= 125 ℃ I_F= 75 A		1.35		V
I_R	Reverse current	T_{vj}= 125 ℃ V_R= 1800 V		1.3		mA
R_{thjc}	Thermal resistance junction to case	per diode		0.65		K/W

Maximum Rated Values (IGBT Brake-Chopper)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{CES}	Collector-emitter voltage	T_{vj}= 25 ℃		1200		V
I_C	Continuous Collector Current	T_C = 100℃, $T_{vj\ max}$ = 150℃		75		A
I_{CRM}	Peak Collector Current	I_{CRM}= 2I_C		150		A
V_{GES}	Gate-Emitter Voltage	T_{vj}= 25 ℃	-20		20	V

Characteristic Values (IGBT Brake-Chopper)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=50 A, V_{GE}=15 V, T_{vj}=25 ℃		1.54		V
		I_C= 50 A, V_{GE}=15 V, T_{vj}=125 ℃		1.65		V
$V_{GE(th)}$	Gate Threshold Voltage	I_C= 5.0 mA,V_{CE}= V_{GE},T_{vj}= 25 ℃		5.8		V
I_{CES}	Collector-Emitter Cut-off Current	V_{CE}=1200 V, V_{GE}=0 V, T_{vj}= 25 ℃			1.2	mA
I_{GES}	Gate-Emitter Leakage Current	V_{CE}= 0 V, V_{GE}= 15 V, T_{vj}= 25 ℃			410	nA
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	I_C= 50 A,V_{CE}= 600 V V_{GE}= ±15 V R_G= 2 Ω T_{vj}= 25 ℃		100		ns
t_r	Rise Time, Inductive Load			23		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			290		ns
t_f	Fall Time, Inductive Load			180		ns
E_{on}	Turn-on Energy Loss per Pulse			1.5		mJ
E_{off}	Energy Loss per Pulse			3.5		mJ
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	I_C= 50 A,V_{CE}= 600 V V_{GE}= ±15 V R_G= 2 Ω T_{vj}= 125 ℃		110		ns
t_r	Rise Time, Inductive Load			25		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			360		ns
t_f	Fall Time, Inductive Load			160		ns
E_{on}	Turn-on Energy Loss per Pulse			1.7		mJ
E_{off}	Energy Loss per Pulse			5.8		mJ
R_{thJC}	Thermal resistance, junction to case	per IGBT			0.35	K/W
$T_{vj\ op}$	Temperature under switching conditions		-40		125	℃

Maximum Rated Values (Diode Brake-Chopper)

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 ℃		50		A
I_{FRM}	Repetitive Peak Forward Current	t_P= 1 ms		100		A
I^2t	I^2t Value	V_R= 0 V, t_P=10 ms, T_{vj}= 125 ℃		1200		A^2s

Characteristics (Diode Brake-Chopper)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	I_F= 50 A, V_{CE}=0 V, T_{vj}= 25 ℃		1.63		V
		I_F= 50 A, V_{CE}=0 V, T_{vj}= 125 ℃		1.64		V
t_{rr}	Reverse Recovery time	I_F= 50 A,V_R= 600 V -di/dt= 2000 A/us T_{vj}= 25 ℃		90		ns
Q_r	Recovered Charge			9.5		uC
E_{rec}	Reverse Recovery Energy			1.2		mJ
t_{rr}	Reverse Recovery time	I_F= 50 A,V_R= 600 V -di/dt= 2000 A/us T_{vj}=125 ℃		110		ns
Q_r	Recovered Charge			15.9		uC
E_{rec}	Reverse Recovery Energy			1.4		mJ
R_{thJC}	Thermal resistance, junction to case	pro Diode / per Diode			0.64	K/W
$T_{vj\ op}$	Temperature under switching conditions		-40		125	℃

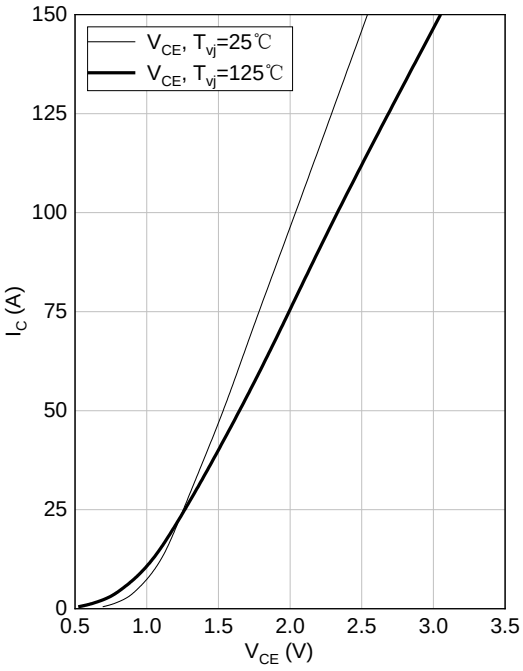
NTC-Thermistor (Characteristic Values)

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

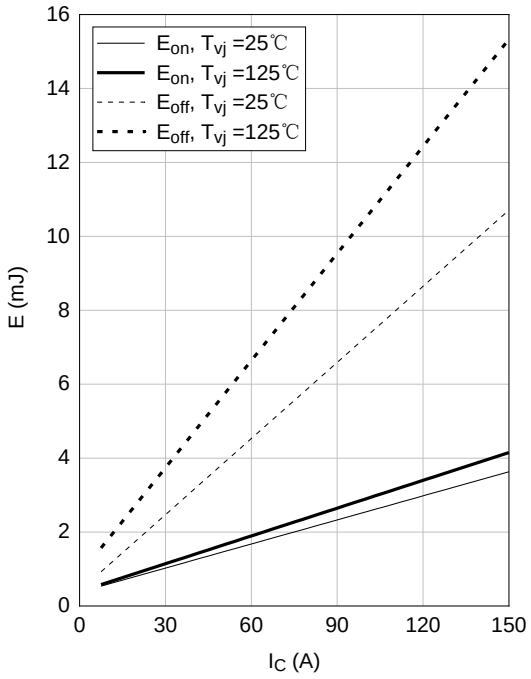
Module Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{isol}	Isolation voltage	t=1 min,f= 50Hz	2500			V
T_{stg}	Storage Temperature		-40		125	℃
M_s	Module-to-Sink Torque	Recommended(M5)	3.0		6.0	N·m
G	Weight of Module			300		g

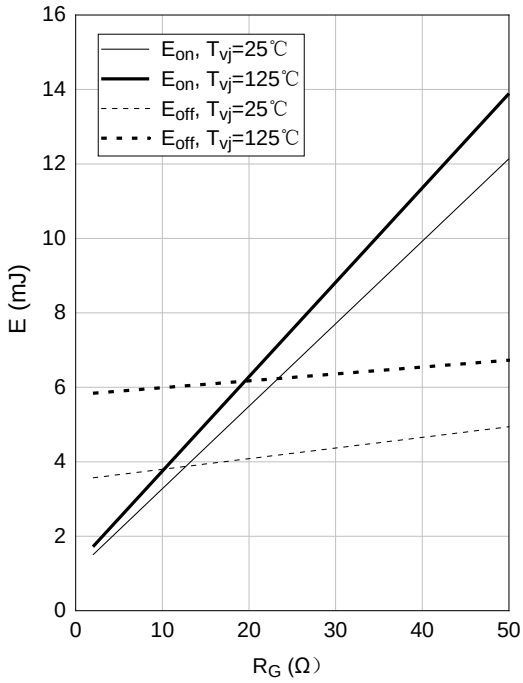
Output characteristic of IGBT,Inverter(typical)
$I_C = f(V_{CE})$
V_{GE} = 15 V



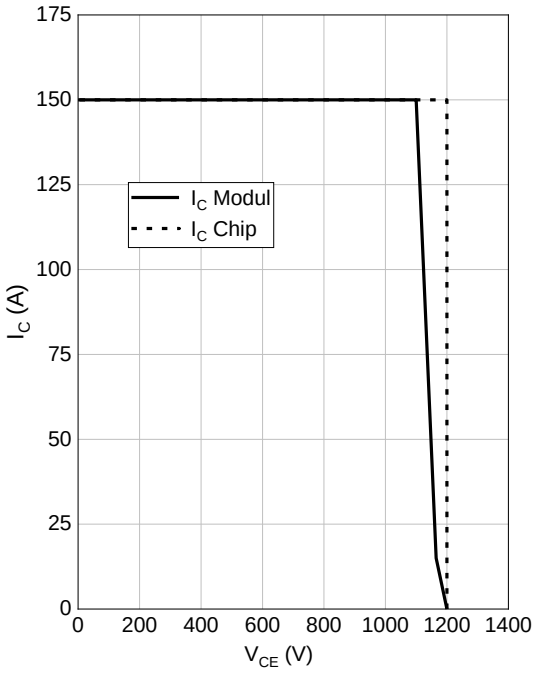
Switching losses IGBT,Inverter(typical)
$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
V_{GE}= ±15V, R_G = 2 Ω, V_{CE} = 600 V



Switching losses IGBT,Inverter(typical)
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
V_{GE} = ±15 V, I_C = 75 A , V_{CE} = 600 V

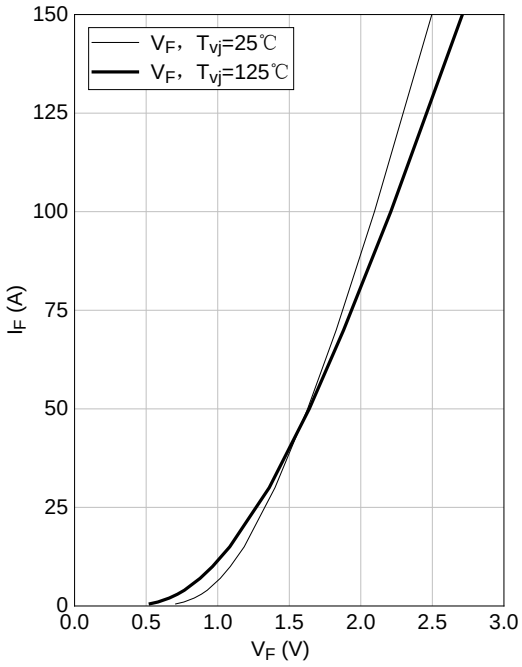


RBSOA IGBT,Inverter (typical)
$I_C = f(V_{CE})$
V_{GE} = ±15 V, R_G = 50 Ω, T_{vj} = 125 ℃



Forward characteristic of Diode, Inverter (typical)

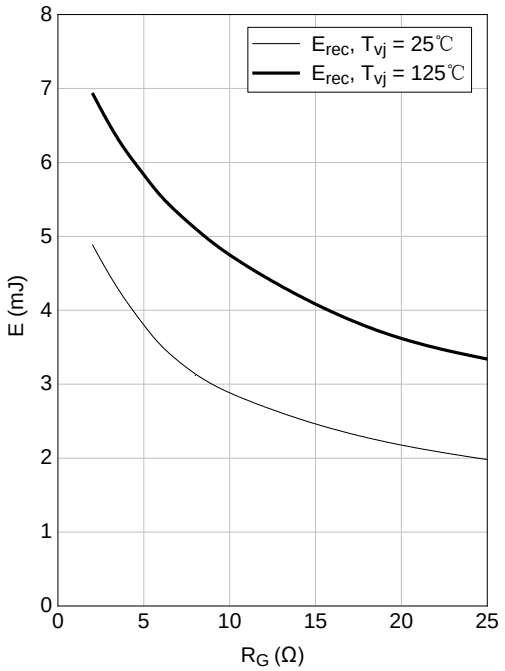
$I_F = f(V_F)$



Switching losses Diode, Inverter (typical)

$E_{rec} = f(R_G)$

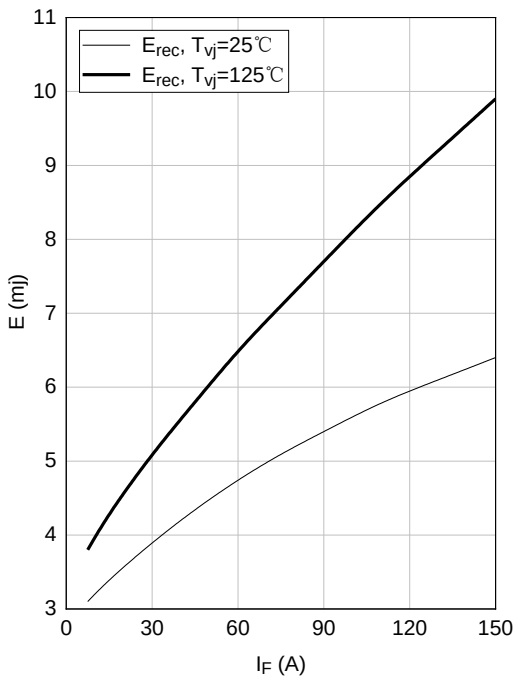
$I_F = 75$ A, $V_{CE} = 600$ V



Switching losses Diode, Inverter (typical)

$E_{rec} = f(I_F)$

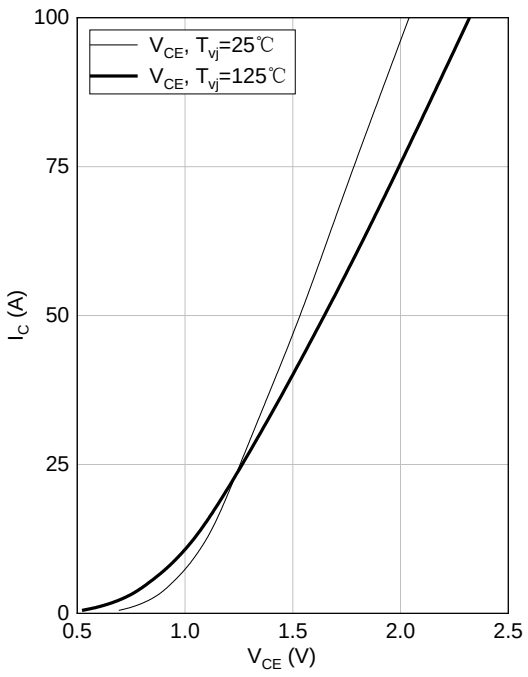
$R_{Gon} = 2\Omega$, $V_{CE} = 600$ V



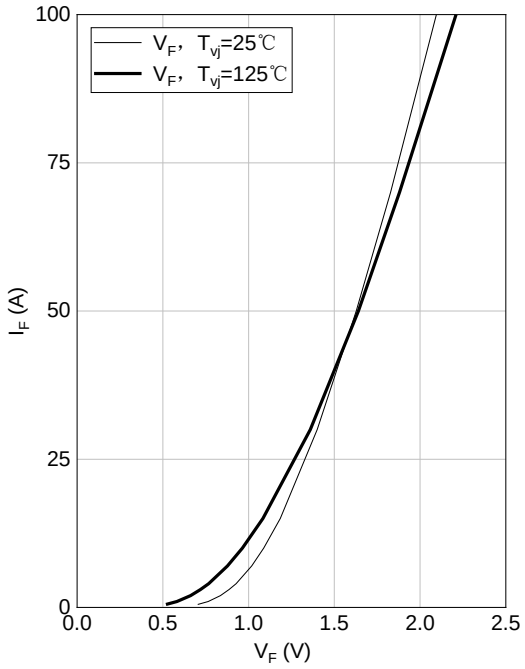
Output characteristic IGBT,Brake-Chopper (typical)

$I_C = f(V_{CE})$

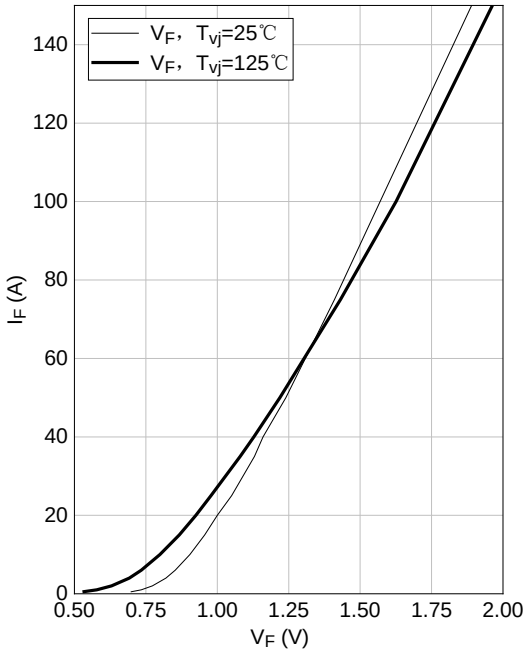
$V_{GE} = 15$ V



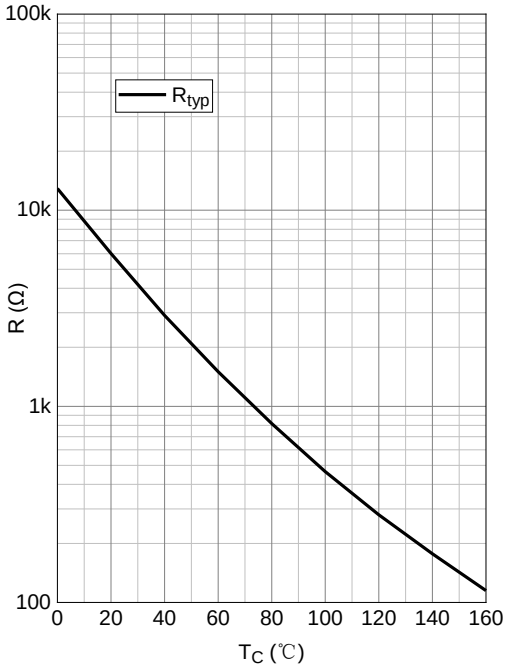
Forward characteristic of Diode,Brake-Chopper (typical)
$I_F = f(V_F)$



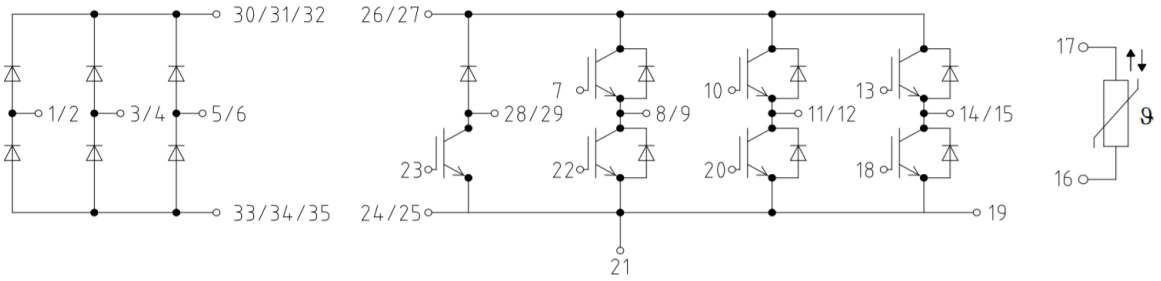
Forward characteristic of Diode, Rectifier(typical)
$I_F = f(V_F)$



NTC-Thermistor-temperature characteristic (typical)
R = f (T)

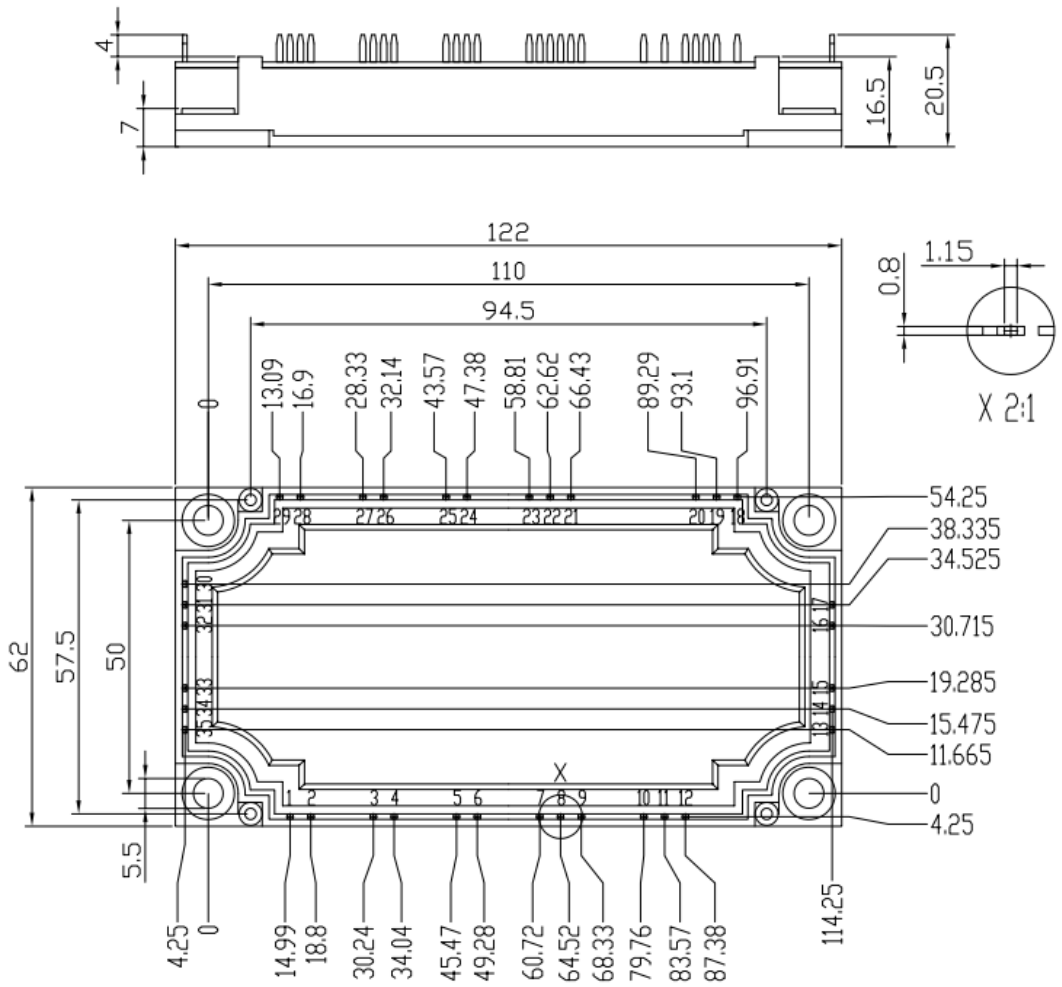


Circuit Diagram



Package Dimensions

(Dimensions in Millimeters)



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