LEGM900BH120L6H7

IGBT Power Module

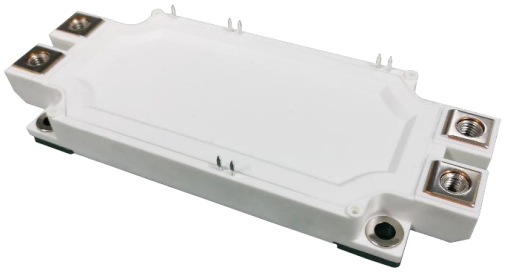
Features:

- V_{CE}=1200V IC=900A
- Low $V_{CE(sat)}$
- TRENCHSTOP™ IGBT7
- V_{CEsat} with positive temperature coefficient
- Overload operation up to 175℃
- Isolation Type Package

Applications:

- Uninterruptible Power Supplies (UPS)
- High power converter
- Inverter for motor drives AC and DC servo drives

Package Type & Internal Circuit



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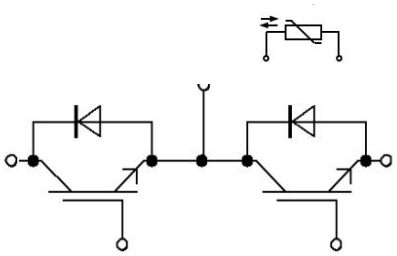


Internal Circuit

Maximum Rated Values (IGBT Inverter)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CES}	Collector-emitter voltage	T_{vj}=25 ℃	1200	V
I_C	Continuous Collector Current	T_C=90 ℃	900	A
I_{CRM}	Peak Collector Current	I_{CRM}=2I_C	1800	A
V_{GES}	Gate-Emitter Voltage	T_{vj}=25 ℃	±20	V

Maximum Rated Values (IGBT Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=900 A, V_{GE}=15 V, T_{vj}=25 ℃		1.65		V
		I_C=900 A, V_{GE}=15 V, T_{vj}=175 ℃		2.05		V
$V_{GE(th)}$	Gate Threshold Voltage	I_C=18.0 mA,V_{CE}=V_{GE},T_{vj}= 25 ℃	5.3	5.8	6.3	V
I_{CES}	Collector-Emitter Cut-off Current	V_{CE}=1200 V, V_{GE}=0 V, T_{vj}=25 ℃			100	μA
I_{GES}	Gate-Emitter Leakage Current	V_{CE}=0 V, V_{GE}=20V, T_{vj}=25 ℃			100	nA
C_{ies}	Input capacitance	V_{GE} = 0 V, V_{CE} = 25 V, f = 100kHz		124		nF
C_{oes}	Output capacitance			3.3		nF
C_{res}	Reverse transfer capacitance			0.7		nF
R_G	Gate input resistance	f = 1MHz		0.42		Ω
Q_G	Gate charge	V_{GE} = -15 V to 15 V, V_{CE} = 600 V		10.8		μC
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	I_C=900 A,V_{CE}=600 V V_{GE}=±15 V R_G=0.51Ω T_{vj}=25 ℃		290		ns
t_r	Rise Time, Inductive Load			90		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			420		ns
t_f	Fall Time, Inductive Load			100		ns
E_{on}	Turn-on Energy Loss per Pulse			50		mJ
E_{off}	Energy Loss per Pulse			85		mJ
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	I_C=900 A,V_{CE}=600 V V_{GE}=±15 V R_G=0.51Ω T_{vj}=175℃		350		ns
t_r	Rise Time, Inductive Load			110		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			540		ns
t_f	Fall Time, Inductive Load			110		ns
E_{on}	Turn-on Energy Loss per Pulse			120		mJ
E_{off}	Energy Loss per Pulse			130		mJ
R_{thJC}	Thermal resistance, junction to case	per IGBT			0.046	K/W
$T_{vj\ op}$	Temperature under switching conditions		-40		150	°C
I_{SC}	SC data	V_{GE} ≤15 V, V_{CC} = 800 V V_{CEmax} = V_{CES} -L_{sCE} ·di/dt t_P ≤ 6 μs, T_{vj} = 175 ℃		3200		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=90 ℃		900		A
I_{FRM}	Repetitive Peak Forward Current	t_P=1 ms		1800		A

Characteristic Values (Diode Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	I_F=900 A, V_{CE}=0 V, T_{vj}=25 ℃		1.9		V
		I_F=900 A, V_{CE}=0 V, T_{vj}=175 ℃		2.1		V
t_{rr}	Reverse Recovery time	I_F=900 A,V_R=600 V R_G=0.51Ω, V_{GE}=±15 V T_{vj}=25 ℃		400		ns
Q_{rr}	Recovered Charge			60		uC
E_{rec}	Reverse Recovery Energy			20		mJ
t_{rr}	Reverse Recovery time	I_F=900 A,V_R=600 V R_G=0.51Ω, V_{GE}=±15 V T_{vj}=175 ℃		700		ns
Q_{rr}	Recovered Charge			141		uC
E_{rec}	Reverse Recovery Energy			48		mJ
R_{thJC}	Thermal resistance, junction to case	per Diode			0.087	K/W
$T_{vj\ op}$	Operating Junction Temperature		-40		150	℃

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	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298,15K))]$		3375		K

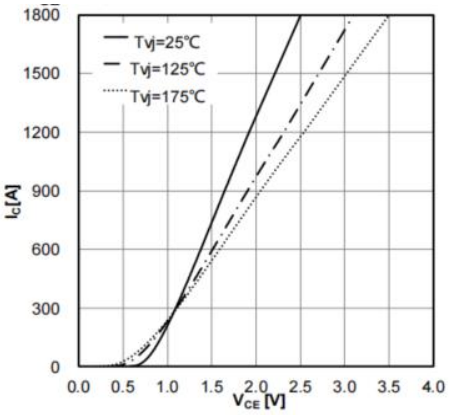
Module Characteristics

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)	3.0		6.0	N·m
M_s	Module-to-Sink Torque	Recommended(M5)	3.0		6.0	N·m
G	Weight of Module			350		g

Output characteristic of IGBT,Inverter (typical)

$I_c = f(V_{CE})$

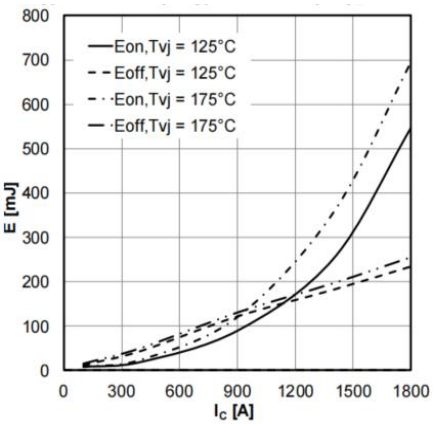
$V_{GE} = 15V$



Switching losses of IGBT,Inverter (typical)

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

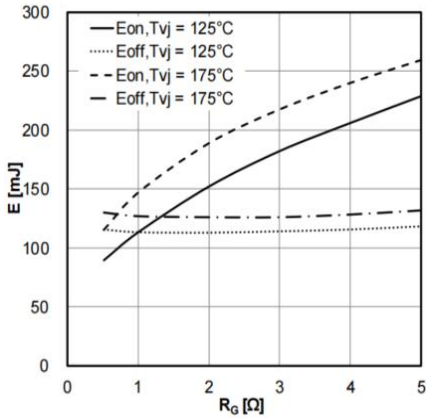
$V_{GE} = \pm 15V$, $R_G = 0.51\Omega$, $V_{CE} = 600V$



Switching losses of IGBT,Inverter (typical)

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

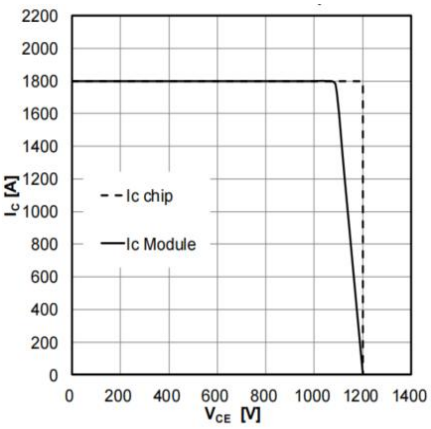
$V_{GE} = \pm 15V$, $I_C = 900A$, $V_{CE} = 600V$



RBSOA IGBT,Inverter (typical)

$I_C = f(V_{CE})$

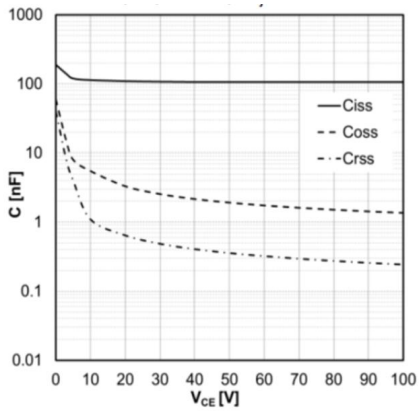
$V_{GE} = \pm 15V$, $R_{Goff} = 0.51\Omega$, $T_{vj} = 175$ ℃



Capacity characteristic, IGBT, Inverter

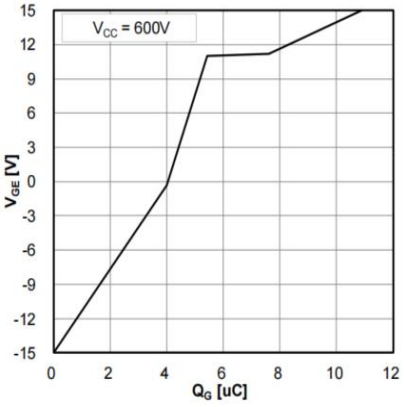
$C = f(V_{CE})$

$f = 100KHz$, $V_{GE} = 0V$, $T_{vj} = 25°C$



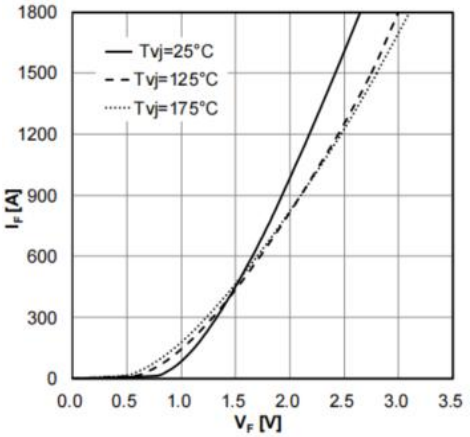
Gate charge characteristic, IGBT, Inverter

$V_{GE} = f(Q_G)$, $I_C = 900A$, $T_{vj} = 25°C$



Forward characteristic, Diode, Inverter

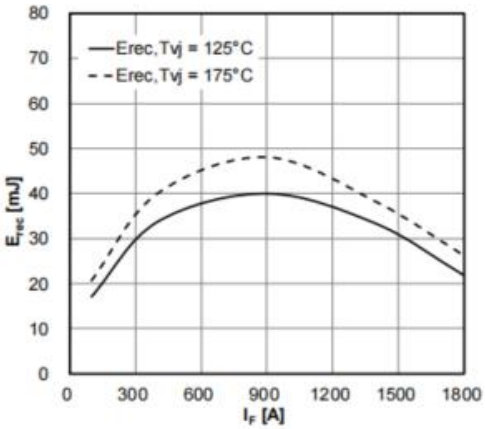
$I_F = f(V_F)$ / (terminal)



Switching losses, Diode, Inverter

$E_{rec} = f(I_F)$

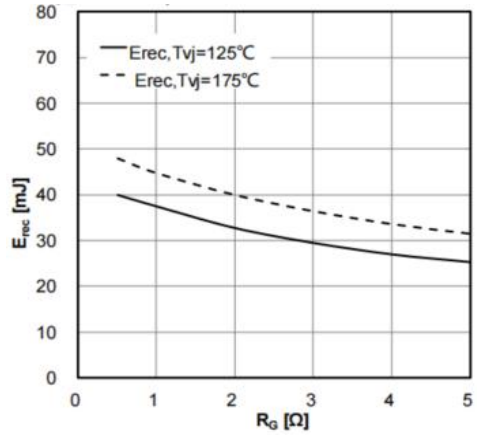
V_{CE} = 600V, R_G = 0.51Ω, V_{GE} = ±15V



Switching losses, Diode, Inverter

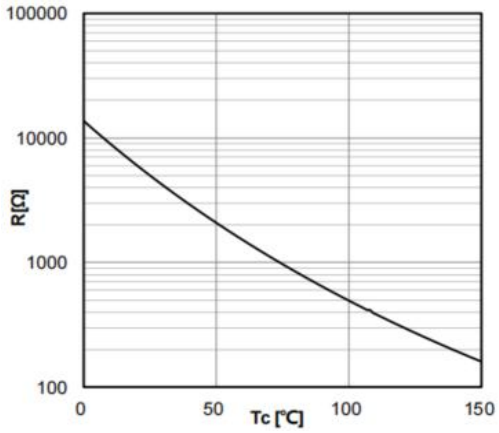
$E_{rec} = f(R_G)$

V_{CE} = 600V, I_F= 900A



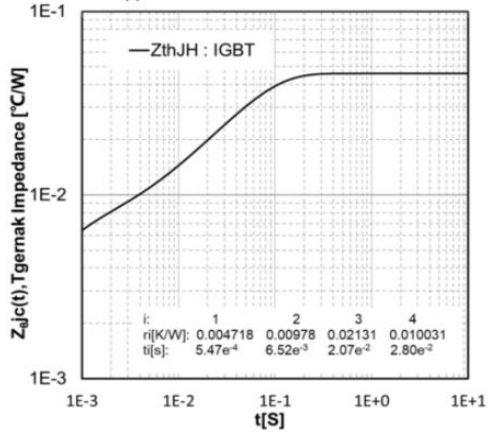
NTC-Thermistor-temperature characteristic (typical)

R = f (T)



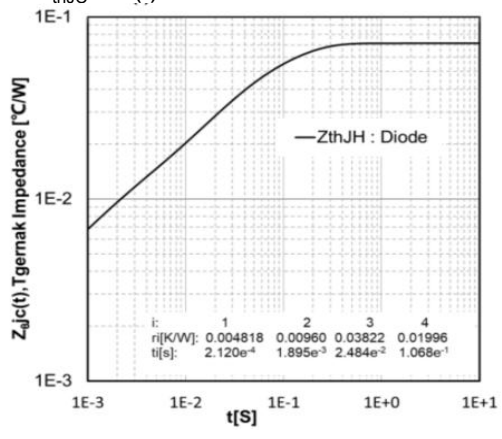
Transient thermal impedance IGBT, Inverter

Z_{thJC} = f (t)

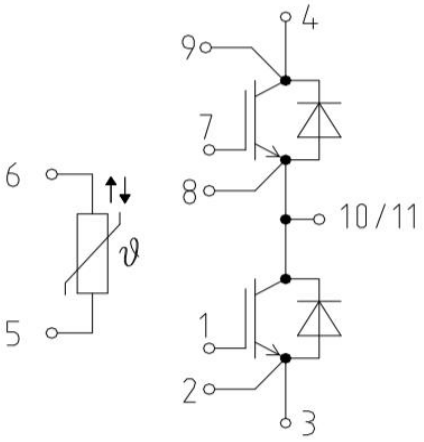


Transient thermal impedance Diode, Inverter

Z_{thJC} = f (t)

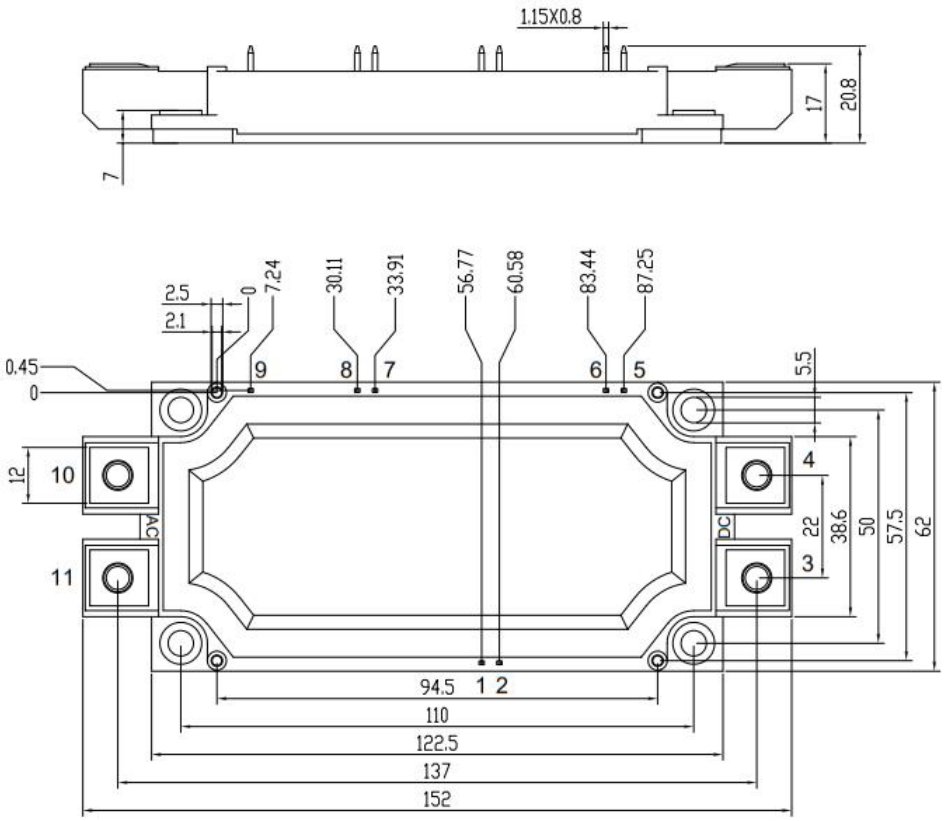


Circuit Diagram



Package Dimensions

(Dimensions in Millimeters)



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