

LEGP140N120BHF

IGBT Discrete

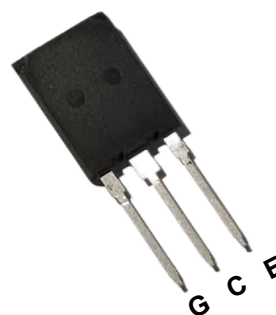
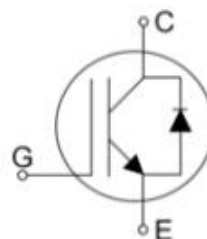
Features:

- 1200V/140A Trench Field Stop IGBT
- High breakdown voltage up to 1200V for improved reliability
- Trench-Stop Technology offering :
 - Low $V_{CE(sat)}$
 - Very tight parameter distribution
 - Short circuit withstand time – 10 μ s
 - High ruggedness, temperature stable
 - Easy parallel switching capability due to positive temperature coefficient in $V_{CE(sat)}$
- Enhanced avalanche capability

V_{CE}	1200	V
I_C	140	A
$V_{CE(sat)} @ I_C=140A$	2.0	V

Applications:

- UPS
- String inverter
- Welding



TO-247-PLUS

Maximum Rated Values

Symbol	Parameter	Conditions	Ratings	Unit
V_{CES}	Collector-emitter voltage		1200	V
I_C	Continuous Collector Current	$T_C=25^{\circ}\text{C}$	280	A
		$T_C=100^{\circ}\text{C}$	140	A
I_F	Diode Forward current	$T_C=25^{\circ}\text{C}$	280	A
		$T_C=100^{\circ}\text{C}$	140	A
V_{GE}	Gate-Emitter Voltage		± 20	V
V_{GE}	Transient Gate-Emitter Voltage		± 30	V
I_{CRM}	Peak Collector Current	$I_{CRM}=2I_C$	560	A
I_{Fplus}	Diode Pulsed Current	Diode Pulsed Current	560	A
T_{sc}	Short Circuit Withstand Time	Short Circuit Withstand Time	10	us
P_{tot}	Total Power Dissipation	$T_C=25^{\circ}\text{C}, T_{vjmax}=150^{\circ}\text{C}$	1050	W
T_{vj}	Operating Junction Temperature	Operating Junction Temperature	-40...+150	$^{\circ}\text{C}$
T_{stg}	Storage Temperature	Storage Temperature	-55...+150	$^{\circ}\text{C}$
	Soldering temperature	wave soldering 1.6mm (0.063in.) from case for 10s	260	$^{\circ}\text{C}$

Thermal Resistance

Symbol	Parameter	Ratings	Unit
$R_{\theta(j-c)}$	IGBT thermal resistance, junction - case	0.17	K/W
$R_{\theta(j-c)}$	Diode thermal resistance, junction - case	0.28	K/W
$R_{\theta(j-a)}$	Thermal resistance, junction - ambient	41	K/W

Characteristics Values of the IGBT

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{CES}	Collector-Emitter Breakdown Voltage	$V_{GE} = 0V, I_C = 250\mu A$	1200			V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=140 A, V_{GE}=15 V, T_{vj}=25^\circ C$		2.0		V
		$I_C=140 A, V_{GE}=15 V, T_{vj}=150^\circ C$		2.6		V
$V_{GE(th)}$	Gate Threshold Voltage	$I_C=1.5 mA, V_{CE}=V_{GE}$	5.2	5.8	6.5	V
I_{CES}	Collector-Emitter Cut-off Current	$V_{CE}=1200V, V_{GE}=0 V, T_{vj}=25^\circ C$			1.0	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{CE}=0 V, V_{GE}=15 V, T_{vj}=25^\circ C$			400	nA
$t_{d(on)}$	Turn-on Delay Time	$I_C=140 A, V_{CE}=600 V$ $V_{GE}=\pm 15 V$ $R_G=10 \Omega$ $T_{vj}=25^\circ C$		168		ns
t_r	Rise Time, Inductive Load			62		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			529		ns
t_f	Fall Time, Inductive Load			67		ns
E_{on}	Turn-on Energy Loss per Pulse			6.35		mJ
E_{off}	Turn-off Energy Loss			5.52		mJ
$t_{d(on)}$	Turn-on Delay Time	$I_C=140 A, V_{CE}=600 V$ $V_{GE}=\pm 15 V$ $R_G=10 \Omega$ $T_{vj}=150^\circ C$		156		ns
t_r	Rise Time, Inductive Load			66		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			577		ns
t_f	Fall Time, Inductive Load			128		ns
E_{on}	Turn-on Energy Loss per Pulse			8.19		mJ
E_{off}	Turn-off Energy Loss			7.95		mJ

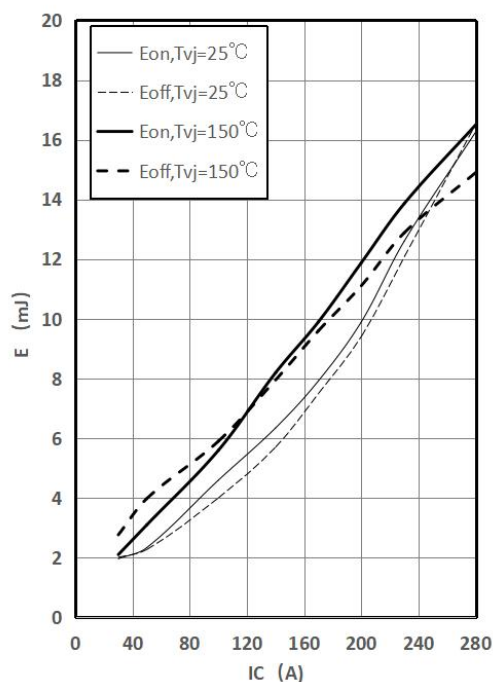
Characteristics Values of the Diode

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=140\text{ A}, T_{vj}=25\text{ }^{\circ}\text{C}$		2.5		V
		$I_F=140\text{ A}, T_{vj}=150\text{ }^{\circ}\text{C}$		2.3		V
t_{rr}	Reverse Recovery time	$I_F=140\text{ A}, V_R=600\text{ V}$ $-di/dt=2000\text{ A/us}$ $T_{vj}=25\text{ }^{\circ}\text{C}$		473		ns
Q_r	Recovered Charge			13.86		uC
E_{rec}	Reverse Recovery Energy			5.21		mJ
t_{rr}	Reverse Recovery time	$I_F=140\text{ A}, V_R=600\text{ V}$ $-di/dt=2000\text{ A/us}$ $T_{vj}=150\text{ }^{\circ}\text{C}$		121		ns
Q_r	Recovered Charge			7.4		uC
E_{rec}	Reverse Recovery Energy			2.47		mJ

Switching losses IGBT, Inverter (typical)

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

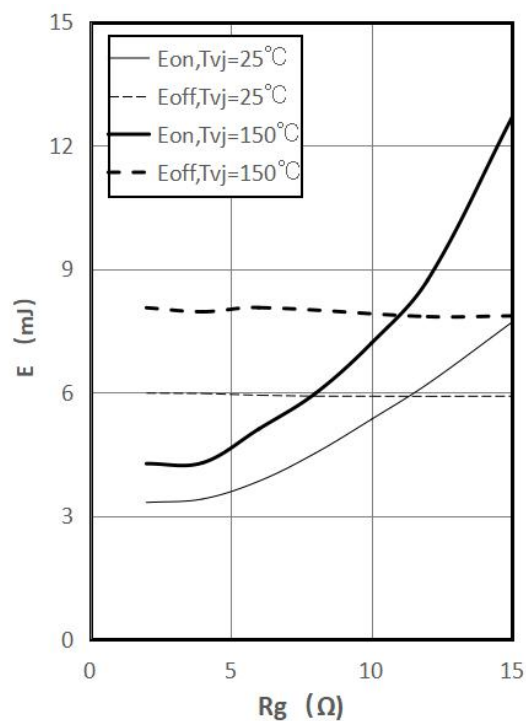
$$V_{GE} = \pm 15V, R_G = 10 \Omega, V_{CE} = 600V$$



Switching losses IGBT, Inverter (typical)

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

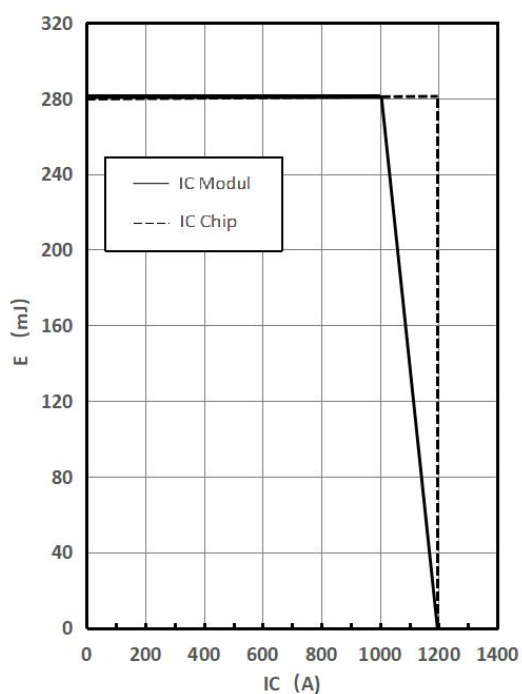
$$V_{GE} = \pm 15V, I_C = 140A, V_{CE} = 600V$$



RBSOA IGBT, Inverter (typical)

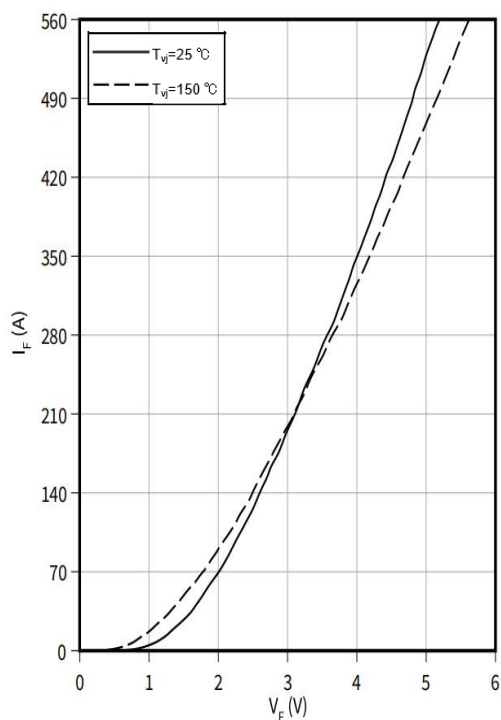
$$I_C = f(V_{CE})$$

$$V_{GE} = \pm 15V, R_G = 10 \Omega, T_{vj} = 150^\circ C$$



Forward characteristic of Diode, Inverter (typical)

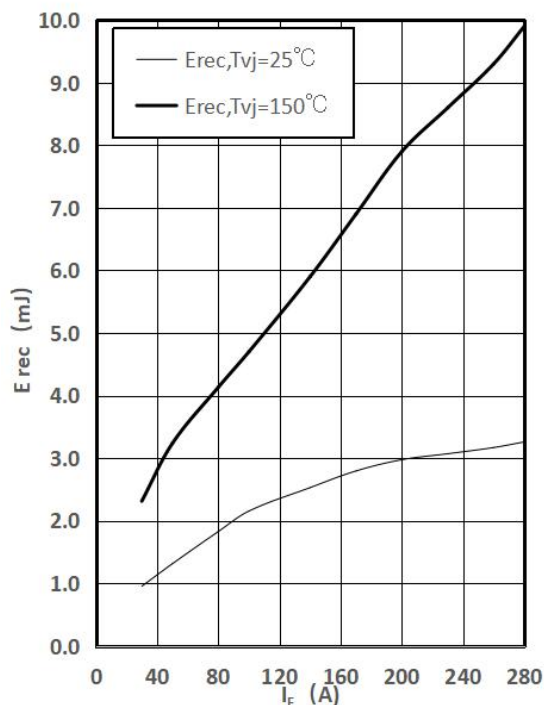
$$I_F = f(V_F)$$



Switching losses Diode, Inverter (typical)

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

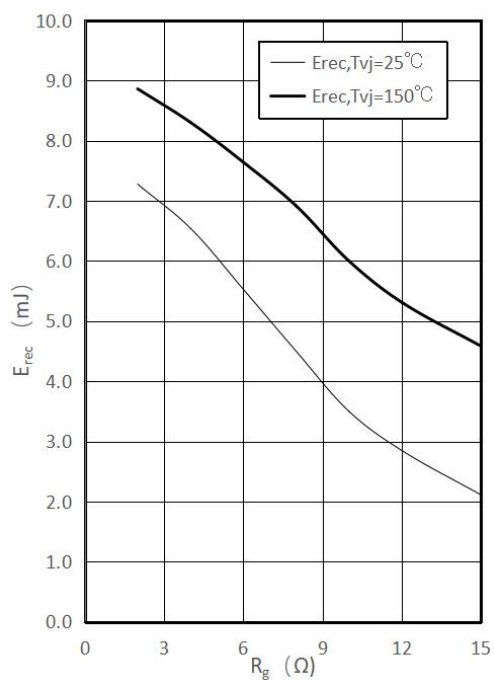
$$I_F = 100 \text{ A}, V_{CE} = 600 \text{ V}$$



Switching losses Diode, Inverter (typical)

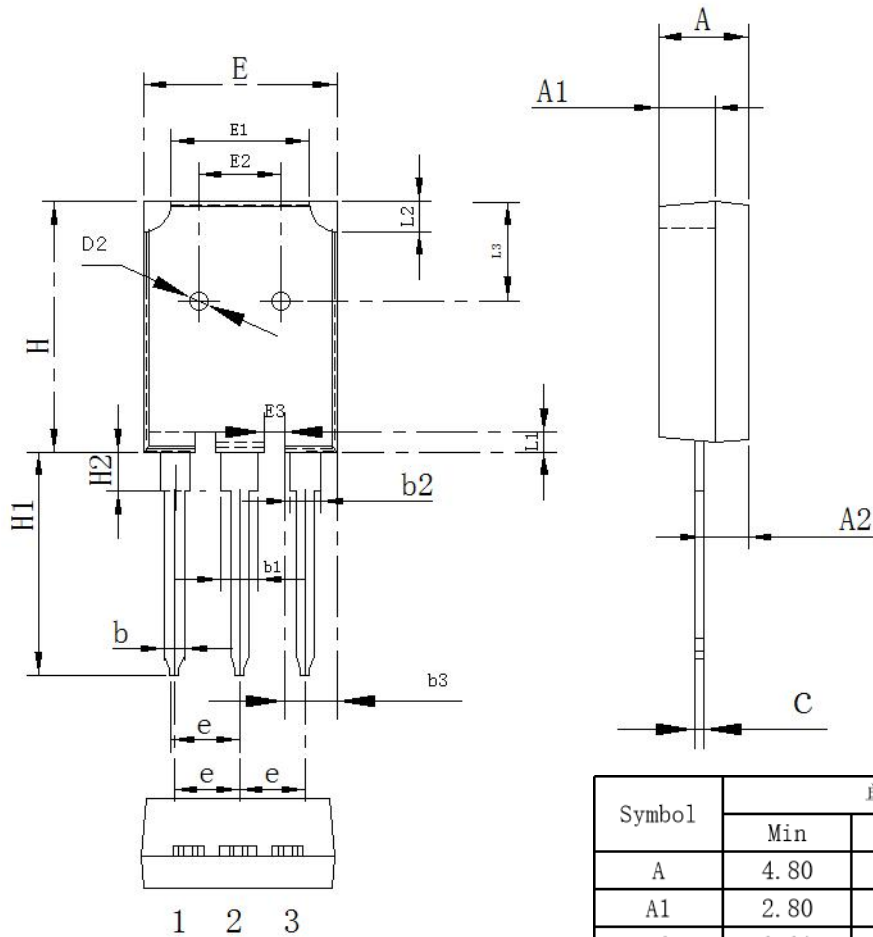
$$E_{rec} = f(I_F)$$

$$R_G = 10 \Omega, V_{CE} = 600 \text{ V}$$



Package Dimensions

TO-247-PLUS



Symbol	单位 mm		
	Min	Nom	Max
A	4.80	5.00	5.20
A1	2.80	3.0	3.20
A2	2.20	2.4	2.60
b	1.00	1.20	1.40
b1	2.90	3.10	3.30
b2	1.90	2.10	2.30
b3	3.90	4.10	4.30
c	0.45	0.60	0.75
e	5.25	5.45	5.65
E	15.6	15.8	16.0
E1	10.2	10.6	11.0
E2	6.30	6.06	6.90
E3	1.60	1.80	2.00
L1	0.35	0.50	0.65
L2	1.80	2.00	2.20
L3	9.50	10.0	10.5
H	20.5	21.0	21.5
H1	19.5	20.0	20.5
H2	3.50	4.00	4.50

DISCLAIMER

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE
TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE