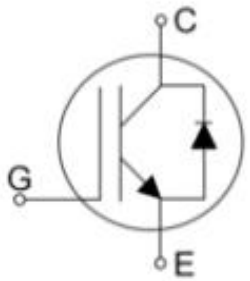
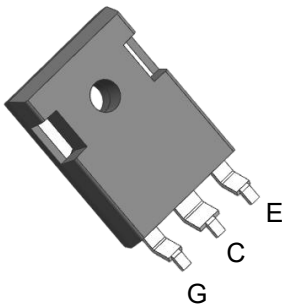
LEGP40N120AHF_E

IGBT Discrete

Features:

- 1200V/40A 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 – 10μs
  - High ruggedness, temperature stable
  - Easy parallel switching capability due to positive temperature coefficient in $V_{CE(sat)}$
- Enhanced avalanche capability





Applications:

- UPS
- Frequency converter
- PTC heater
- Climate compressor
- Solar inverter

Type	V_{CE}	I_C	$V_{CE(sat)}$ @I_C=40A	Marking	Package
LEGP40N120AHF_E	1200V	40A	1.85 V	GP40N120AHF_E	TO-247-3L

Maximum Rated Values

Symbol	Parameter	Conditions	Ratings	Unit
V_{CES}	Collector-emitter voltage		1200	V
I_C	Continuous Collector Current	T_C=25℃	80	A
		T_C=100℃	40	A
I_F	Diode Forward current	T_C=25℃	80	A
		T_C=100℃	40	A
V_{GE}	Gate-Emitter Voltage		±20	V
V_{GE}	Transient Gate-Emitter Voltage		±30	V
I_{Cplus}	Pulsed collector current		160	A
IF_{plus}	Diode Pulsed Current		160	A
T_{sc}	Short Circuit Withstand Time	Short Circuit Withstand Time	10	us
P_{tot}	Total Power Dissipation	T_C=25℃	428	W
T_{vj}	Operating Junction Temperature	Operating Junction Temperature	-40...+175	℃
T_{stg}	Storage Temperature	Storage Temperature	-55...+150	℃
	Soldering temperature	wave soldering 1.6mm (0.063in.) from case for 10s	260	℃
M	Mounting torque	M3 screw Maximum of mounting processes: 3	0.6	Nm

Thermal Resistance

Symbol	Parameter	Ratings	Unit
$R_{\theta(j-c)}$	IGBT thermal resistance, junction - case	0.35	K/W
$R_{\theta(j-c)}$	Diode thermal resistance, junction - case	0.60	K/W
$R_{\theta(j-a)}$	Thermal resistance, junction - ambient	40	K/W

Characteristics Values of the IGBT

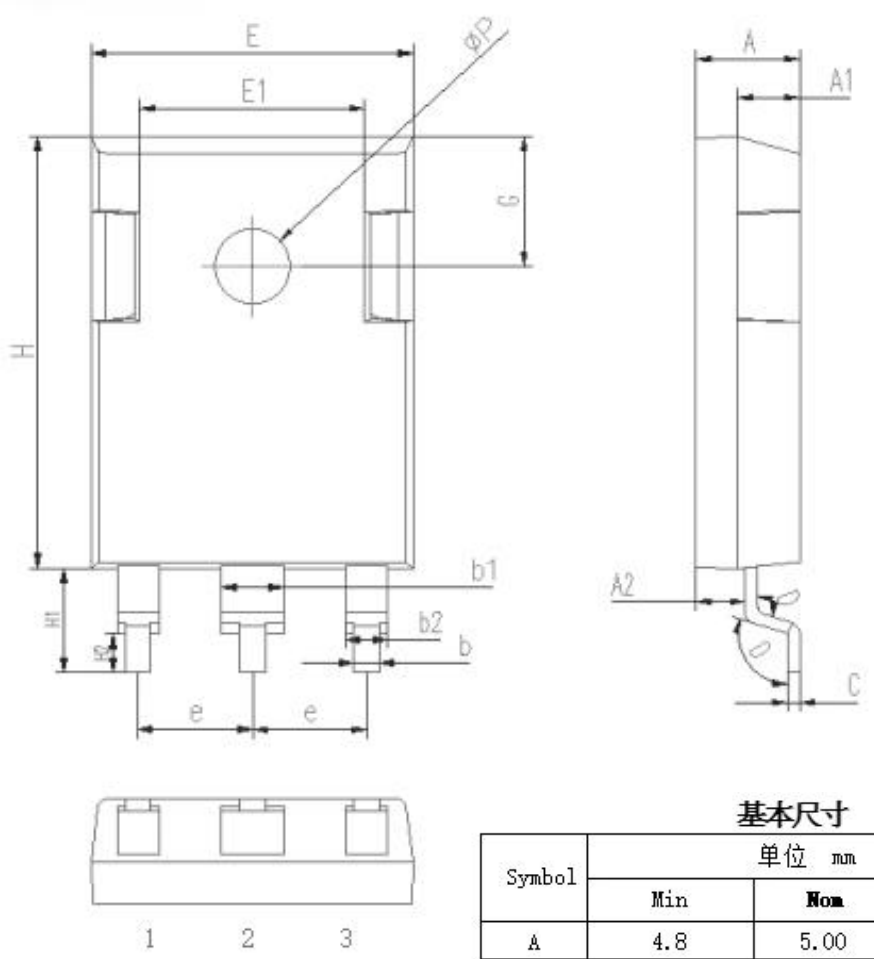
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{CES}	Collector-Emitter Breakdown Voltage	V_{GE} = 0V, I_C = 250μA	1200			V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=40 A, V_{GE}=15 V, T_{vj}=25 ℃		1.85	2.2	V
		I_C=40 A, V_{GE}=15 V, T_{vj}=150 ℃		2.35		V
		I_C=40 A, V_{GE}=15 V, T_{vj}=175 ℃		2.45		V
$V_{GE(th)}$	Gate Threshold Voltage	I_C=1.5 mA,V_{CE}=V_{GE}	5.0	5.8	6.5	V
I_{CES}	Collector-Emitter Cut-off Current	V_{CE}=1200V, V_{GE}=0 V, T_{vj}=25 ℃			0.1	mA
		V_{CE}=1200V, V_{GE}=0 V, T_{vj}=175 ℃			4.0	mA
I_{GES}	Gate-Emitter Leakage Current	V_{CE}=0 V, V_{GE}=20 V, T_{vj}=25 ℃			250	nA
g_{FS}	Transconductance	V_{CE}=20V,I_C=40A		20		S
C_{ies}	Input Capacitance	f = 1MHz, T_{vj}= 25℃, V_{CE}= 25 V, V_{GE}= 0 V		3149		pF
C_{oes}	Output Capacitance			183		pF
C_{res}	Reverse Transfer Capacitance			103		pF
Q_G	Gate charge	V_{CC}=600V,I_C=40A, V_{GE}=15V		240		nC
$t_{d(on)}$	Turn-on Delay Time	I_C=40 A,V_{CE}=600 V, V_{GE}=±15 V, R_G=10Ω, T_{vj}=25 ℃		186		ns
t_r	Rise Time, Inductive Load			38		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			234		ns
t_f	Fall Time, Inductive Load			159		ns
E_{on}	Turn-on Energy Loss per Pulse			1.6		mJ
E_{off}	Turn-off Energy Loss			3.0		mJ
$t_{d(on)}$	Turn-on Delay Time	I_C=40 A,V_{CE}=600 V, V_{GE}=±15 V, R_G=10Ω, T_{vj}=175℃		187		ns
t_r	Rise Time, Inductive Load			39		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			318		ns
t_f	Fall Time, Inductive Load			290		ns
E_{on}	Turn-on Energy Loss per Pulse			3.4		mJ
E_{off}	Turn-off Energy Loss			4.8		mJ
I_{SC}	Short circuit collector current	V_{GE}=15V, V_{CC}≤600V, t_{SC}≤10μs,Tj=175℃		160		A

Characteristics Values of the Diode

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	I_F=40 A,T_{vj}=25 ℃		2.2		V
		I_F=40 A,T_{vj}=150 ℃		1.8		V
		I_F=40 A,T_{vj}=175 ℃		1.6		V
t_{rr}	Reverse Recovery time	I_F=40 A,V_R=600 V -di/dt=500A/us T_{vj}=25 ℃		255		ns
Q_r	Recovered Charge			2.0		uC
I_{rrm}	Diode peak reverse recovery current			18		A
t_{rr}	Reverse Recovery time	I_F=40 A,V_R=600V -di/dt=500A/us T_{vj}=175 ℃		526		ns
Q_r	Recovered Charge			9.0		uC
I_{rrm}	Diode peak reverse recovery current			37		A

Package Dimensions

TO-247



基本尺寸

Symbol	单位 mm		
	Min	Nom	Max
A	4.8	5.00	5.20
A1	3.3	3.5	3.7
A2	2.20	2.40	2.60
b	1.00	1.2	1.40
b1	2.90	3.10	3.30
b2	1.90	2.10	2.30
c	0.50	0.60	0.70
D	107.5°	108°	108.5°
e	5.25	5.45	5.65
E	15.2	15.7	16.2
E1	10.2	10.7	11.2
H	20.8	21	21.2
H1	4.8	5	5.2
H2	1.7	1.9	2.1
G	5.60	5.80	600
ΦP	3.30	3.50	3.70

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