

LEGP40N120AHF

IGBT Discrete

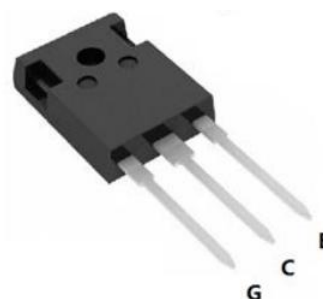
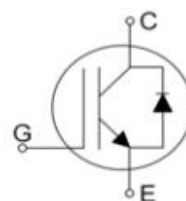
Features:

- 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 – 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	40	A
$V_{CE(sat)}$ @ $I_C=40A$	1.7	V

Applications:

- Inverter for motor drive
- AC and DC servo drive amplifier
- Uninterruptible power supply



TO-247H-3L

Maximum Rated Values ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CE}	Collector-emitter voltage		1200	V
I_C	Continuous Collector Current	$T_C = 25^\circ\text{C}$	80	A
		$T_C = 100^\circ\text{C}$	40	A
I_F	Diode Forward current	$T_C = 25^\circ\text{C}$	60	A
		$T_C = 100^\circ\text{C}$	40	A
V_{GE}	Continuous Gate-emitter voltage		± 20	V
V_{GE}	Transient Gate-emitter voltage		± 30	V
I_{CM}	Pulsed Collector Current	$V_{GE} = 15\text{V}$, tp limited by T_{Jmax}	160	A
I_{Fplus}	Diode Pulsed Current	tp limited by T_{Jmax}	160	A
T_{sc}	Short Circuit Withstand Time	$V_{GE} = 15\text{V}$, $V_{CE} \leq 600\text{V}$	10	μs
P_{tot}	Total Power Dissipation	$T_J = 25^\circ\text{C}$	376	W
T_J	Operating Junction Temperature		$-40 \dots +175$	$^\circ\text{C}$
T_{stg}	Storage Temperature		$-55 \dots +175$	$^\circ\text{C}$
-	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	0.52	K/W
$R_{\theta(j-c)}$	Diode thermal resistance, junction - case	0.65	K/W
$R_{\theta(j-a)}$	Thermal resistance, junction - ambient	40	K/W

Characteristics Values of the IGBT ($T_j = 25^\circ\text{C}$ unless otherwise specified)

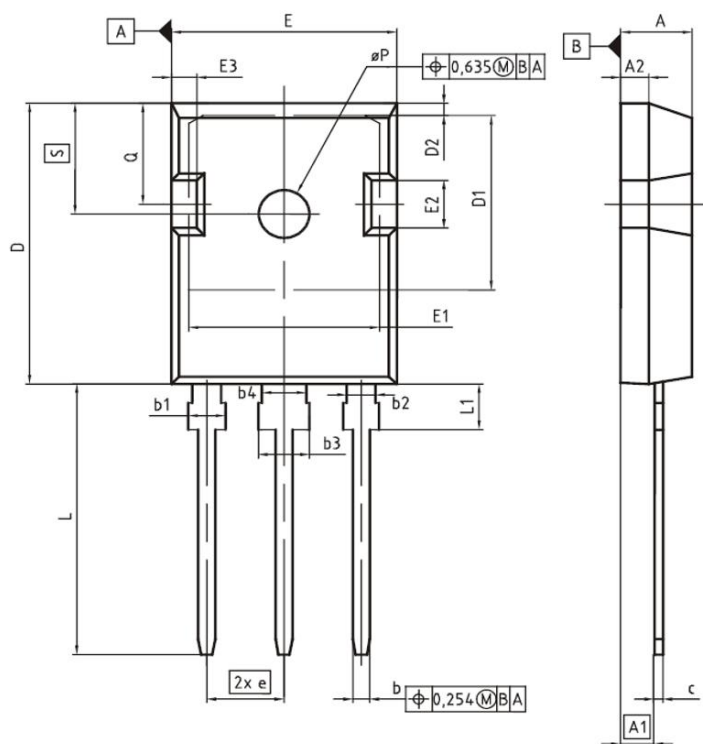
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=40\text{ A}, V_{GE}=15\text{ V}, T_{vj}=25^\circ\text{C}$		2.0	2.5	V
		$I_C=40\text{ A}, V_{GE}=15\text{ V}, T_{vj}=150^\circ\text{C}$		2.3	2.7	V
$V_{GE(th)}$	Gate Threshold Voltage	$I_C=2\text{ mA}, V_{CE}=V_{GE}, T_{vj}=25^\circ\text{C}$	5.2	6.2	7.0	V
C_{ies}	Input capacitance	$f = 1\text{ MHz}, T_{vj}=25^\circ\text{C},$ $V_{CE}=25\text{ V}, V_{GE}=0\text{ V}$			3.11	nF
C_{res}	Reverse transfer capacitance				103	pF
I_{CES}	Collector-Emitter Cut-off Current	$V_{CE}=1200\text{ V}, V_{GE}=0\text{ V}, T_{vj}=25^\circ\text{C}$			1.2	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{CE}=0\text{ V}, V_{GE}=20\text{ V}, T_{vj}=25^\circ\text{C}$			410	nA
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	$I_C=40\text{ A}, V_{CE}=600\text{ V}$ $V_{GE}=\pm 15\text{ V}$ $R_G=15\Omega$ $T_{vj}=25^\circ\text{C}$		50		ns
t_r	Rise Time, Inductive Load			48		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			200		ns
t_f	Fall Time, Inductive Load			156		ns
E_{on}	Turn-on Energy Loss per Pulse			2.64		mJ
E_{off}	Turn-off Energy Loss per Pulse			1.87		mJ
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	$I_C=40\text{ A}, V_{CE}=600\text{ V}$ $V_{GE}=\pm 15\text{ V}$ $R_G=15\Omega$ $T_{vj}=150^\circ\text{C}$		55		ns
t_r	Rise Time, Inductive Load			60		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			240		ns
t_f	Fall Time, Inductive Load			240		ns
E_{on}	Turn-on Energy Loss per Pulse			3.22		mJ
E_{off}	Turn-off Energy Loss per Pulse			3.01		mJ
I_{sc}	SC	$V_{GE}\leq 15\text{ V}, V_{CE}=600\text{ V},$ $t_p\leq 10\mu\text{S}, T_{vj}=150^\circ\text{C},$ $V_{CEmax}=V_{CES}-L_{sCE}\cdot di/dt$		160		A

Characteristics Values of the Diode ($T_j = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=40\text{ A}, V_{CE}=0\text{ V}, T_{vj}=25^\circ\text{C}$		1.7	2.5	V
		$I_F=40\text{ A}, V_{CE}=0\text{ V}, T_{vj}=150^\circ\text{C}$		1.9		V
t_{rr}	Reverse Recovery time	$I_F=40\text{ A}, V_R=600\text{ V}$ -di/dt=100A/us $T_{vj}=25^\circ\text{C}$, $V_{GE}=-15\text{V}$		170		ns
Q_r	Recovered Charge			0.98		uC
E_{rec}	Reverse Recovery Energy			0.35		mJ
t_{rr}	Reverse Recovery time	$I_F=40\text{ A}, V_R=600\text{ V}$ -di/dt=100A/us $T_{vj}=150^\circ\text{C}$ $V_{GE}=-15\text{V}$		205		ns
Q_r	Recovered Charge			1.09		uC
E_{rec}	Reverse Recovery Energy			0.36		mJ

Package Dimensions

TO-247H-3L



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.83	5.21	0.190	0.205
A1	2.27	2.54	0.089	0.100
A2	1.85	2.16	0.073	0.085
b	1.07	1.33	0.042	0.052
b1	1.90	2.41	0.075	0.095
b2	1.90	2.16	0.075	0.085
b3	2.87	3.38	0.113	0.133
b4	2.87	3.13	0.113	0.123
c	0.55	0.68	0.022	0.027
D	20.80	21.10	0.819	0.831
D1	16.25	17.65	0.640	0.695
D2	0.95	1.35	0.037	0.053
E	15.70	16.13	0.618	0.635
E1	13.10	14.15	0.516	0.557
E2	3.68	5.10	0.145	0.201
E3	1.00	2.60	0.039	0.102
e	5.44 (BSC)		0.214 (BSC)	
N	3		3	
L	19.80	20.32	0.780	0.800
L1	4.10	4.47	0.161	0.176
øP	3.50	3.70	0.138	0.146
Q	5.49	6.00	0.216	0.236
S	6.04	6.30	0.238	0.248

DISCLAIMER

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