

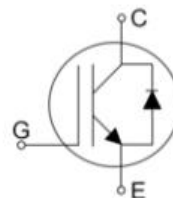
LEGP40N120AHDF

IGBT Discrete

Features:

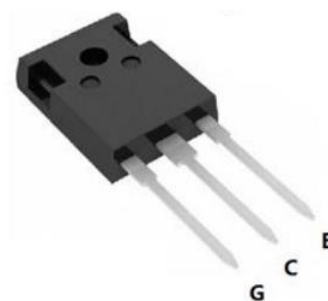
- 1200V/40A Trench Field Stop IGBT
- High breakdown voltage up to 1200V for improved reliability
- Trench-Stop Technology offering :
 - Low $V_{CE(sat)}$
 - Very tight parameter distribution
 - Short circuit withstand time – 10 μ s
 - High ruggedness, temperature stable
 - Easy parallel switching capability 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 ($T_{vj} = 25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CES}	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	$T_C = 25^{\circ}\text{C}$	80	A
		$T_C = 100^{\circ}\text{C}$	40	A
V_{GE}	Gate-Emitter Voltage		± 20	V
V_{GE}	Transient Gate-Emitter Voltage		± 30	V
I_{CRM}	Peak Collector Current	$I_{CRM} = 2I_C$	160	A
I_{Fplus}	Diode Pulsed Current	Diode Pulsed Current	160	A
T_{sc}	Short Circuit Withstand Time	Short Circuit Withstand Time	10	us
P_{tot}	Total Power Dissipation	$T_C = 25^{\circ}\text{C}, T_{vjmax} = 175^{\circ}\text{C}$	500	W
T_{vj}	Operating Junction Temperature	Operating Junction Temperature	$-40 \dots +175$	$^{\circ}\text{C}$
T_{stg}	Storage Temperature	Storage Temperature	$-55 \dots +150$	$^{\circ}\text{C}$
	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	0.52	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 ($T_{vj} = 25^{\circ}\text{C}$ unless otherwise specified)

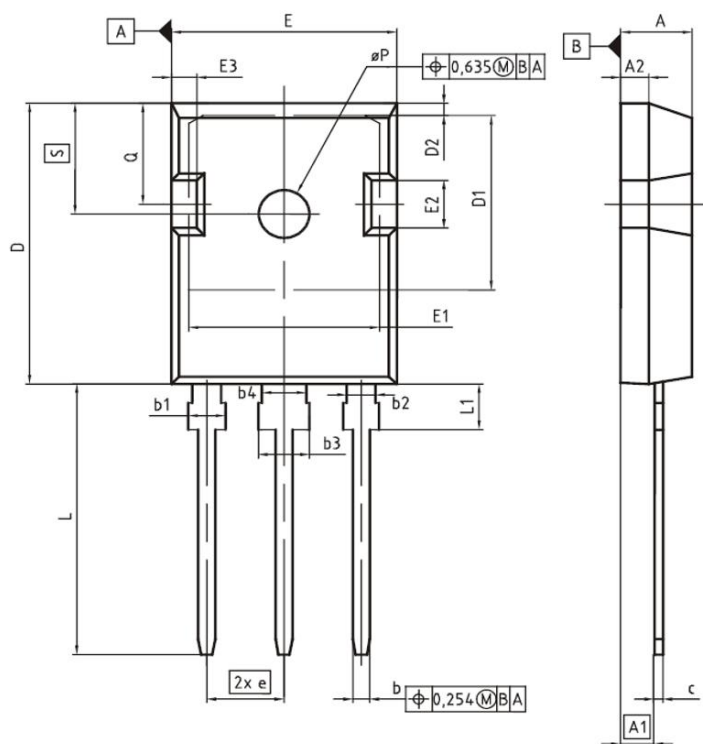
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{CES}	Collector-Emitter Breakdown Voltage	$V_{GE} = 0\text{V}, I_C = 250\mu\text{A}$	1200			V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=40\text{ A}, V_{GE}=15\text{ V}, T_{vj}=25^{\circ}\text{C}$		1.7	2.25	V
		$I_C=40\text{ A}, V_{GE}=15\text{ V}, T_{vj}=150^{\circ}\text{C}$		2.3	2.7	V
$V_{GE(th)}$	Gate Threshold Voltage	$I_C=5.0\text{ mA}, V_{CE}=V_{GE}$	5.2	6.0	6.5	V
I_{CES}	Collector-Emitter Cut-off Current	$V_{CE}=1200\text{V}, V_{GE}=0\text{ V}, T_{vj}=25^{\circ}\text{C}$			20	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{CE}=0\text{ V}, V_{GE}=15\text{ V}, T_{vj}=25^{\circ}\text{C}$			200	nA
C_{ies}	Input Capacitance	$f = 1\text{MHz}, T_{vj} = 25^{\circ}\text{C},$ $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$		2.15		nF
C_{res}	Reverse Transfer Capacitance			72.3		pF
$t_{d(on)}$	Turn-on Delay Time	$I_C=40\text{ A}, V_{CE}=600\text{ V}$ $V_{GE}=\pm 15\text{ V}$ $R_G=20\Omega$ $T_{vj}=25^{\circ}\text{C}$		221		ns
t_r	Rise Time, Inductive Load			150		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			352		ns
t_f	Fall Time, Inductive Load			243		ns
E_{on}	Turn-on Energy Loss per Pulse			5.65		mJ
E_{off}	Turn-off Energy Loss			1.97		mJ
$t_{d(on)}$	Turn-on Delay Time	$I_C=40\text{ A}, V_{CE}=600\text{ V}$ $V_{GE}=\pm 15\text{ V}$ $R_G=20\Omega$ $T_{vj}=150^{\circ}\text{C}$		186		ns
t_r	Rise Time, Inductive Load			182		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			422		ns
t_f	Fall Time, Inductive Load			390		ns
E_{on}	Turn-on Energy Loss per Pulse			7.06		mJ
E_{off}	Turn-off Energy Loss			2.89		mJ
I_{SC}	Short Circuit Collector Current	$V_{GE} \leq 15\text{ V}, V_{CC} = 600\text{ V}$ $V_{CEmax} = V_{CES} - L_{sCE} \cdot di/dt$ $t_p \leq 10\mu\text{s}, T_{vj} = 150^{\circ}\text{C}$		137.5		A

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=40\text{ A}, T_{vj}=25^{\circ}\text{C}$		1.7		V
		$I_F=40\text{ A}, T_{vj}=150^{\circ}\text{C}$		2.5		V
t_{rr}	Reverse Recovery time	$I_F=40\text{ A}, V_R=600\text{ V}$ $-di/dt=100\text{ A/us}$ $T_{vj}=25^{\circ}\text{C}$ $V_{GE}=-15\text{ V}$		272		ns
Q_r	Recovered Charge			1.57		uC
E_{rec}	Reverse Recovery Energy			0.56		mJ
t_{rr}	Reverse Recovery time	$I_F=40\text{ A}, V_R=600\text{ V}$ $-di/dt=100\text{ A/us}$ $T_{vj}=150^{\circ}\text{C}$ $V_{GE}=-15\text{ V}$		328		ns
Q_r	Recovered Charge			1.74		uC
E_{rec}	Reverse Recovery Energy			0.58		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