

LEGP50N70AH

IGBT Discrete

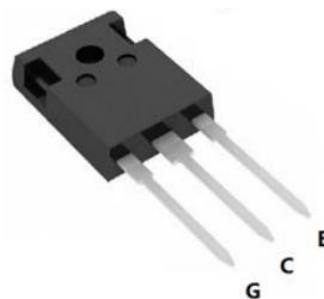
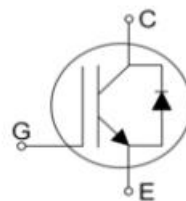
Features:

- 650V/60A Trench Field Stop IGBT
- High breakdown voltage up to 650V for improved reliability
- Trench-Stop Technology offering :
 - Low $V_{CE(sat)}$
 - High speed switching
 - High ruggedness, temperature stable
 - Easy parallel switching capability due to positive temperature coefficient in $V_{CE(sat)}$
- Enhanced avalanche capability

V_{CE}	700	V
I_C	50	A
$V_{CE(sat)} @ I_C=50A$	1.5	V

Applications:

- Uninterruptible Power Supplies
- Inverter
- Welding Converters
- PFC applications
- Converter with high switching frequency



TO-247-3L

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

Symbol	Parameter	Conditions	Ratings	Unit
V_{CE}	Collector-emitter voltage		700	V
I_C	Continuous Collector Current	$T_C = 25^\circ\text{C}$	80	A
		$T_C = 100^\circ\text{C}$	50	A
I_F	Diode Forward current	$T_C = 25^\circ\text{C}$	80	A
		$T_C = 100^\circ\text{C}$	50	A
V_{GE}	Continuous Gate-emitter voltage		± 20	V
V_{GE}	Transient Gate-emitter voltage		± 30	V
-	Turn off Safe Operating Area	$V_{CE} \leq 700\text{V}, T_j \leq 150^\circ\text{C}$	200	A
I_{CM}	Pulsed Collector Current	$V_{GE} = 15\text{V}, t_p$ limited by T_{jmax}	200	A
P_{tot}	Total Power Dissipation	$T_j = 25^\circ\text{C}$	280	W
T_j	Operating Junction Temperature		$-40 \dots +150$	$^\circ\text{C}$
T_{stg}	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	0.53	K/W
$R_{\theta(j-c)}$	Diode thermal resistance, junction - case	1.05	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)

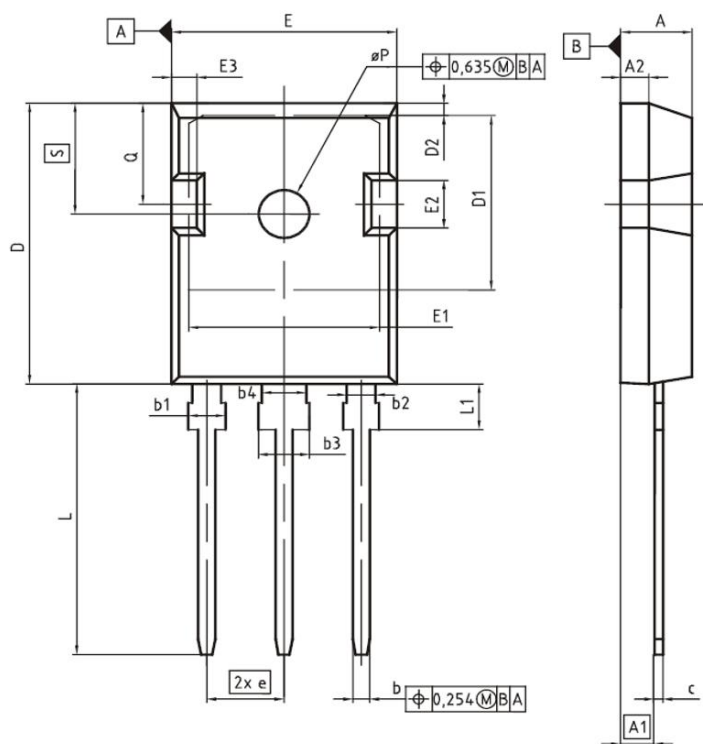
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{CES}	Collector-Emitter Breakdown Voltage	$V_{GE} = 0V, I_C = 250\mu A$	700	-	-	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 50A, V_{GE} = 15V, T_j = 25^\circ\text{C}$	-	1.5	1.85	V
		$I_C = 50A, V_{GE} = 15V, T_j = 150^\circ\text{C}$	-	1.67	-	V
$V_{GE(th)}$	Gate Threshold Voltage	$I_C = 250\mu A, V_{CE} = V_{GE}$	5.2	6.0	6.5	V
I_{CES}	Collector-Emitter Cut-off Current	$V_{CE} = 700V, V_{GE} = 0V, T_j = 25^\circ\text{C}$	-	0.1	40	μA
		$V_{CE} = 700V, V_{GE} = 0V, T_j = 150^\circ\text{C}$	-	-	10	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{CE} = 0V, V_{GE} = \pm 20V$			100	nA
g_{fs}	Transconductance	$I_C = 50A, V_{CE} = 20V$	-	52	-	S
C_{ies}	Input Capacitance	$V_{GE} = 0V, V_{CE} = 30V,$ $f = 1\text{MHz}$	-	3800	-	pF
C_{oes}	Output Capacitance		-	130	-	pF
C_{res}	Reverse Transfer Capacitance		-	70	-	pF
Q_G	Gate Charge	$V_{CC} = 520V, I_C = 50A,$ $V_{GE} = 15V$	-	158	-	nC
$t_{d(on)}$	Turn-on Delay Time	$I_C = 50A, V_{CC} = 400V$ $V_{GE} = 0/15V$ $R_g = 12\Omega$ $T_j = 25^\circ\text{C}$	-	32	-	ns
t_r	Rise Time		-	47	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	89	-	ns
t_f	Fall Time		-	45	-	ns
E_{on}	Turn-on Energy Loss		-	2.2	-	mJ
E_{off}	Turn-off Energy Loss		-	0.89	-	mJ
$t_{d(on)}$	Turn-on Delay Time	$I_C = 50A, V_{CC} = 400V$ $V_{GE} = 0/15V$ $R_g = 12\Omega$ $T_j = 150^\circ\text{C}$	-	35	-	ns
t_r	Rise Time		-	51	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	96	-	ns
t_f	Fall Time		-	53	-	ns
E_{on}	Turn-on Energy Loss		-	2.5	-	mJ
E_{off}	Turn-off Energy Loss		-	2.99	-	mJ

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	$I_F=50\text{ A}$	-	1.55	-	V
t_{rr}	Reverse Recovery time	$I_F=50\text{ A}, V_R=300\text{ V}$ $di/dt = 600\text{ A}/\mu\text{s}$ $T_j = 25^\circ\text{C}$	-	155	-	ns
I_{rr}	Reverse Recovery Current		-	17	-	A
Q_{rr}	Reverse Recovery Charge		-	1.67	-	μC
E_{rec}	Reverse Recovery Energy			0.33		mJ
t_{rr}	Reverse Recovery time	$I_F=50\text{ A}, V_R=300\text{ V}$ $di/dt = 600\text{ A}/\mu\text{s}$ $T_j = 150^\circ\text{C}$	-	155	-	ns
I_{rr}	Reverse Recovery Current		-	17	-	A
Q_{rr}	Reverse Recovery Charge		-	1.67	-	μC
E_{rec}	Reverse Recovery Energy			0.79		mJ

Package Dimensions

TO-247-3L



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
ϕP	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

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TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE