

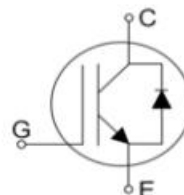
LEGP50N120AH

IGBT Discrete

Features:

- 1200V/50A 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	50	A
$V_{CE(sat)}$ @ $I_C=50A$	1.7	V



Applications:

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



TO-247PLUS

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	$T_C = 25^\circ\text{C}$	100	A
		$T_C = 100^\circ\text{C}$	50	A
I_F	Diode Forward current	$T_C = 25^\circ\text{C}$	85	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
I_{CM}	Pulsed Collector Current	$V_{GE} = 15\text{V}$, tp limited by T_{Jmax}	200	A
I_{Fplus}	Diode Pulsed Current	tp limited by T_{Jmax}	200	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	$T_J = 25^\circ\text{C}$, $T_J = 175^\circ\text{C}$	500	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	0.3	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)

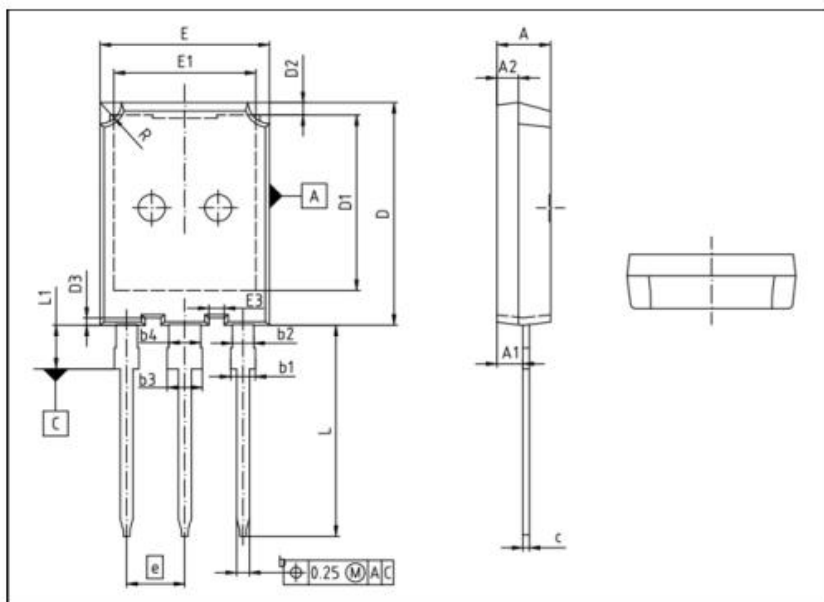
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=50\text{ A}, V_{GE}=15\text{ V}, T_{vj}=25^\circ\text{C}$		1.7	2.25	V
		$I_C=50\text{ A}, V_{GE}=15\text{ V}, T_{vj}=150^\circ\text{C}$		2.05	2.7	V
$V_{GE(th)}$	Gate Threshold Voltage	$I_C=2\text{ mA}, V_{CE}=V_{GE}, T_{vj}=25^\circ\text{C}$	5	6	6.5	V
I_{CES}	Collector-Emitter Cut-off Current	$V_{CE}=1200\text{ V}, V_{GE}=0\text{ V}, T_{vj}=25^\circ\text{C}$			4.0	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{CE}=0\text{ V}, V_{GE}=15\text{ V}, T_{vj}=25^\circ\text{C}$			450	nA
C_{ies}	Input Capacitance	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V},$ $f = 1\text{MHz}$	-	5.19	-	nF
C_{oes}	Output Capacitance		-	225	-	pF
C_{res}	Reverse Transfer Capacitance		-	189	-	pF
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	$I_C=50\text{ A}, V_{CE}=600\text{ V}$ $V_{GE}=\pm 15\text{ V}$ $R_{Gon}=15\ \Omega$ $T_{vj}=25^\circ\text{C}$		76		ns
t_r	Rise Time, Inductive Load			62		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			278		ns
t_f	Fall Time, Inductive Load			196		ns
E_{on}	Turn-on Energy Loss per Pulse			5.2		mJ
E_{off}	Energy Loss per Pulse			3.1		mJ
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	$I_C=50\text{ A}, V_{CE}=600\text{ V}$ $V_{GE}=\pm 15\text{ V}$ $R_{Gon}=15\ \Omega$ $T_{vj}=150^\circ\text{C}$		80		ns
t_r	Rise Time, Inductive Load			64		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			326		ns
t_f	Fall Time, Inductive Load			284		ns
E_{on}	Turn-on Energy Loss per Pulse			5.4		mJ
E_{off}	Energy Loss per Pulse			4.5		mJ
I_{SC}	SC data	$V_{GE} \leq 15\text{ V}, V_{CC} = 600\text{ V}$ $V_{CEmax} = V_{CES} - L_{sCE} \cdot di/dt$ $t_p \leq 10\ \mu\text{s}, T_{vj} = 150^\circ\text{C}$		250		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	$I_F = 50\text{ A}$	$T_J = 25^\circ\text{C}$	-	1.7	-	V
			$T_J = 150^\circ\text{C}$		2.2		V
t_{rr}	Reverse Recovery time	$I_F = 50\text{ A}, V_R = 600\text{ V}$ $di/dt = 500\text{ A}/\mu\text{s}$ $T_J = 25^\circ\text{C}$		-	644	-	ns
I_{rr}	Reverse Recovery Current			-	21	-	A
Q_{rr}	Reverse Recovery Charge			-	7.11	-	μC
E_{rec}	Eeverse Recovery Energy			-	2.45	-	mJ
t_{rr}	Reverse Recovery time	$I_F = 50\text{ A}, V_R = 600\text{ V}$ $di/dt = 500\text{ A}/\mu\text{s}$ $T_J = 25^\circ\text{C}$		-	786	-	ns
I_{rr}	Reverse Recovery Current			-	26	-	A
Q_{rr}	Reverse Recovery Charge			-	8.85	-	μC
E_{rec}	Eeverse Recovery Energy			-	3.32	-	mJ

Package Dimensions

TO-247PLUS



DIM	MILLIMETERS	
	MIN	MAX
A	4.90	5.10
A1	2.31	2.51
A2	1.90	2.10
b	1.16	1.26
b1	1.86	2.16
b2	1.96	2.06
c	0.58	0.64
D	20.90	21.10
D1	16.25	16.85
D2	1.05	1.35
D3	0.58	0.78
E	15.70	15.90
E1	13.10	13.50
E3	1.35	1.55
e	5.44(BSC)	
L	19.78	20.08
L1	4.03	4.23
R	1.90	2.10

DISCLAIMER

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