Lonten N-channel 650V, 11A, 0.38Ω LonFET™ Power MOSFET

Description

LonFET™ Power MOSFET is fabricated using advanced super junction technology. The resulting device has extremely low on resistance, making it especially suitable for applications which require superior power density and outstanding efficiency.

Features

◆ Ultra low $R_{DS(on)}$

◆ Ultra low gate charge (typ. Q_g = 14.7nC)

◆ 100% UIS tested

◆ RoHS compliant

Applications

◆ Power factor correction (PFC).

◆ Switched mode power supplies (SMPS).

◆ Uninterruptible power supply (UPS).

Product Summary

V_{DS} @ $T_{j,max}$	700V
$R_{DS(on),max}$	0.38Ω
I_{DM}	30A
$Q_{g,typ}$	14.7 nC

TO-247

N-Channel MOSFET

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	650	V
Continuous drain current (T_C = 25°C)	I_D	11	A
(T_C = 100°C)		8.2	A
Pulsed drain current [1]	I_{DM}	30	A
Gate-Source voltage	V_{GSS}	±30	V
Avalanche energy, single pulse [2]	E_{AS}	245	mJ
Power Dissipation (T_C = 25°C)	P_D	90	W
- Derate above 25°C		0.72	W/°C
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C
Continuous diode forward current	I_S	11	A
Diode pulse current	$I_{S,pulse}$	30	A

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{θJC}$	1.39	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{θJA}$	45	°C/W
Soldering temperature, wavesoldering only allowed at leads. (1.6mm from case for 10s)	T_{sold}	260	°C

Package Marking and Ordering Information

Device	Device Package	Marking	Units/Tube
LSB65R380HT	TO-247	LSB65R380HT	30

Electrical Characteristics T_c = 25°C unless otherwise noted

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0 V, I_D=0.25 mA	650	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=0.25mA	2.5	3.5	4.5	V
Drain cut-off current	I_{DSS}	V_{DS}=650 V, V_{GS}=0 V,,T_j = 25°C	-	-	1	µA
Gate leakage current, Forward	I_{GSSF}	V_{GS}=30 V, V_{DS}=0 V	-	-	100	nA
Gate leakage current, Reverse	I_{GSSR}	V_{GS}=-30 V, V_{DS}=0 V	-	-	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=5.5 A	-			
		T_j = 25°C	-	0.33	0.38	Ω
		T_j = 150°C	-	0.9	-	
Gate resistance	R_G	f=1 MHz, open drain	-	5.7	-	Ω
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS} = 100 V, V_{GS} = 0 V,	-	804	-	
Output capacitance	C_{oss}	f = 250 kHz	-	36.1	-	pF
Reverse transfer capacitance	C_{rss}		-	1.35	-	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 400V, I_D = 5.5A	-	20.6	-	
Rise time	t_r	R_G = 10Ω, V_{GS}=15V	-	32	-	ns
Turn-off delay time	$t_{d(off)}$		-	62	-	
Fall time	t_f		-	12.5	-	
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DD}=520 V, I_D=5.5A,	-	4.8	-	
Gate to drain charge	Q_{gd}	V_{GS}=0 to 10 V	-	4.7	-	nC
Gate charge total	Q_g		-	14.7	-	
Gate plateau voltage	$V_{plateau}$		-	6	-	V
Reverse diode characteristics						
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=5.5A	-	1.2	-	V
Reverse recovery time	t_{rr}	V_R=400 V, I_F=5.5A,	-	234	-	ns
Reverse recovery charge	Q_{rr}	dI_F/dt=100 A/µs	-	4.4	-	µC
Peak reverse recovery current	I_{rrm}		-	18.7	-	A

Notes:

1. Limited by maximum junction temperature, maximum duty cycle is 0.75.

2. I_{AS} = 3A, V_{DD} = 60V, Starting T_j= 25°C.

Electrical Characteristics Diagrams
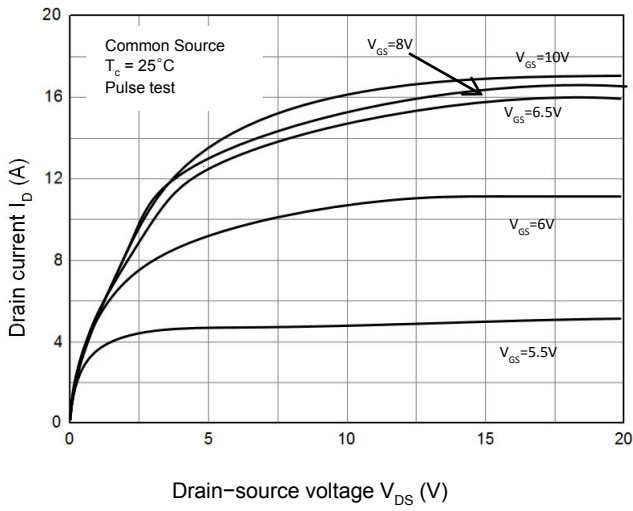
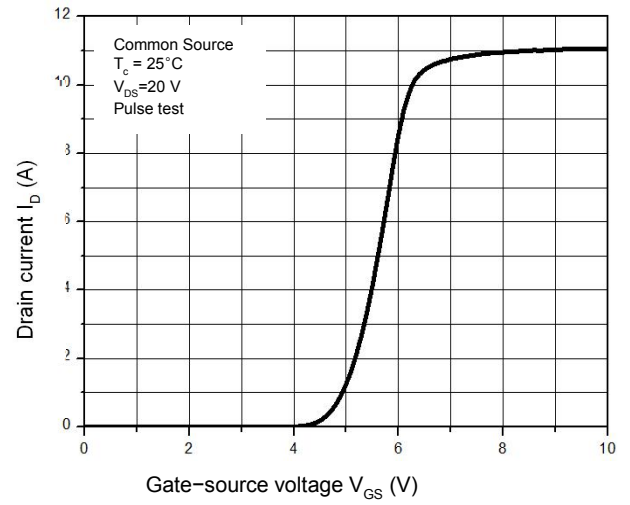Figure 1. On-Region Characteristics

Figure 2. Transfer Characteristics

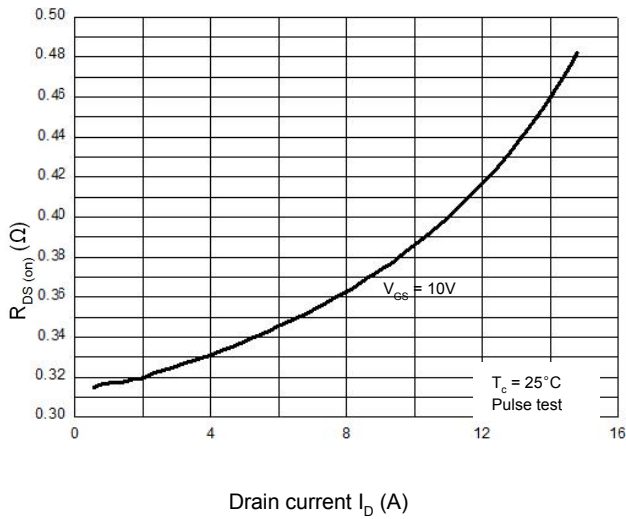Figure 3. On-Resistance Variation vs. Drain Current

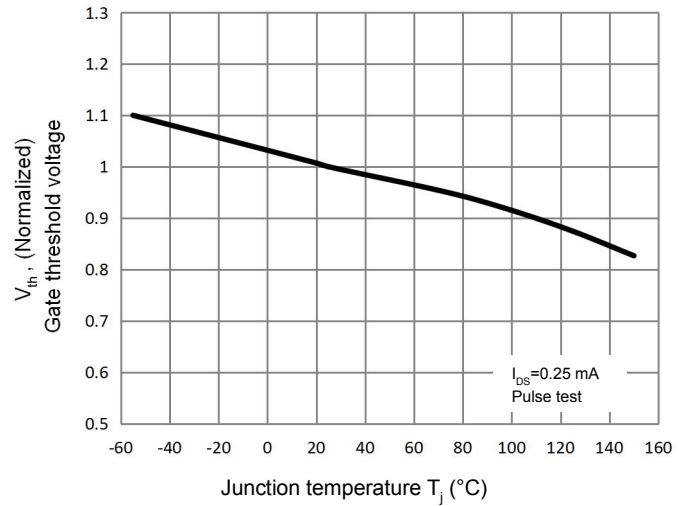Figure 4. Threshold Voltage vs. Temperature
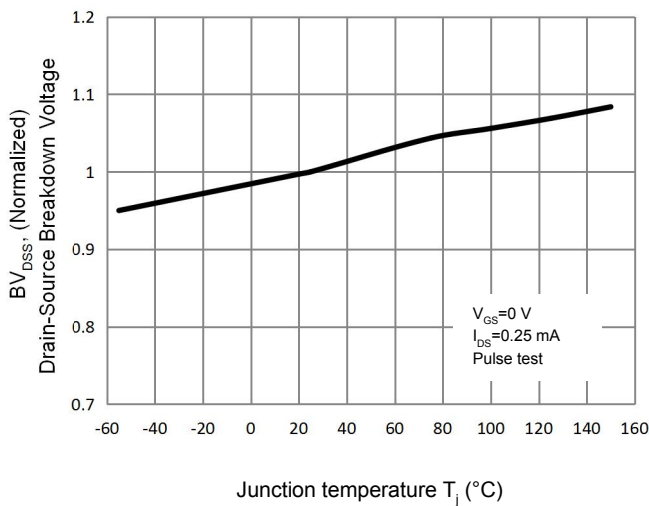
Figure 5. Breakdown Voltage vs. Temperature

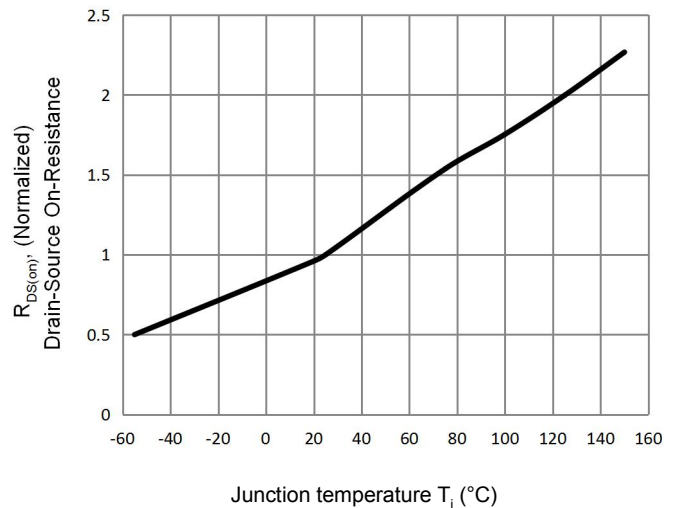Figure 6. On-Resistance vs. Temperature
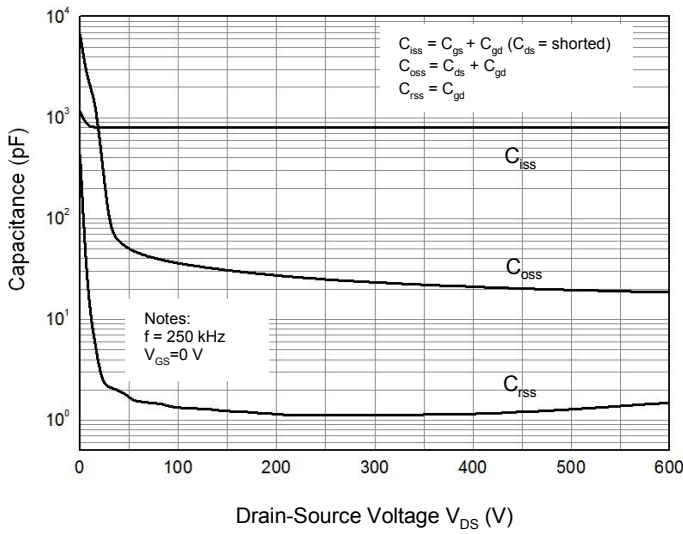
Figure 7. Capacitance Characteristics
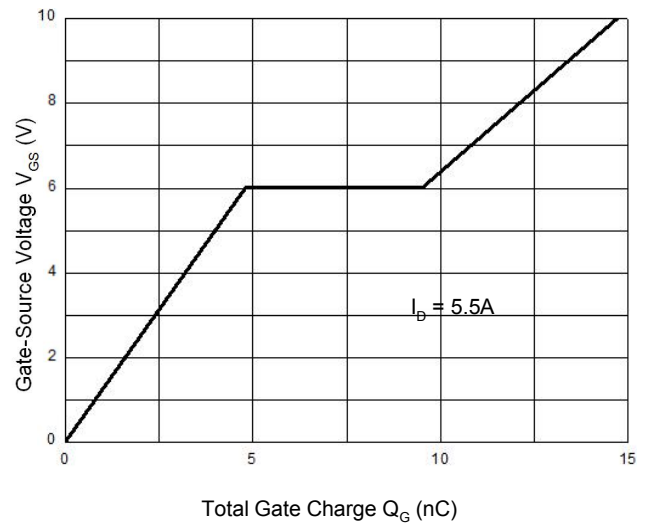
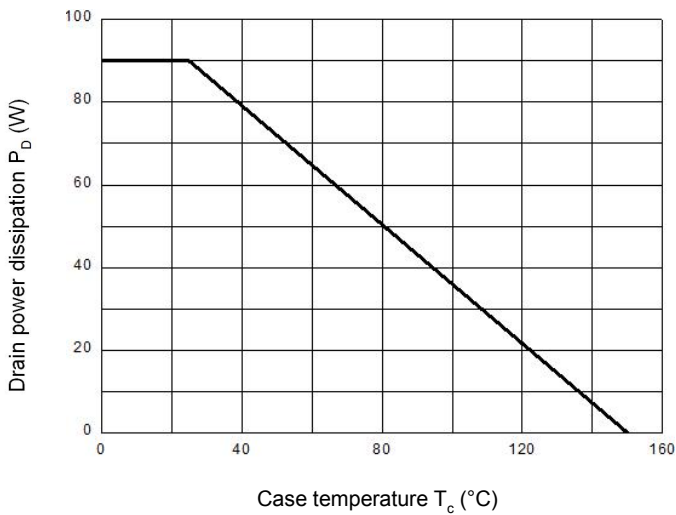Figure 8. Gate Charge Characteristics

Figure 9. Power Dissipation vs. Temperature
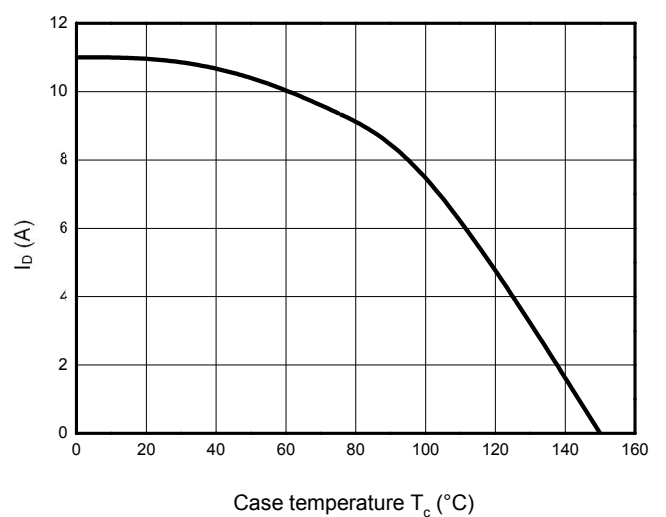
Figure 10.Drain Current Derating
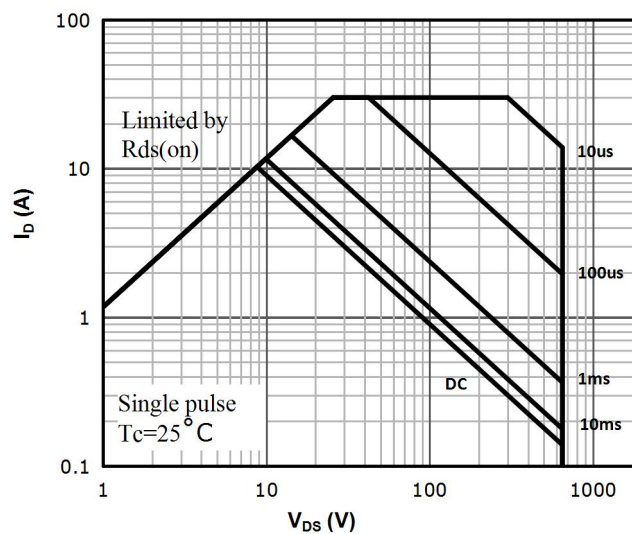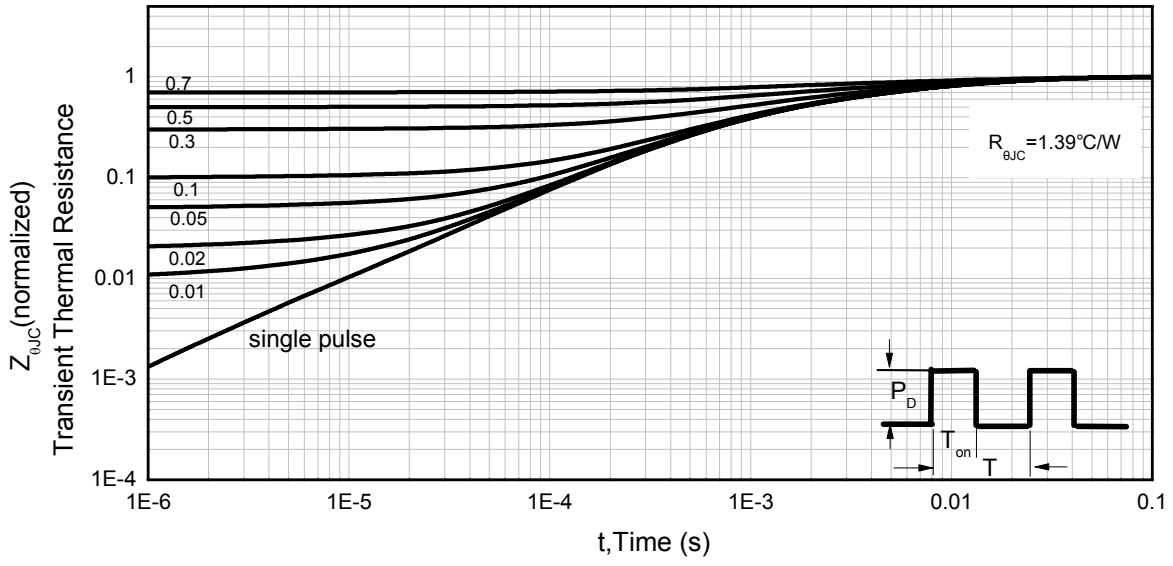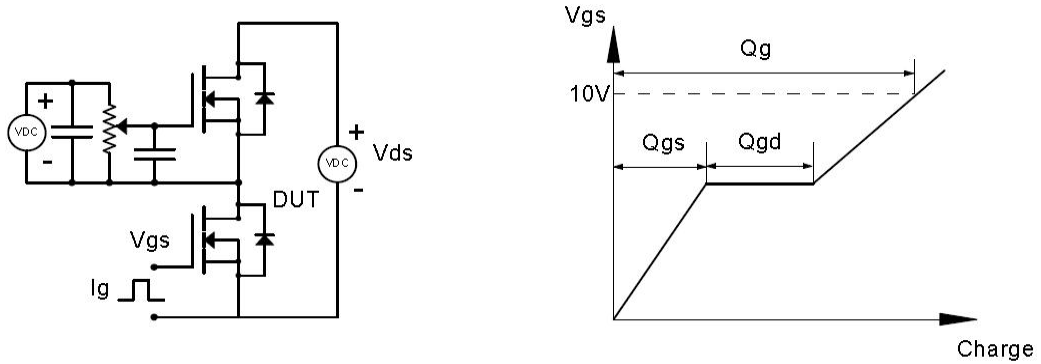
Figure 11: Safe Operating Area
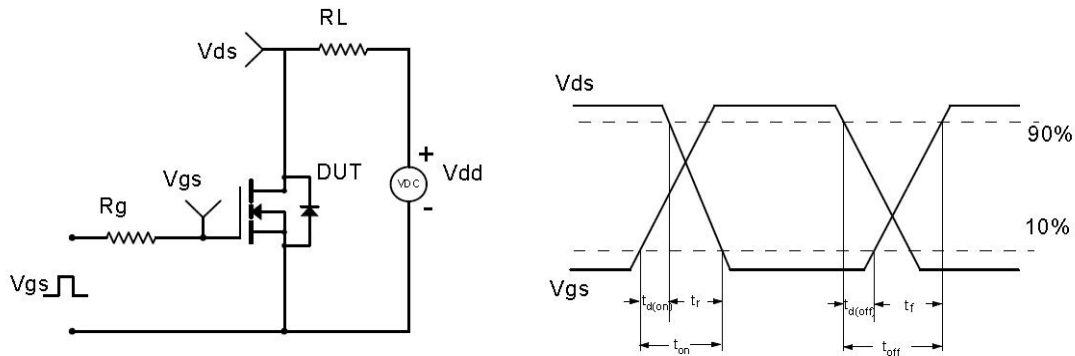
Figure 12. Transient Thermal Response Curve

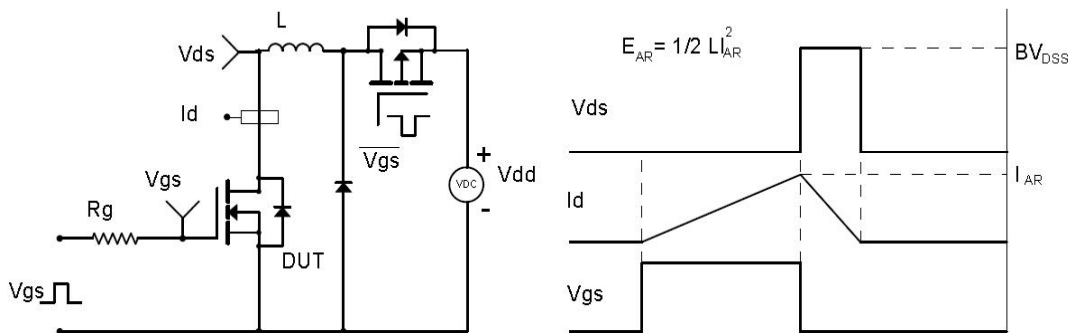# Test Circuit & Waveform

Gate Charge Test Circuit & Waveform

Resistive Switching Test Circuit & Waveforms

Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

$$E_{AR} = 1/2 \, LI_{AR}^2$$

Mechanical Dimensions for TO-247
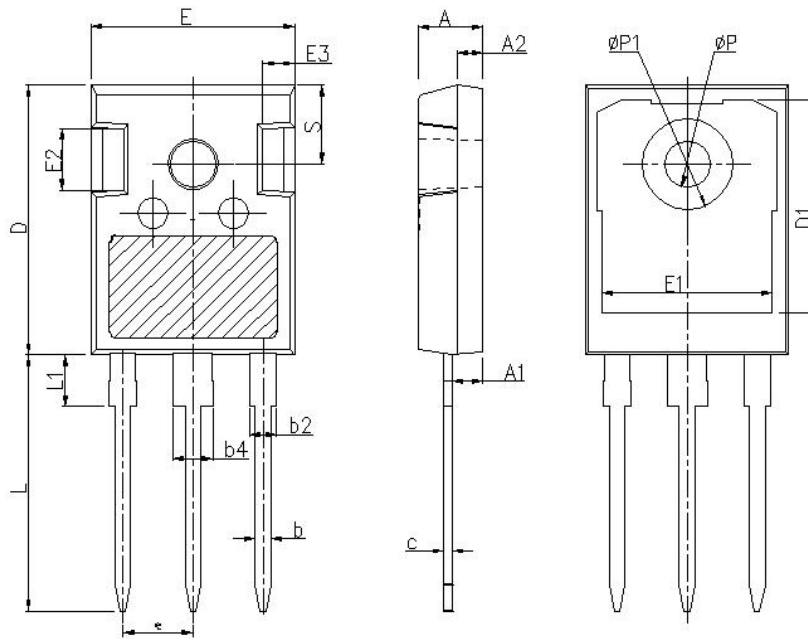
DIMENSIONS IN MILLITMETERS			DIMENSIONS IN INCHES	
SYMBOL	MIN	MAX	MIN	MAX
A	4.8	5.21	0.189	0.205
A1	2.21	2.61	0.087	0.103
A2	1.85	2.16	0.073	0.085
b	1.07	1.36	0.042	0.054
b2	1.91	2.41	0.075	0.095
b4	2.87	3.38	0.113	0.133
c	0.51	0.75	0.020	0.030
D	20.7	21.3	0.815	0.839
D1	16.25	17.65	0.640	0.695
E	15.5	16.13	0.610	0.635
E1	13	13.6	0.512	0.535
E2	3.68	5.2	0.145	0.205
E3	1	2.7	0.039	0.106
e	5.44BSC		0.214BSC	
L	19.62	20.32	0.772	0.800
L1	–	4.4	–	0.173
ΦP	3.4	3.8	0.134	0.150
ΦP1	–	7.4	–	0.291
S	6.04	6.3	0.238	0.248

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