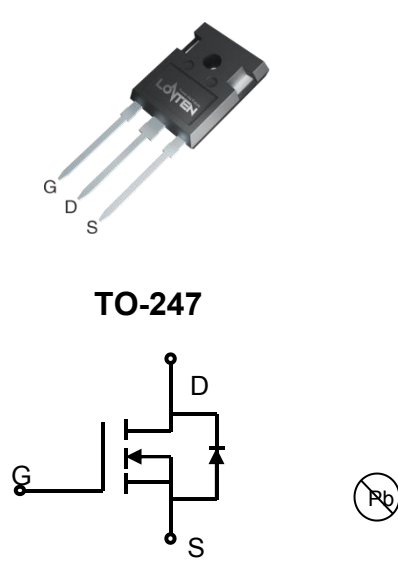


Lonten N-channel 650V, 11A, 0.38Ω LonFET™ Power MOSFET

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. $Q_g = 14.7\text{nC}$) ◆ 100% UIS tested ◆ RoHS compliant Applications ◆ Power factor correction (PFC). ◆ Switched mode power supplies (SMPS). ◆ Uninterruptible power supply (UPS).	Product Summary <table> <tr> <td>$V_{DS} @ T_{j,max}$</td><td>700V</td></tr> <tr> <td>$R_{DS(on),max}$</td><td>0.38Ω</td></tr> <tr> <td>I_{DM}</td><td>30A</td></tr> <tr> <td>$Q_{g,typ}$</td><td>14.7 nC</td></tr> </table>  TO-247 N-Channel MOSFET	$V_{DS} @ T_{j,max}$	700V	$R_{DS(on),max}$	0.38Ω	I_{DM}	30A	$Q_{g,typ}$	14.7 nC
$V_{DS} @ T_{j,max}$	700V								
$R_{DS(on),max}$	0.38Ω								
I_{DM}	30A								
$Q_{g,typ}$	14.7 nC								

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	650	V
Continuous drain current ($T_C = 25^\circ\text{C}$)	I_D	11	A
($T_C = 100^\circ\text{C}$)		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 ($T_C = 25^\circ\text{C}$)	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	$R_{\theta JC}$	1.39	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	45	°C/W
Soldering temperature, wavesoldering only allowed at leads. (1.6mm from case for 10s)	T_{solder}	260	°C

Package Marking and Ordering Information

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

Electrical Characteristics

 $T_c = 25^{\circ}\text{C}$ 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 T _j = 150°C	- - -	 0.33 0.9	 0.38 -	 Ω
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, f = 250 kHz	-	804	-	pF
Output capacitance	C _{oss}		-	36.1	-	
Reverse transfer capacitance	C _{rss}		-	1.35	-	
Turn-on delay time	t _{d(on)}	V _{DD} = 400V, I _D = 5.5A R _G = 10Ω, V _{GS} =15V	-	20.6	-	ns
Rise time	t _r		-	32	-	
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, V _{GS} =0 to 10 V	-	4.8	-	nC
Gate to drain charge	Q _{gd}		-	4.7	-	
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, dI _F /dt=100 A/μs	-	234	-	ns
Reverse recovery charge	Q _{rr}		-	4.4	-	μC
Peak reverse recovery current	I _{rrm}		-	18.7	-	A

Notes:

- Limited by maximum junction temperature, maximum duty cycle is 0.75.
- $I_{AS} = 3\text{ A}$, $V_{DD} = 60\text{ V}$, Starting $T_j = 25^{\circ}\text{C}$.

Electrical Characteristics Diagrams

Figure 1. On-Region Characteristics

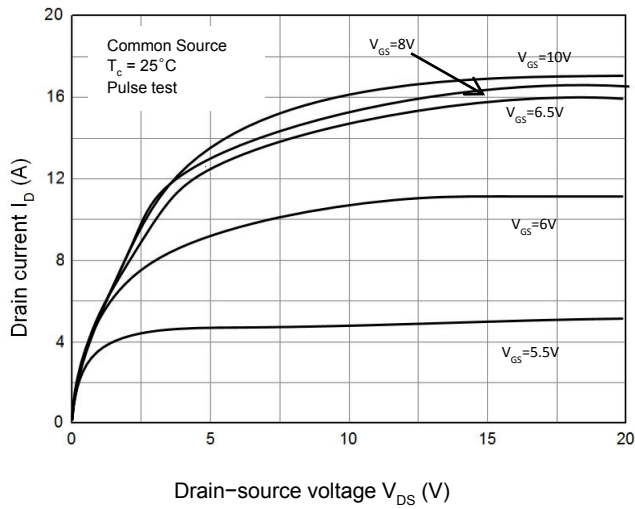


Figure 2. Transfer Characteristics

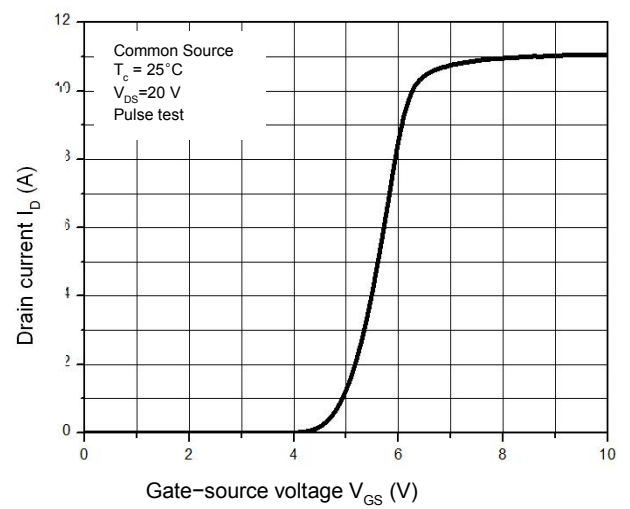


Figure 3. On-Resistance Variation vs. Drain Current

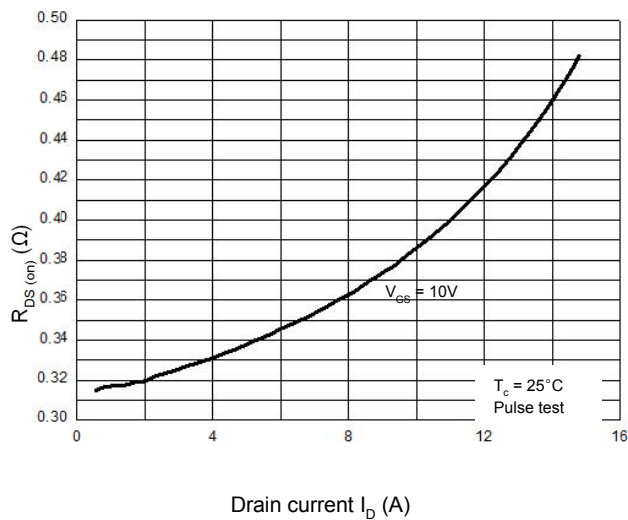


Figure 4. Threshold Voltage vs. Temperature

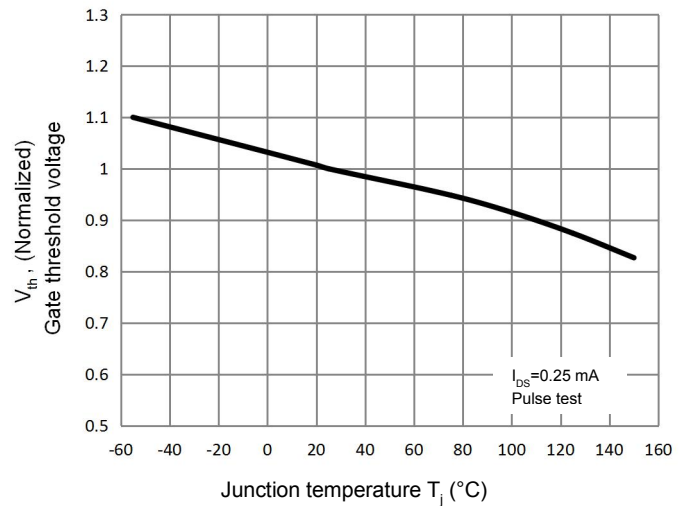


Figure 5. Breakdown Voltage vs. Temperature

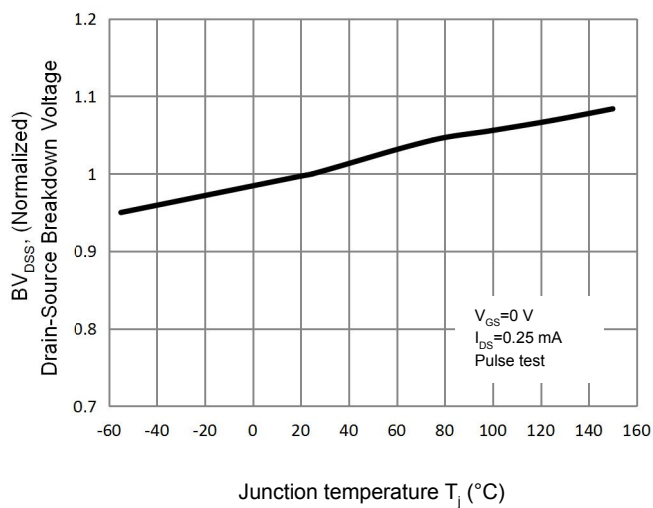


Figure 6. On-Resistance vs. Temperature

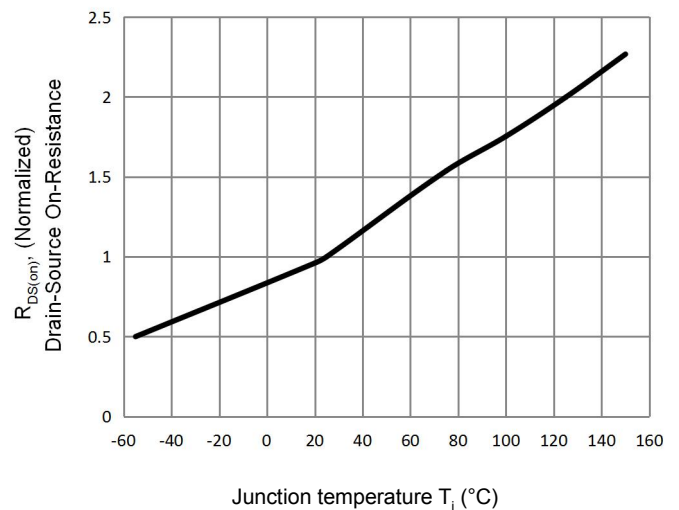


Figure 7. Capacitance Characteristics

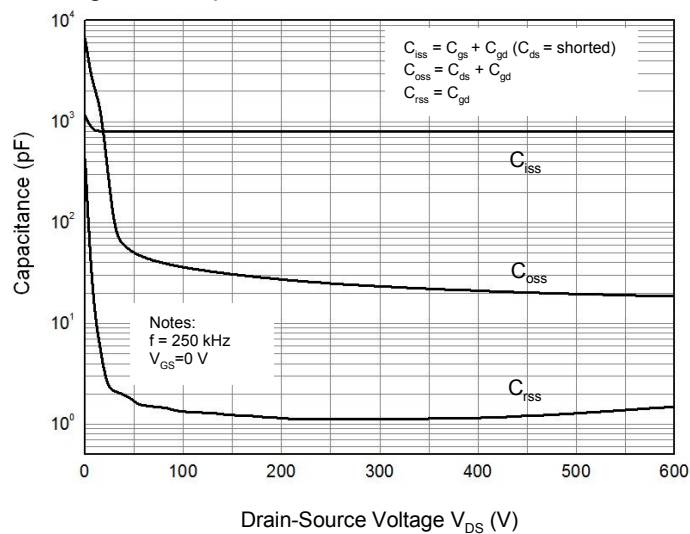


Figure 8. Gate Charge Characteristics

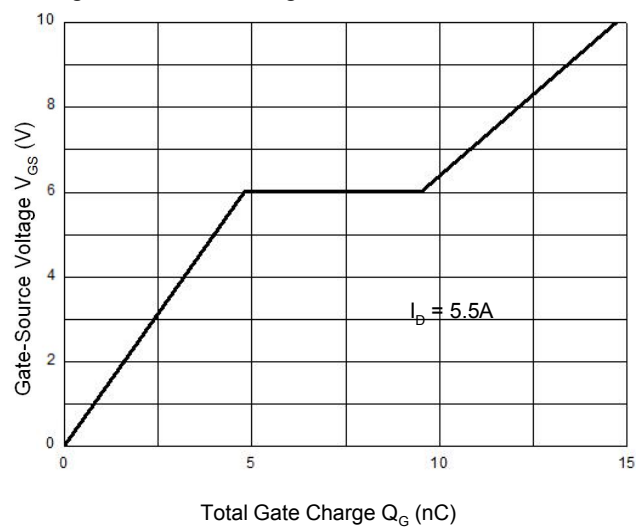


Figure 9. Power Dissipation vs. Temperature

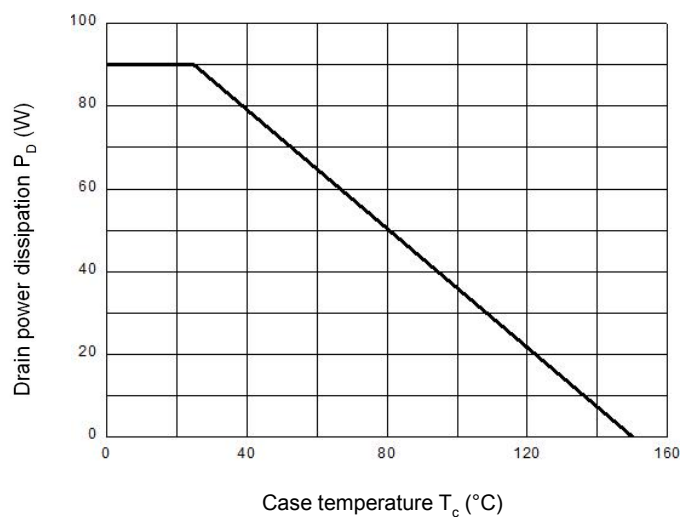


Figure 10. Drain Current Derating

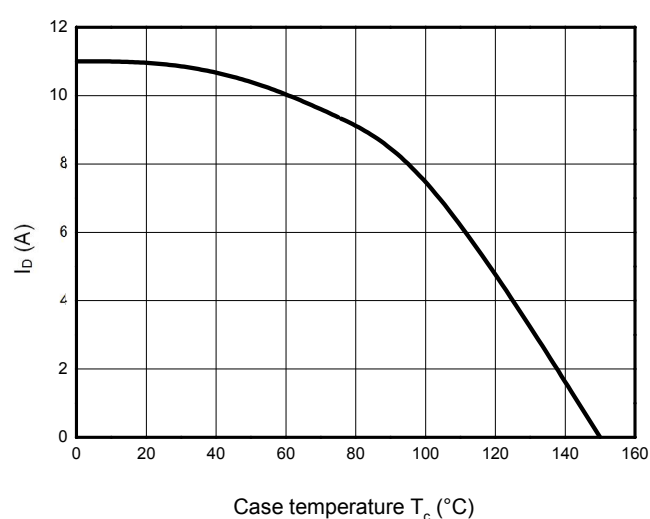


Figure 11: Safe Operating Area

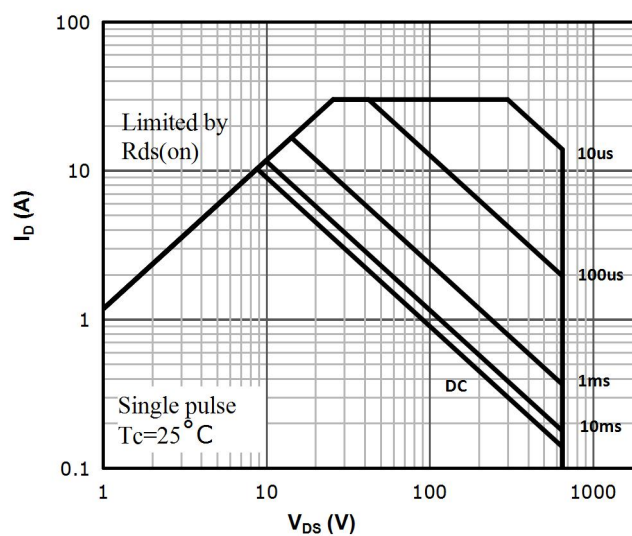
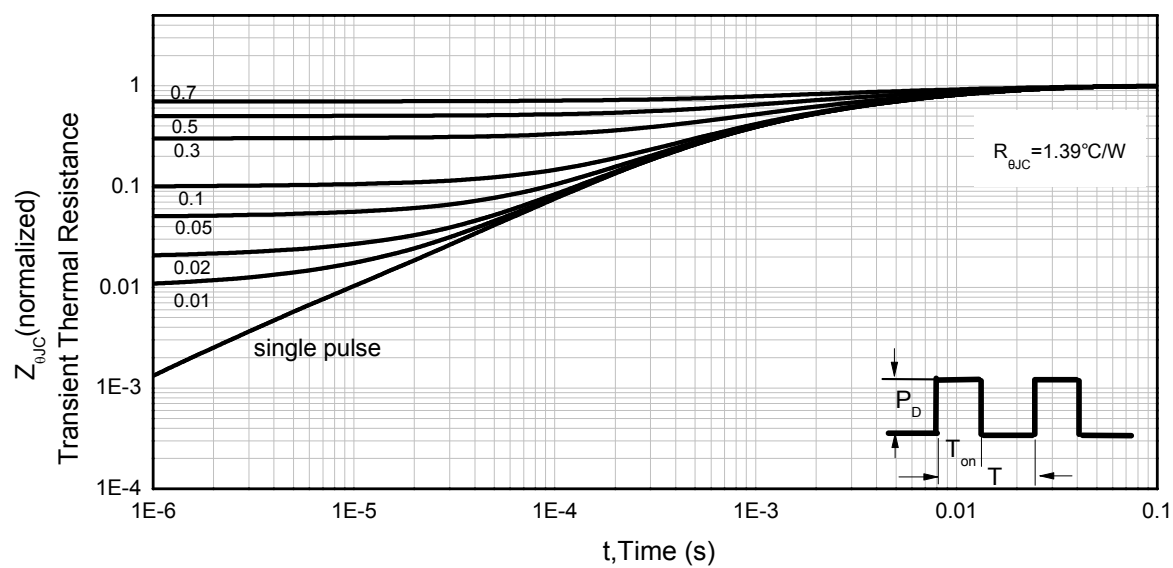
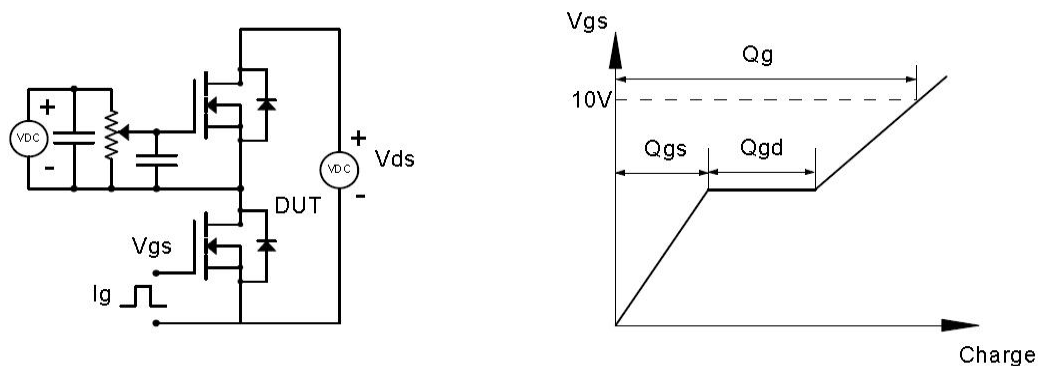


Figure 12. Transient Thermal Response Curve

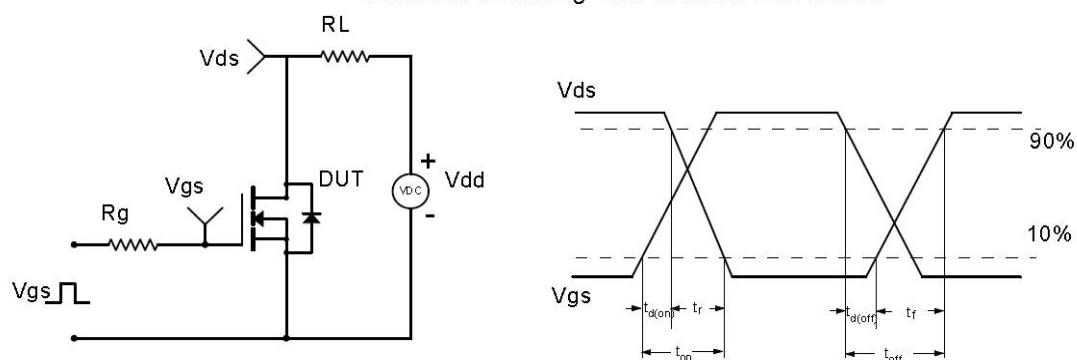


Test Circuit & Waveform

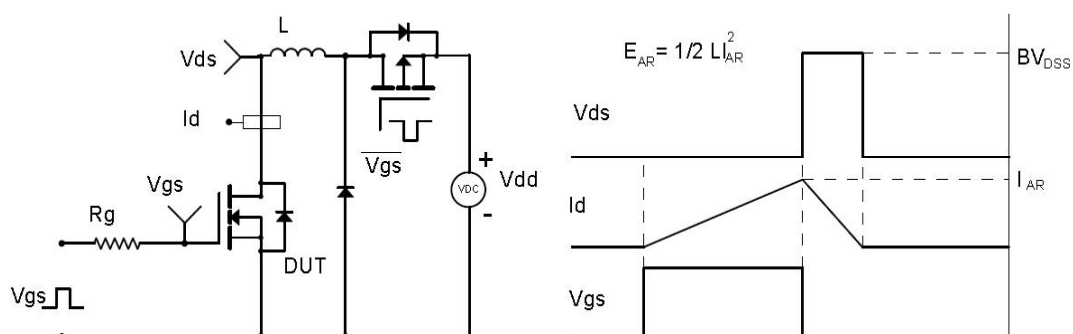
Gate Charge Test Circuit & Waveform



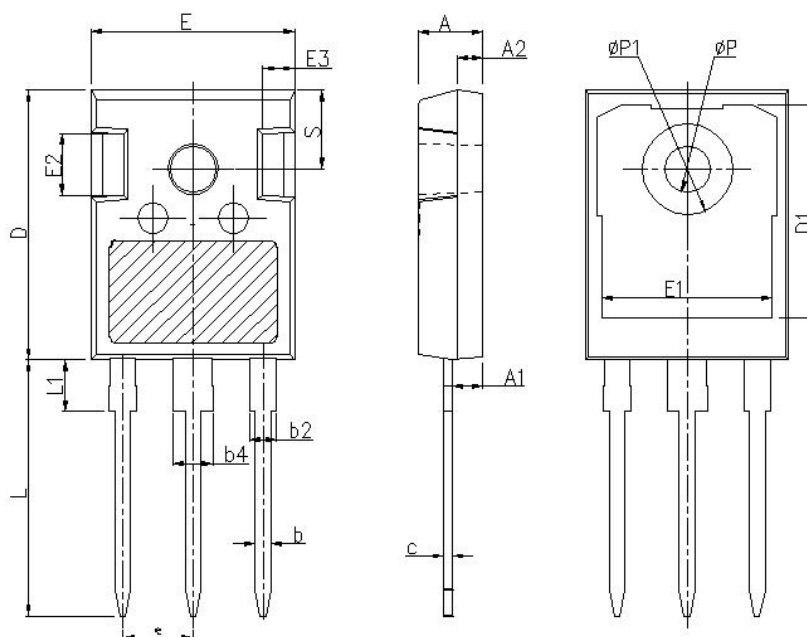
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Mechanical Dimensions for TO-247



DIMENSIONS IN MILLIMETERS			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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