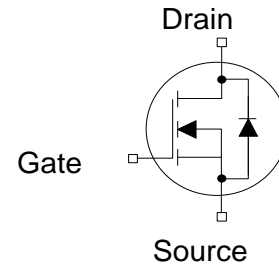




### Description

WLP28N50 is high voltage MOSFET family based on advanced planar stripe DMOS technology. This advanced MOSFET family has optimized on-state resistance, and also provides superior switching performance and higher avalanche energy strength. This device family is suitable for high efficiency switch mode power supplies.

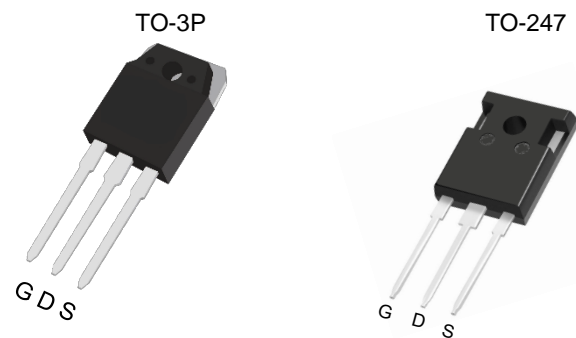


### Features

- $R_{DS(on)} \leq 0.12\Omega$  @  $V_{gs}=10V, I_d=15A$
- Ultra Low gate Charge (typical 151nC)
- Low  $C_{rss}$  (typical 184pF)
- Fast switching capability
- 100% avalanche tested
- Improved dv/dt capability

### Applications

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC) (PFC)
- Charger



### Key Performance Parameters

Parameter	Value	Unit
$V_{DS} @ T_{J,max}$	550	V
$R_{DS(on),max}$	0.12	$\Omega$
$Q_{g,typ}$	151	nC
$I_D$	30	A
$I_{D,pulse}$	120	A

### Device Marking and Package Information

Device	Package	Marking
WLP28N50G	TO-3P	28N50G
WLP28N50E	TO-247	28N50E



<b>Absolute Maximum Ratings</b> $T_C = 25^\circ\text{C}$ , unless otherwise noted			
Parameter	Symbol	Value	Unit
Drain-Source Voltage( $V_{GS}=0\text{V}$ )	$V_{DS}$	500	V
Continuous Drain Current <sup>1)</sup>	$I_D$	$T_C = 25^\circ\text{C}$	30
		$T_C = 100^\circ\text{C}$	18
Pulsed Drain Current <sup>2)</sup>	$I_{D,pulse}$	120	A
Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
Single Pulse Avalanche Energy <sup>3)</sup>	$E_{AS}$	3175	mJ
MOSFET dv/dt Ruggedness, $V_{DS} = 0.480\text{V}$	dv/dt	5	V/ns
Power Dissipation For TO-3P/247	$P_D$	658	W
Continuous Diode Forward Current	$I_S$	30	A
Diode Pulsed Current <sup>2)</sup>	$I_{S,pulse}$	120	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55~+150	$^\circ\text{C}$

<b>Thermal Resistance For TO-3P/247</b>			
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{thJC}$	0.19	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{thJA}$	62	

### Notes

- 1) Limited by maximum junction temperature.
- 2) Repetitive Rating: Pulse width limited by maximum junction temperature.
- 3)  $L=10\text{mH}$ ,  $I_D=25.2\text{A}$ , Start  $T_J=25^\circ\text{C}$



Electrical Characteristics $T_J = 25^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	500	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 500V$ $V_{GS} = 0V, T_J = 25^\circ\text{C}$	--	--	1	$\mu A$
		$V_{DS} = 500V$ , $V_{GS} = 0V, T_J = 150^\circ\text{C}$	--	--	100	
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS} = \pm 30V$	--	--	$\pm 100$	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	--	4	V
Drain-Source On-State-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 15A$	--	0.09	0.12	$\Omega$
Gate Resistance	$R_G$	$f = 1.0\text{MHz}$ open drain	--	1.5	--	$\Omega$
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0V, V_{DS} = 25V$ $f = 1.0\text{MHz}$	--	9471	--	$\mu F$
Output Capacitance	$C_{oss}$		--	717	--	
Reverse Transfer Capacitance	$C_{rss}$		--	184	--	
Total Gate Charge	$Q_g$	$V_{DD} = 400V, I_D = 30A$ $V_{GS} = 10V$	--	151	--	nC
Gate-Source Charge	$Q_{gs}$		--	46	--	
Gate-Drain Charge	$Q_{gd}$		--	40	--	
Gate Plateau Voltage	$V_{Plateau}$		--	5.2	--	V
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 250V, I_D = 30A$ $R_G = 25\Omega, V_{GS} = 10V$	--	69	--	ns
Turn-on Rise Time	$t_r$		--	144	--	
Turn-off Delay Time	$t_{d(off)}$		--	216	--	
Turn-off Fall Time	$t_f$		--	98	--	
<b>Drain-Source Body Diode Characteristics</b>						
Body Diode Forward Voltage	$V_{SD}$	$T_J = 25^\circ\text{C}, I_{SD} = 30A$ $V_{GS} = 0V$	--	--	1.2	V
Reverse Recovery Time	$t_{rr}$	$V_R = 400V$ $I_F = 30A, di_F/dt = 100A/\mu s$	--	484	--	ns
Reverse Recovery Charge	$Q_{rr}$		--	8.7	--	$\mu C$



Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

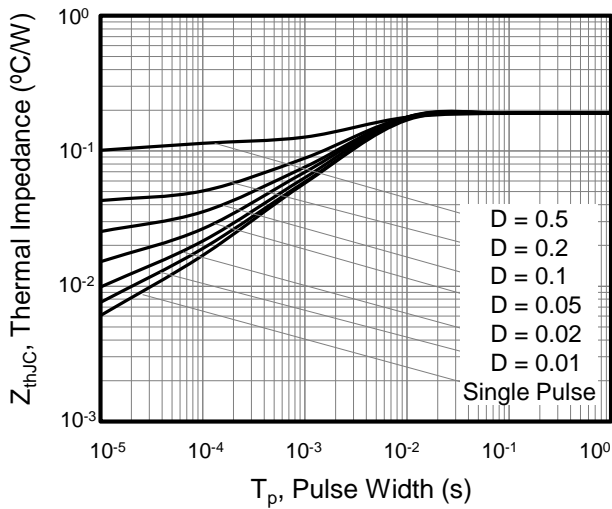


Figure 1. Transient Thermal Impedance For TO-3P/247

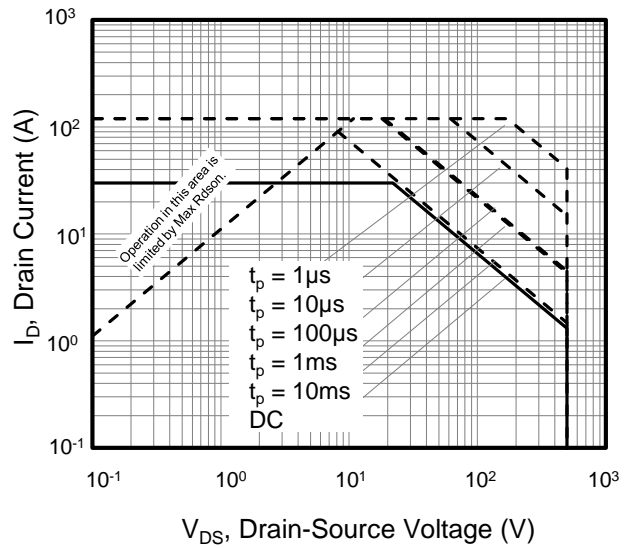


Figure 2. Safe Operation Area For TO-3P/247

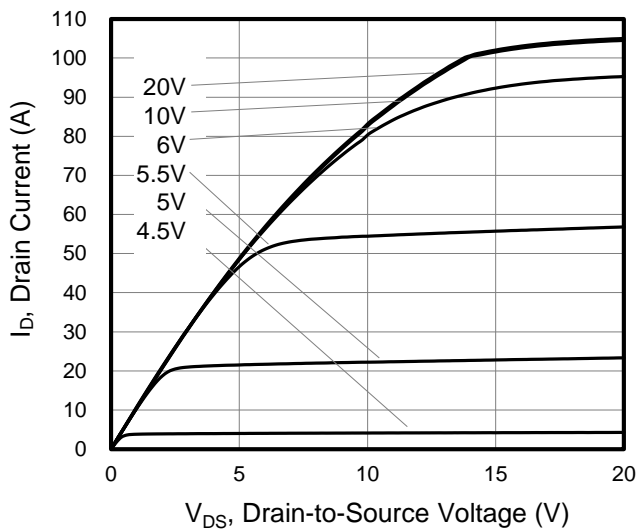


Figure 3. Output Characteristics

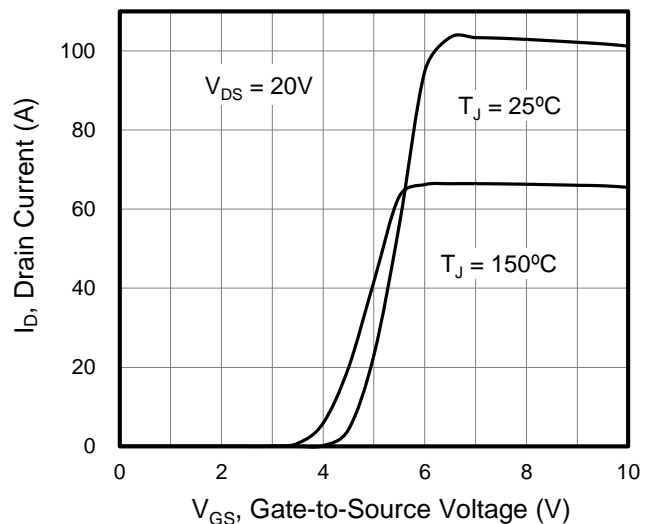


Figure 4. Transfer Characteristics

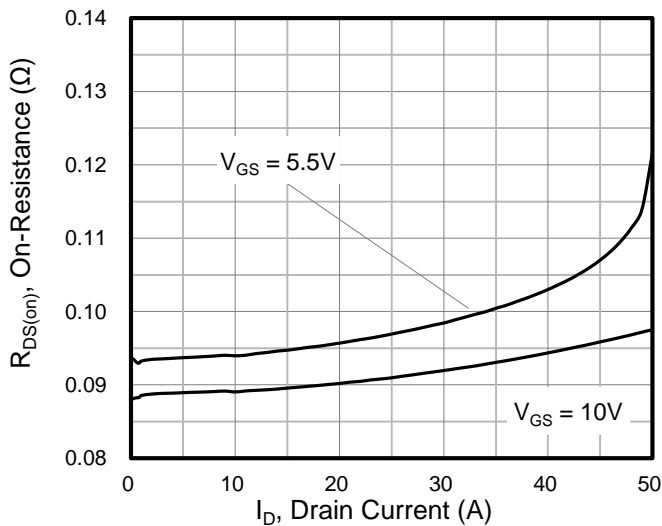


Figure 5. On-Resistance vs Drain Current

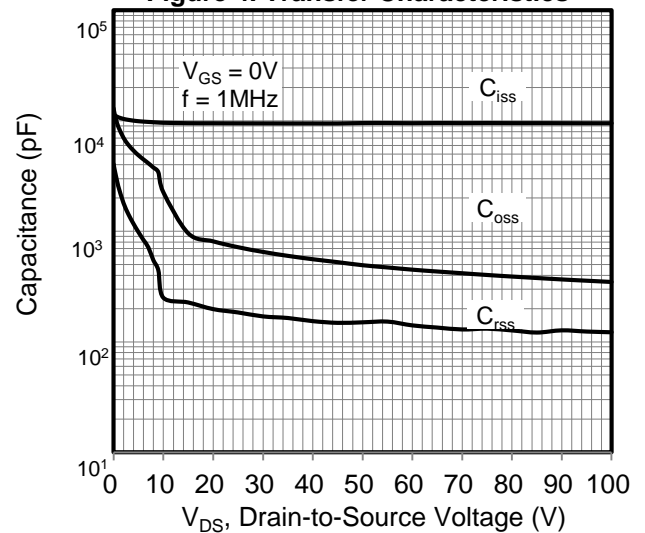


Figure 6. Capacitance



### Typical Characteristics $T_J = 25^\circ\text{C}$ , unless otherwise noted

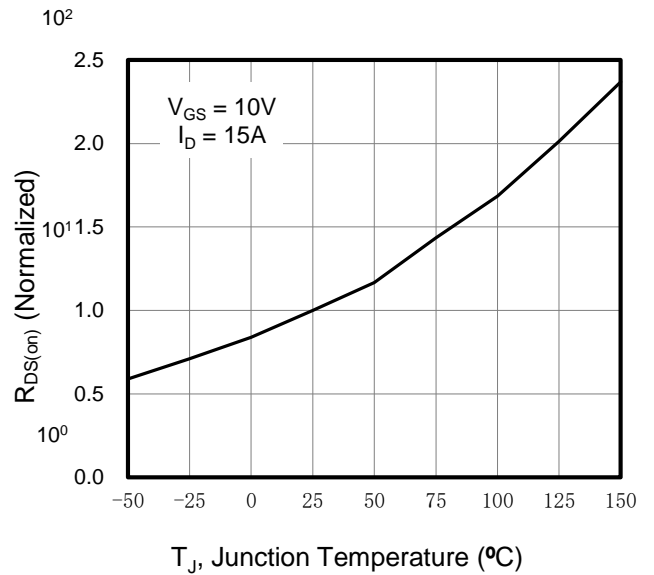
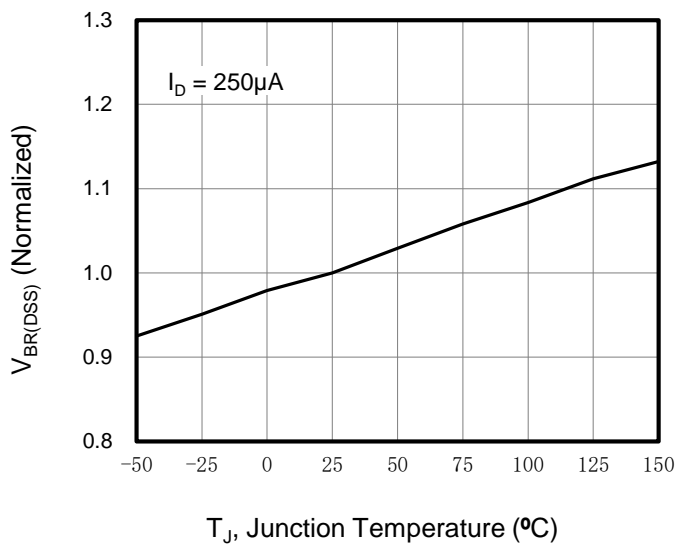
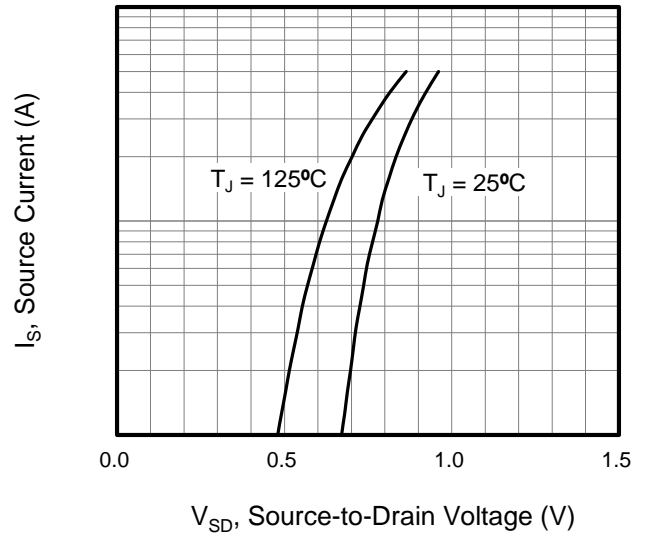
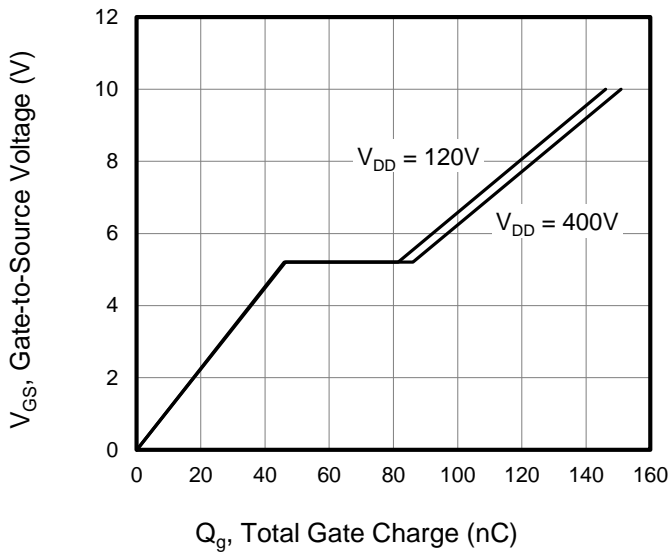




Figure A: Gate Charge Test Circuit and Waveform

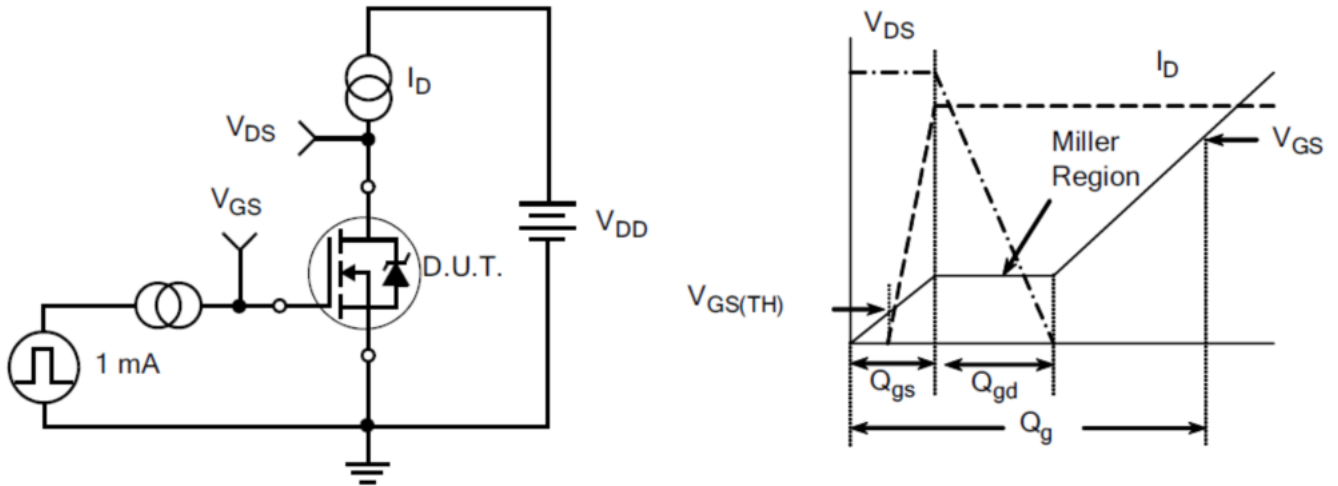


Figure B: Resistive Switching Test Circuit and Waveform

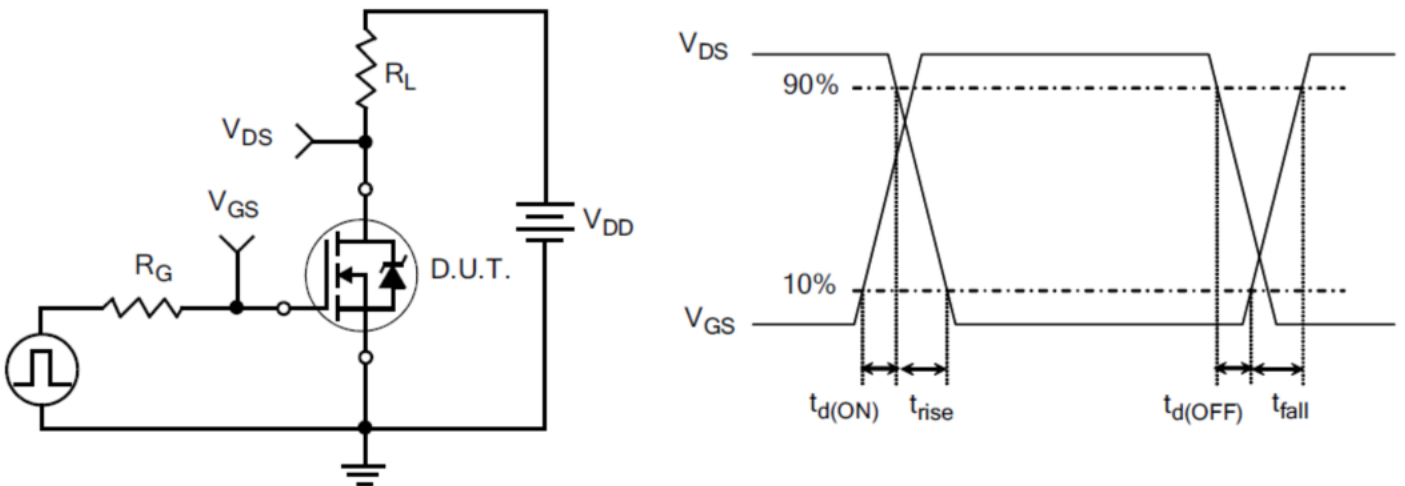
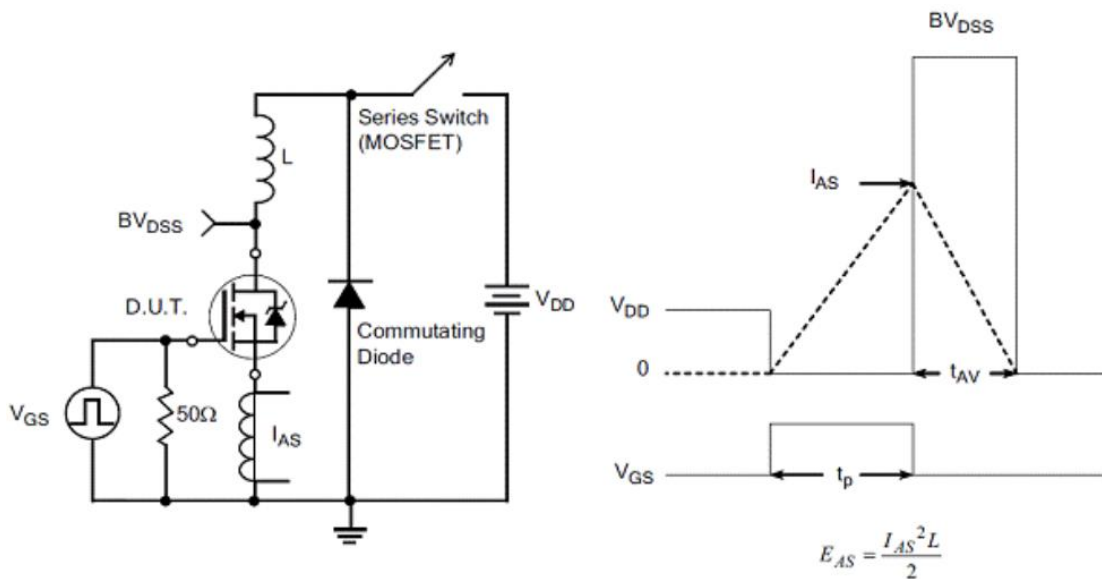
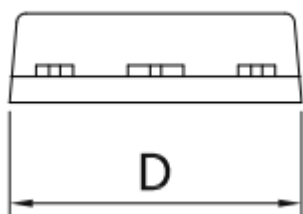
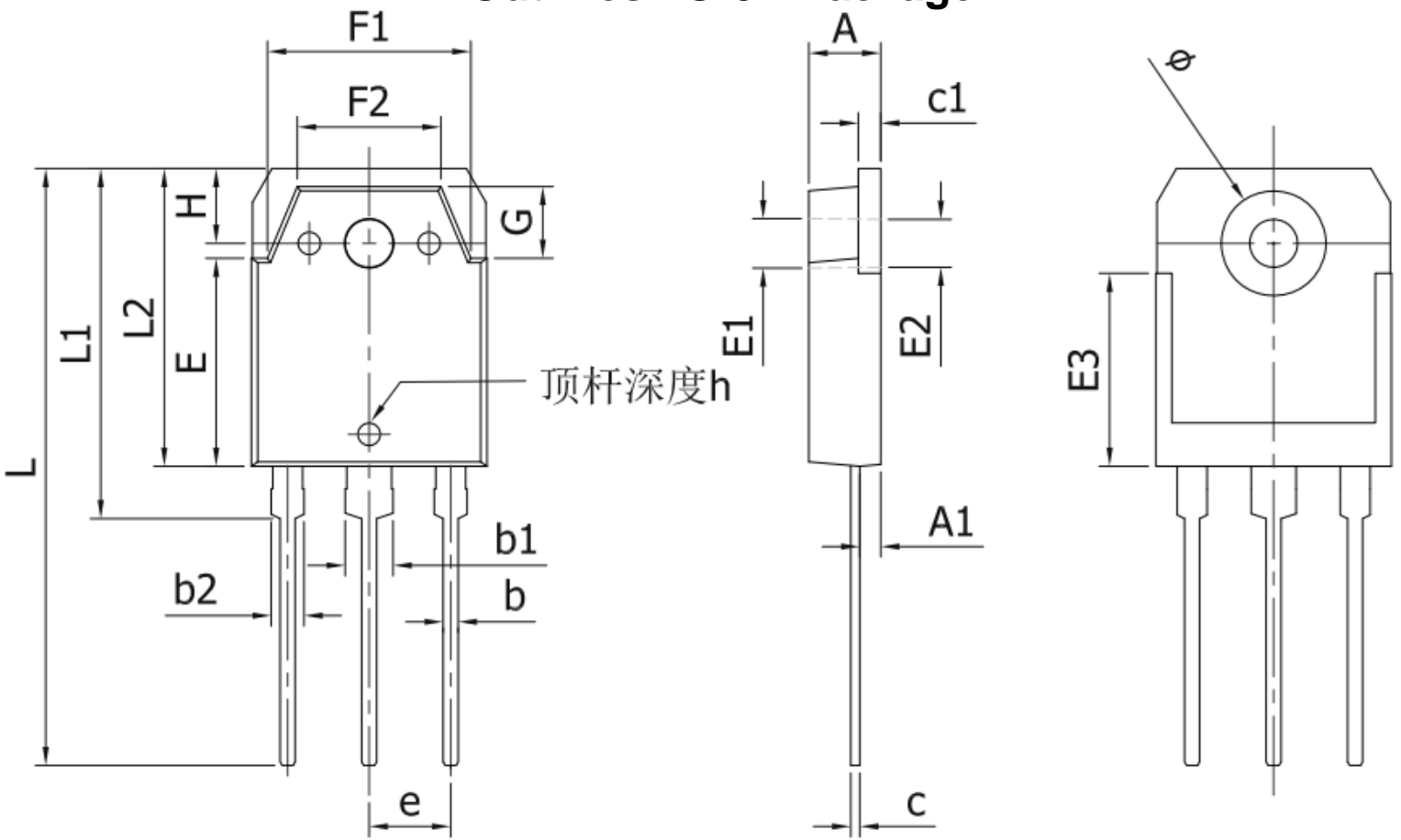


Figure C: Unclamped Inductive Switching Test Circuit and Waveform





### Outlines TO-3P Package

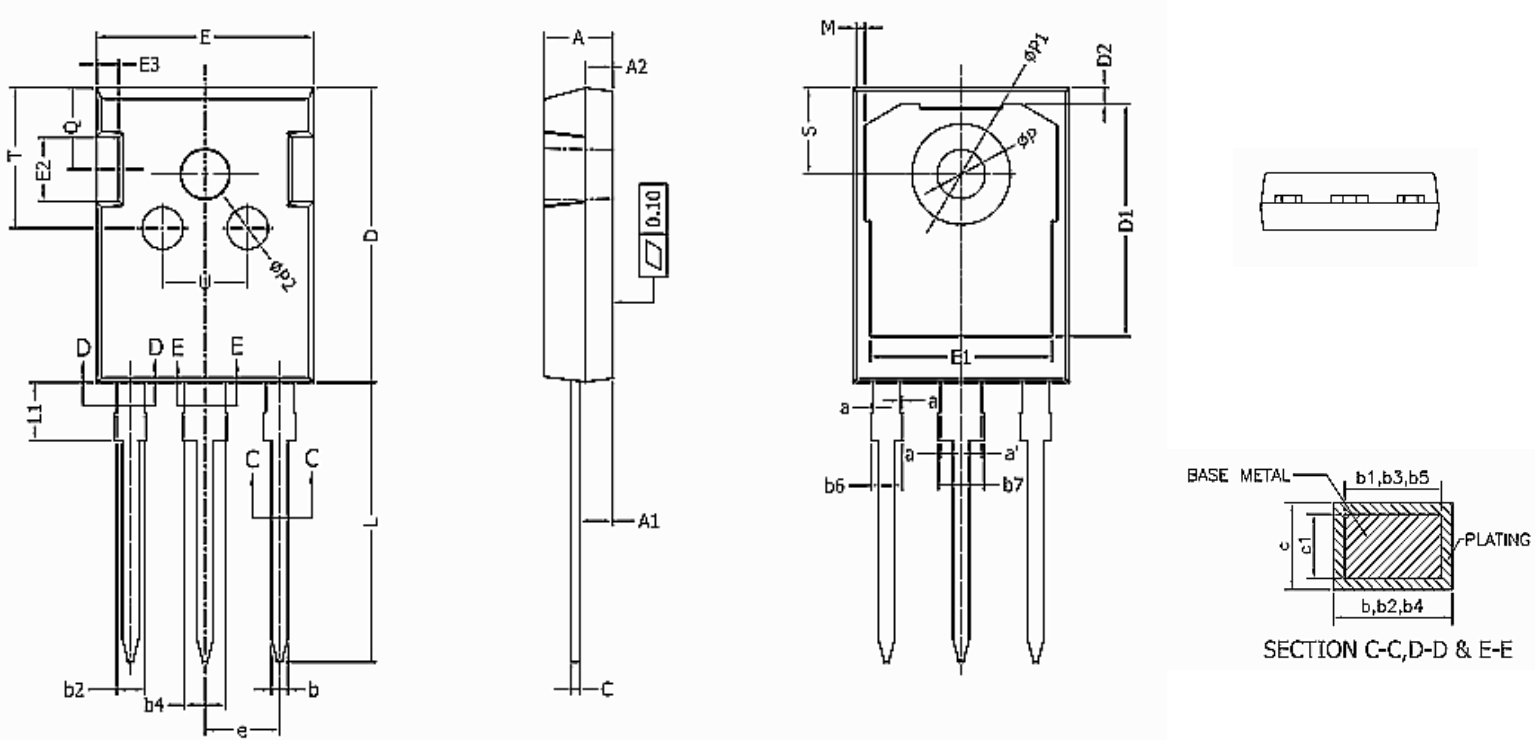


SYMBOL	MIN	NOM	MAX
A	4.6	4.8	5.0
A1	1.2	1.4	1.6
b	0.8	1	1.2
b1	2.8	3	3.2
b2	1.8	2	2.2
c	0.5	0.6	0.7
c1	1.45	1.55	1.65
D	15.45	15.65	15.85
E	13.7	13.9	14.1
E1	3.3REF		
E2	3.2REF		

SYMBOL	MIN	NOM	MAX
E3	12.9REF		
F1	13.4	13.6	13.8
F2	9.4	9.6	9.8
L	39.7	39.9	40.1
L1	23.2	23.4	23.6
L2	19.7	19.9	20.1
ø	6.9	7	7.1
G	4.6	4.8	5.0
e	5.45TYP		
H	5.0REF		
h	0.0	0.15	0.3



### Outlines TO-247 Package



SYMBOL	MIN	NOM	MAX
A	4.9	5	5.1
A1	2.31	2.41	2.51
A2	1.9	2	2.1
a	0	---	0.15
a'	0	---	0.15
b	1.16	---	1.26
b1	1.15	1.2	1.22
b2	1.96	---	2.06
b3	1.95	2	2.02
b4	2.96	---	3.06
b5	2.96	3	3.02
b6	---	---	2.25
b7	---	---	3.25
c	0.59	---	0.66
c1	0.58	0.6	0.62
D	20.9	21	21.1
D1	16.25	16.55	16.85

SYMBOL	MIN	NOM	MAX
D2	1.05	1.17	1.35
E	15.7	15.8	15.9
E1	13.1	13.3	13.5
E2	4.4	4.5	4.6
E3	2.4	2.5	2.6
e	5.436 BSC		
L	19.8	19.92	20.1
L1	---	---	4.3
M	0.35	---	0.95
P	3.4	3.5	3.6
P1	7	---	7.4
P2	2.4	2.5	2.6
Q	5.6	---	6
S	6.05	6.15	6.25
T	9.8	---	10.2
U	6	---	6.4



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