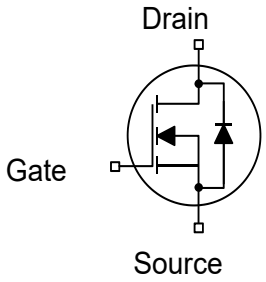
WLP18N50B

500V N-Channel Planar MOSFET

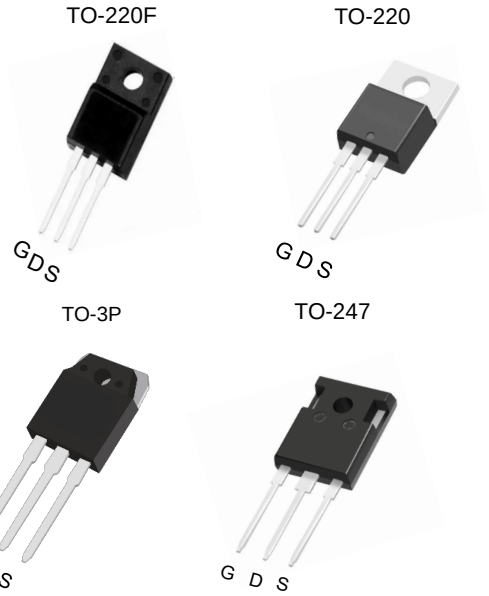
Description

WLP18N50B 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

- RDSON≤0.31Ω @Vgs=10V, Id=9A
- Ultra Low gate Charge(typical 65.5nC)
- Low Crss (typical 6.8pF)
- 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
$R_{DS(on),max}$	0.31	Ω
$Q_{g,typ}$	65.5	nC
I_D	18	A
$I_{D,pulse}$	72	A

Device Marking and Package Information		
Device	**Package**	**Marking**
WLP18N50F	TO-220F	WLP18N50F
WLP18N50	TO-220	WLP18N50
WLP18N50G	TO-3P	WLP18N50G
WLP18N50E	TO-247	WLP18N50E

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted				
Parameter		**Symbol**	**Value**	**Unit**
Drain-Source Voltage(V_{GS}=0V)		V_{DS}	500	V
Continuous Drain Current[1]	T_C = 25ºC	I_D	18	A
	T_C = 100ºC		11.7	
Pulsed Drain Current[2]		$I_{D,pulse}$	72	A
Gate-Source Voltage		V_{GS}	±30	V
Single Pulse Avalanche Energy[3]		E_{AS}	929	mJ
MOSFET dv/dt Ruggedness, V_{DS} = 0...480V		dv/dt	5	V/ns
Power Dissipation For TO-220F		P_D	202	W
Power Dissipation For TO-220/3P/247			260	
Continuous Diode Forward Current		I_S	18	A
Diode Pulsed Current[2]		$I_{S,pulse}$	72	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55~+150	ºC
Thermal Resistance For TO-220F				
Thermal Resistance, Junction-to-Case		R_{thJC}	0.62	ºC/W
Thermal Resistance, Junction-to-Ambient		R_{thJA}	80	
Thermal Resistance For TO-220/3P/237				
Thermal Resistance, Junction-to-Case		R_{thJC}	0.48	ºC/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=10mH, ID=8.5A, Start TJ=25℃

Electrical Characteristics T_J = 25ºC, unless otherwise noted						
Parameter	**Symbol**	**Test Conditions**	**Value**			**Unit**
			Min.	**Typ.**	**Max.**	
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	500	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 500V V_{GS} = 0V, T_J = 25ºC	--	--	1	μA
		V_{DS} = 500V, V_{GS} = 0V, T_J = 150ºC	--	--	100	
Gate-Source Leakage Current	I_{GSS}	V_{GS} = ±30V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2	--	4	V
Drain-Source On-State-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 9A	--	0.26	0.31	Ω
Gate Resistance	R_G	f = 1.0MHz open drain	--	1.1	--	Ω
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V f = 1.0MHz	--	3345	--	pF
Output Capacitance	C_{oss}		--	190	--	
Reverse Transfer Capacitance	C_{rss}		--	6.8	--	
Total Gate Charge	Q_g	V_{DD} = 400V, I_D = 18A V_{GS} = 10V	--	65.5	--	nC
Gate-Source Charge	Q_{gs}		--	17.9	--	
Gate-Drain Charge	Q_{gd}		--	21.3	--	
Gate Plateau Voltage	$V_{Plateau}$		--	5.2	--	V
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 250V, I_D = 18A R_G = 25Ω, V_{GS} = 10V	--	60	--	ns
Turn-on Rise Time	t_r		--	135	--	
Turn-off Delay Time	$t_{d(off)}$		--	112	--	
Turn-off Fall Time	t_f		--	78	--	
Drain-Source Body Diode Characteristics						
Body Diode Forward Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 18A V_{GS} = 0V	--	--	1.2	V
Reverse Recovery Time	t_{rr}	V_R = 400V I_F = 18A, di_F/dt = 100A/μs	--	419	--	ns
Reverse Recovery Charge	Q_{rr}		--	7.1	--	μC

Typical Characteristics T_J = 25ºC, unless otherwise noted

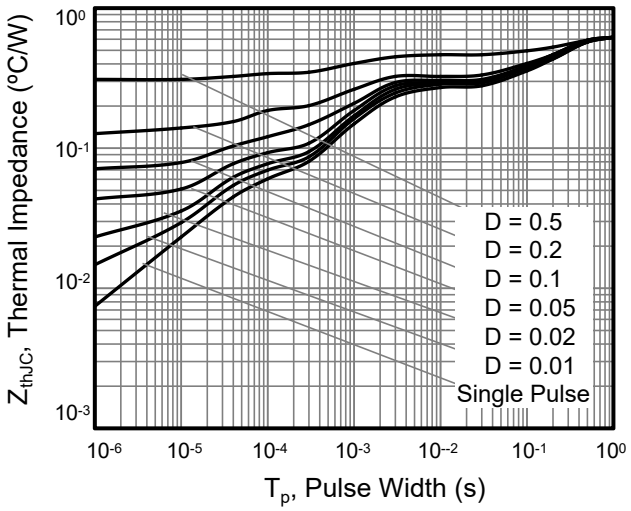


Figure 2. Transient Thermal Impedance For TO-220F

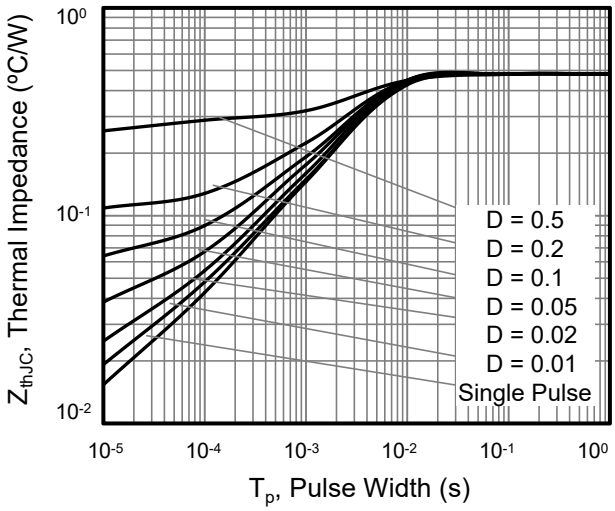


Figure 1. Transient Thermal Impedance For TO-220

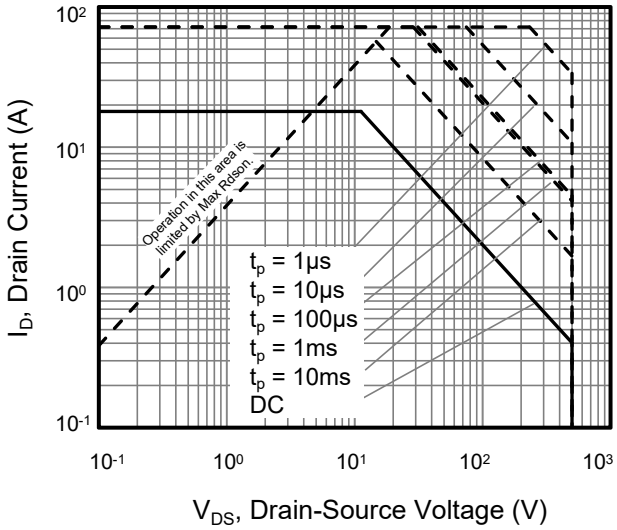


Figure 4. Safe Operation Area For TO-220F

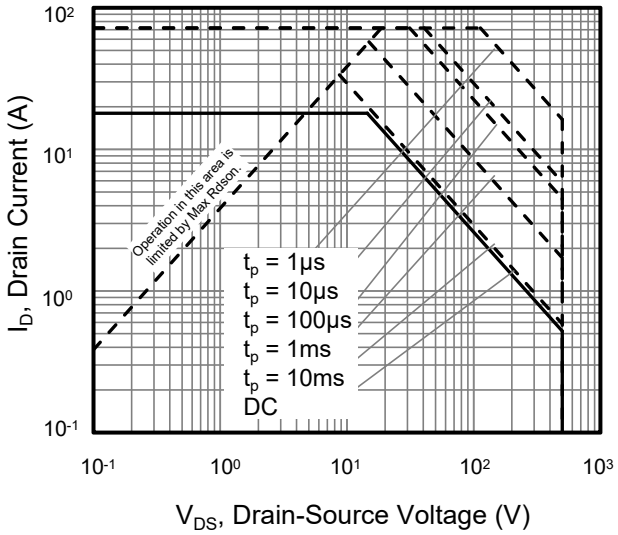


Figure 3. Safe Operation Area For TO-220

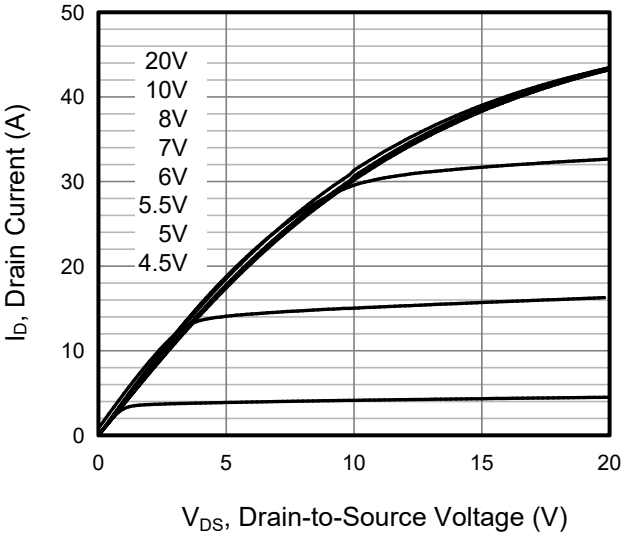


Figure 5. Output Characteristics

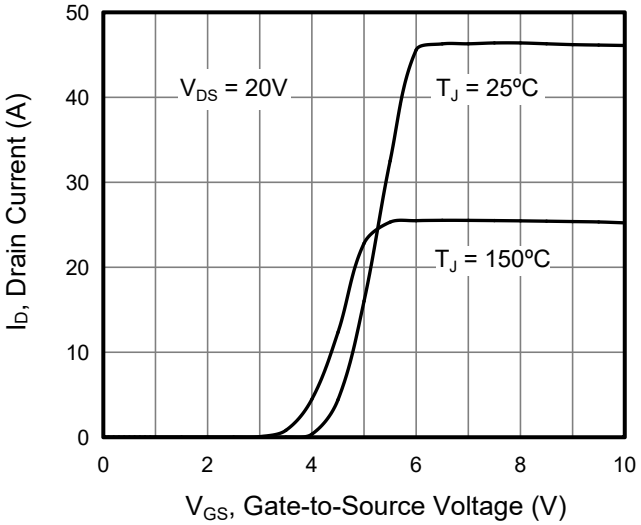


Figure 6. Transfer Characteristics

Typical Characteristics T_J = 25ºC, unless otherwise noted

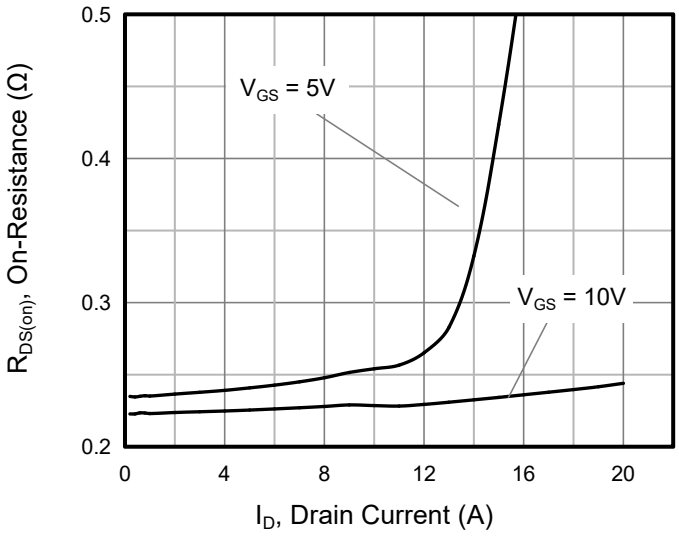


Figure 7. On-Resistance vs Drain Current

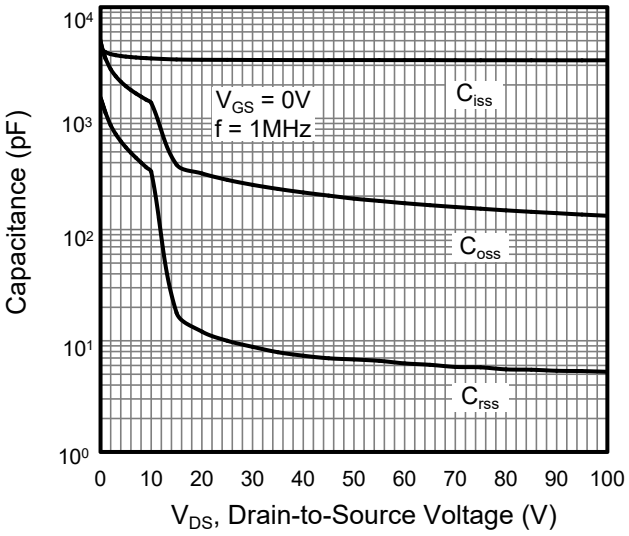


Figure 8. Capacitance

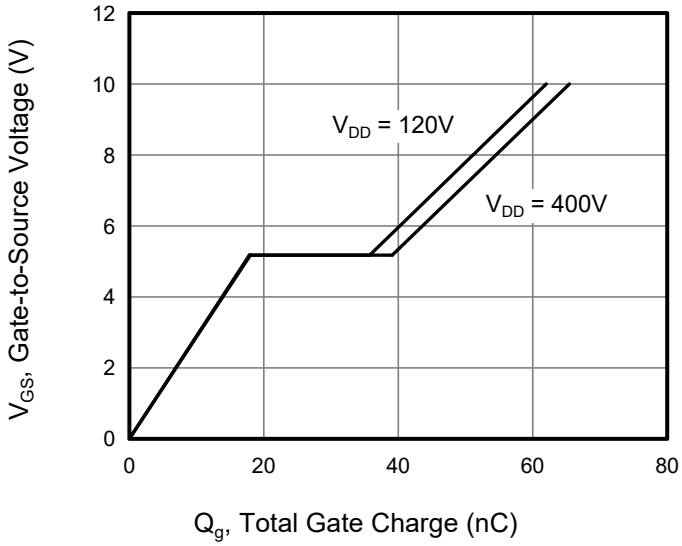


Figure 9. Gate Charge

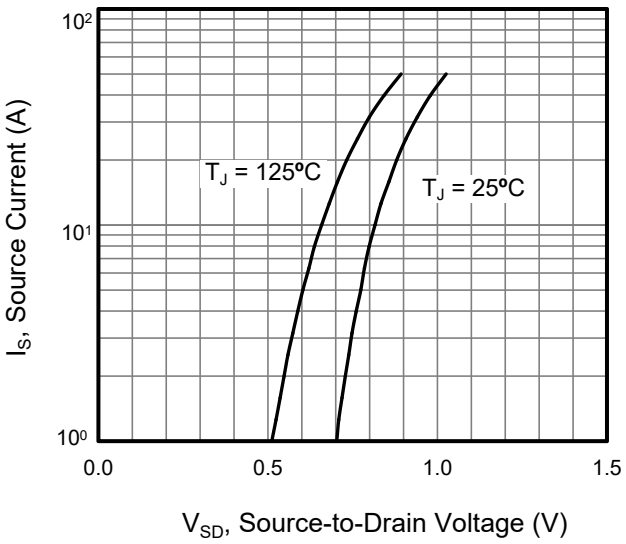


Figure 10. Body Diode Forward Voltage

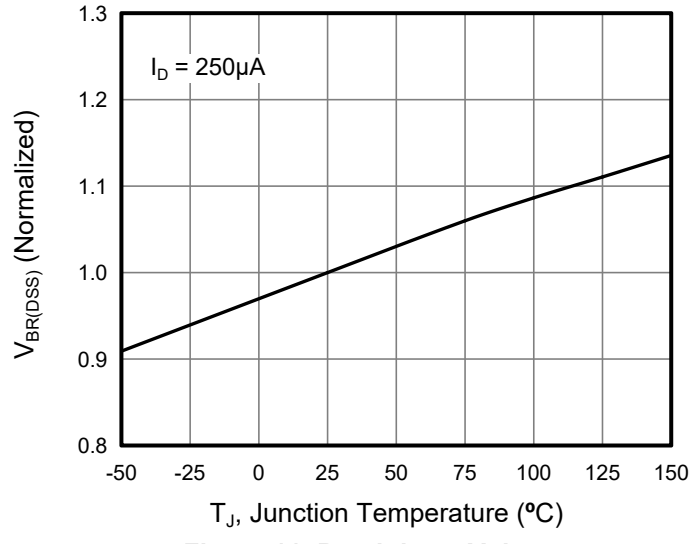


Figure 11. Breakdown Voltage vs Junction Temperature

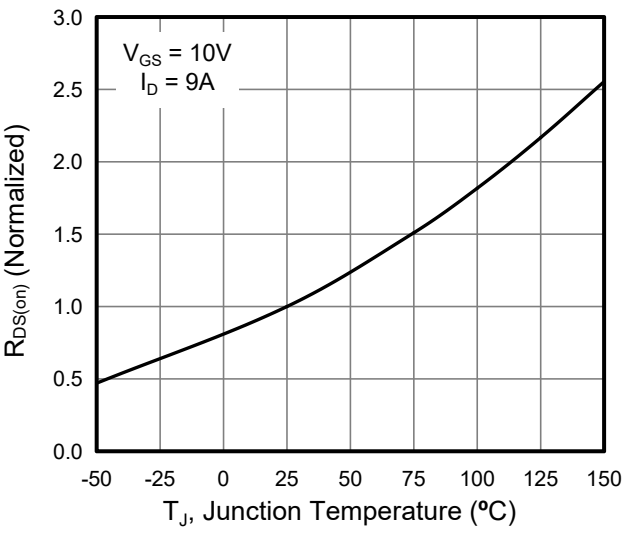


Figure 12. On-Resistance vs Temperature

Figure A：Gate Charge Test Circuit and Waveform

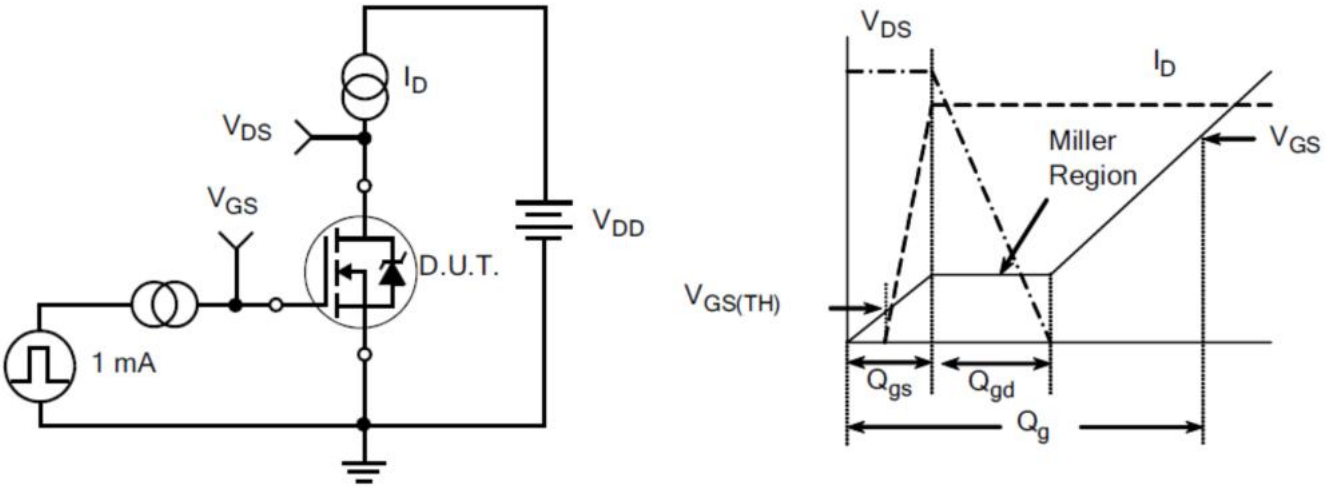


Figure B：Resistive Switching Test Circuit and Waveform

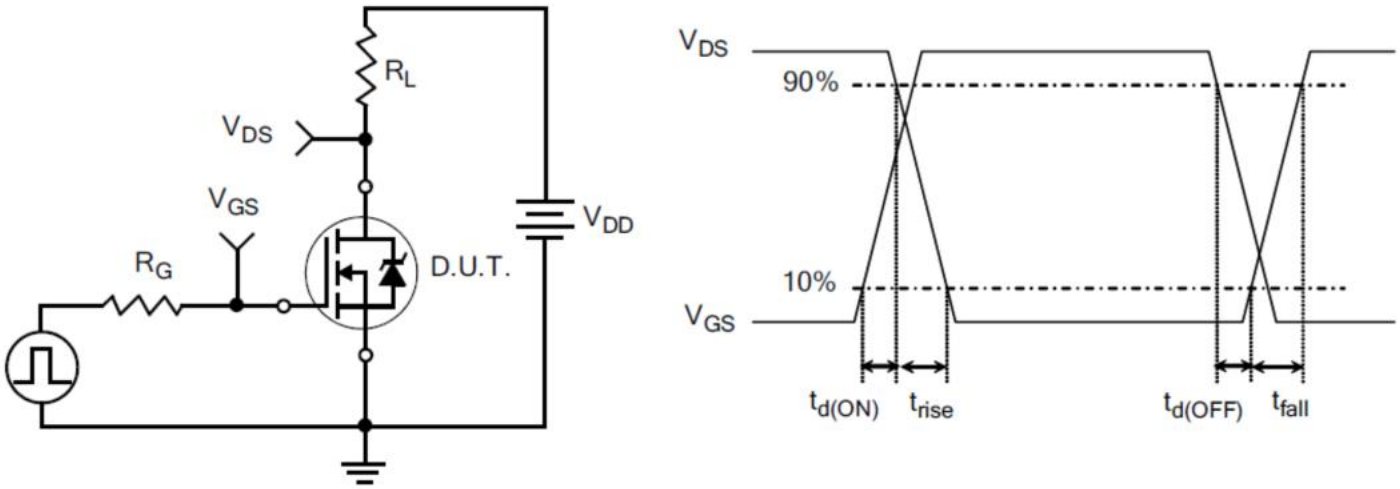
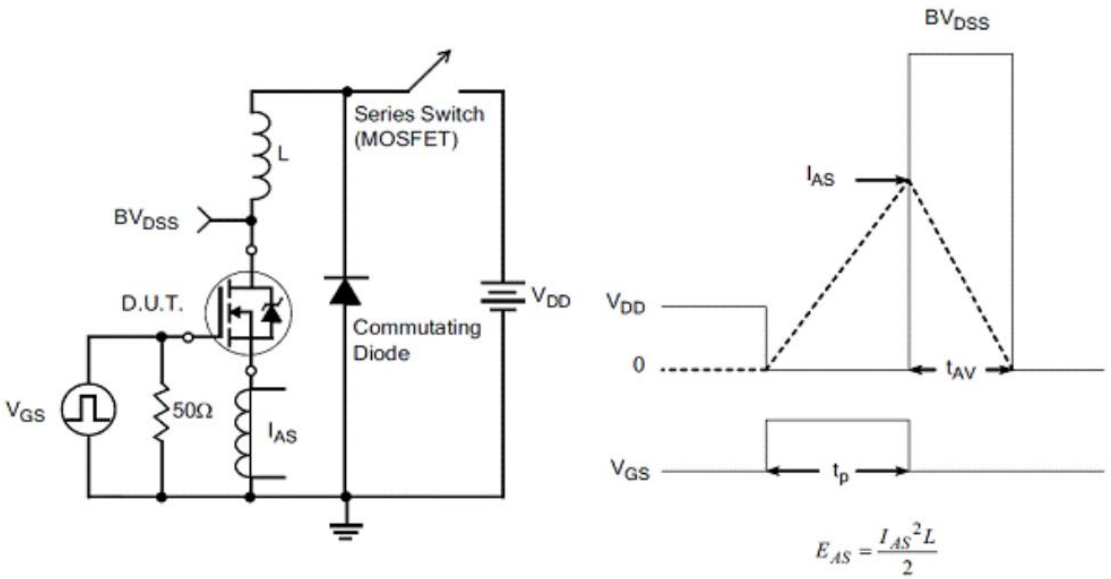
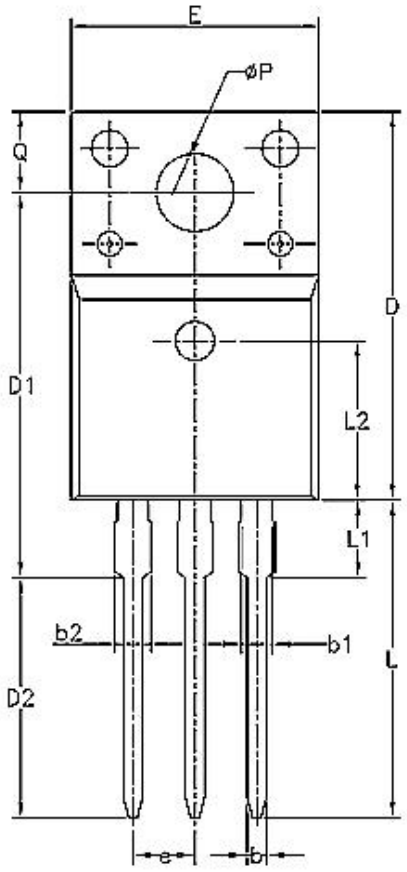
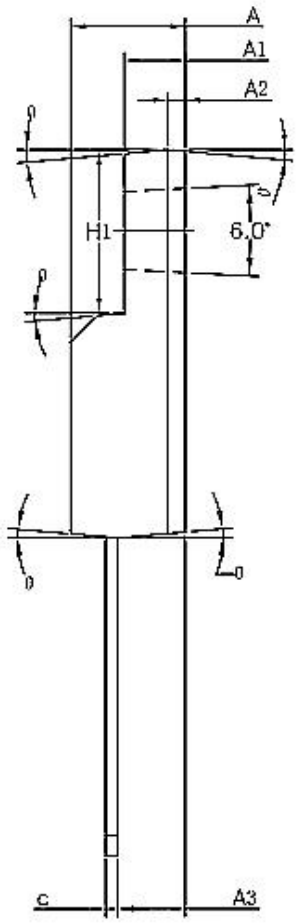


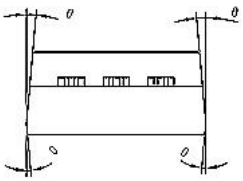
Figure C：Unclamped Inductive Switching Test Circuit and Waveform



Outlines TO-220F Package



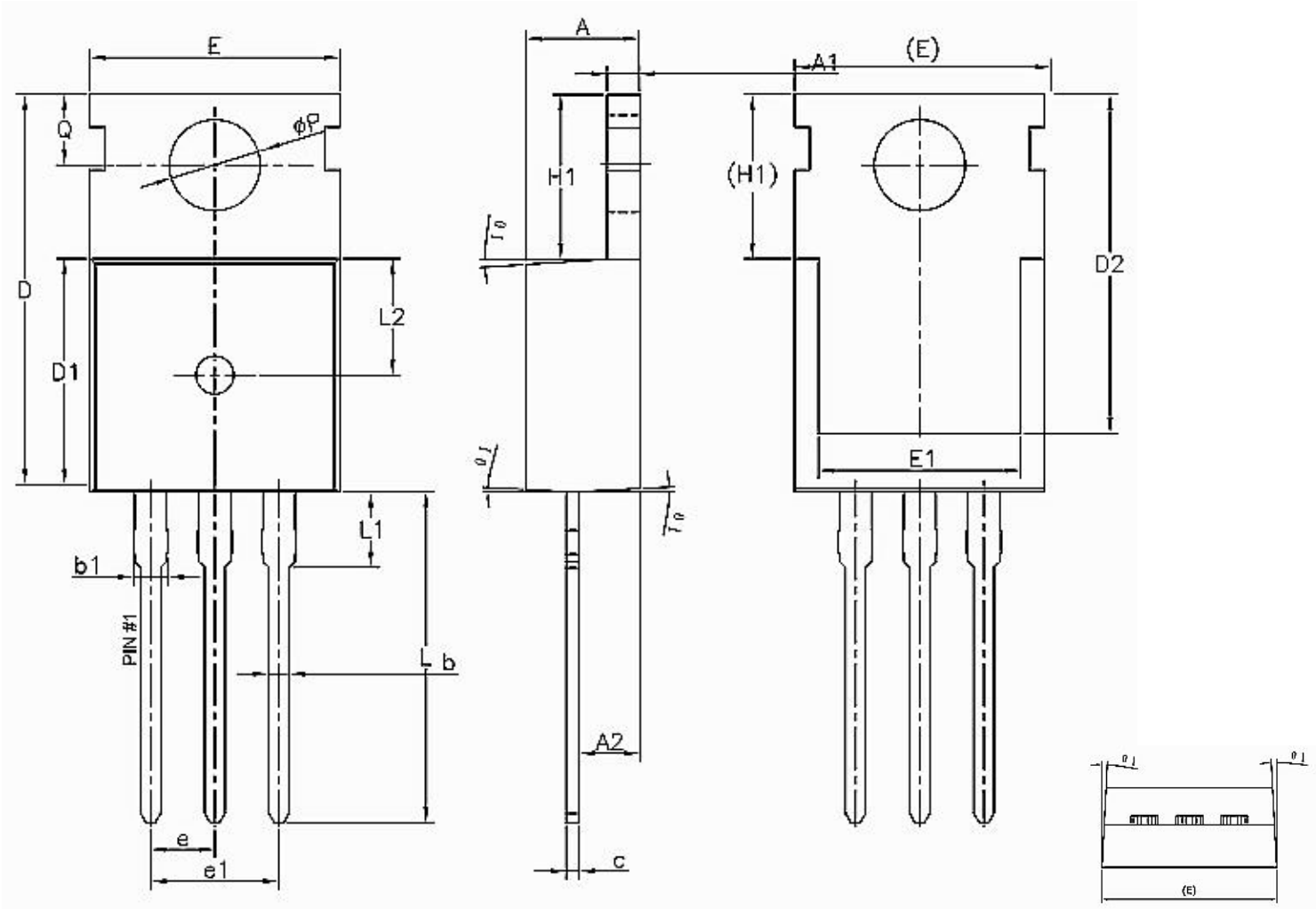




Unit:mm			
Symbol	**Min.**	**Nom**	**Max.**
A	4.50	4.70	4.83
A1	2.34	2.54	2.74
A2	0.70 REF		
A3	2.56	2.76	2.93
b	0.70	---	0.90
b1	1.18	---	1.38
b2	---	---	1.47
c	0.45	0.50	0.60
D	15.67	15.87	16.07
D1	15.55	15.75	15.95

Unit:mm			
Symbol	**Min.**	**Nom**	**Max.**
D2	9.60	9.80	10.0
E	9.96	10.16	10.36
e	2.54 BSC		
H1	6.48	6.68	6.88
L	12.68	12.98	13.28
L1	---	---	3.50
L2	6.50 REF		
ΦP	3.08	3.18	3.28
Q	3.20	---	3.40
θ1	1°	3°	5°

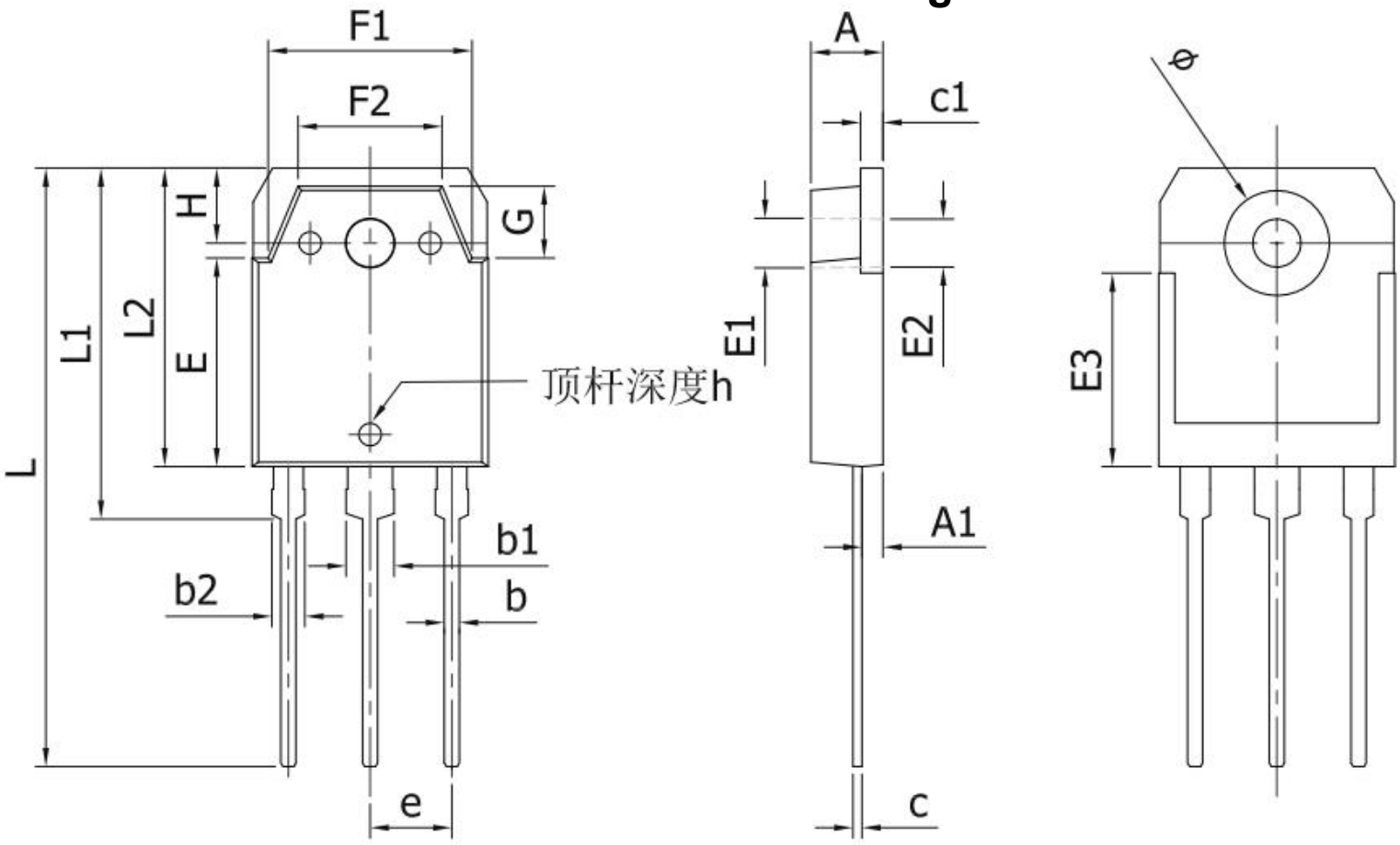
Outlines TO-220 Package

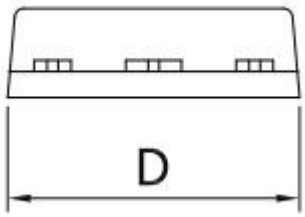


Unit:mm			
Symbol	**Min.**	**Nom**	**Max.**
A	4.40	4.50	4.60
A1	1.27	1.30	1.33
A2	2.30	2.40	2.50
b	0.70	---	0.90
b2	1.27	---	1.40
c	0.45	0.50	0.60
D	15.30	15.70	16.10
D1	9.10	9.20	9.30
D2	13.10	---	13.70
E	9.70	9.90	10.20

Unit:mm			
Symbol	**Min.**	**Nom**	**Max.**
E1	7.80	8.00	8.20
e	2.54 BSC		
e1	5.08 BSC		
H1	6.30	6.50	6.70
L	12.78	13.08	13.38
L1	---	---	3.50
L2	4.60 REF		
ΦP	3.55	3.60	3.65
Q	2.73	---	2.87
θ1	1°	3°	5°

Outlines TO-3P Package

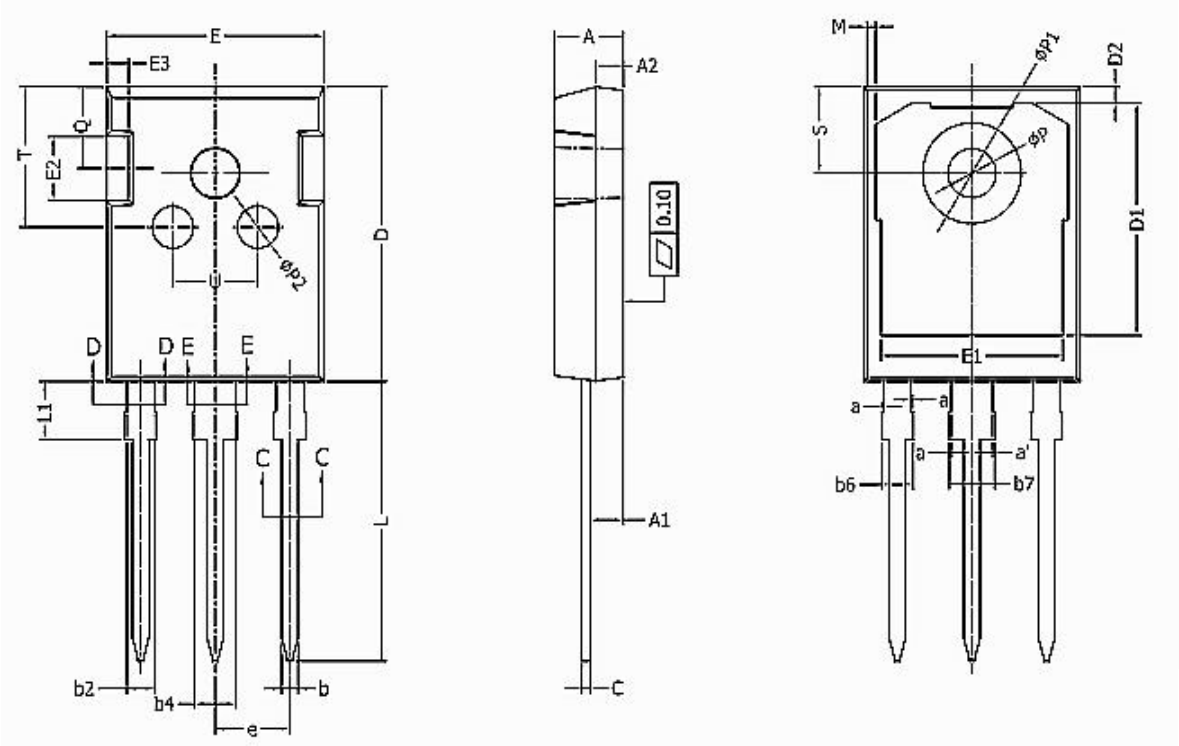


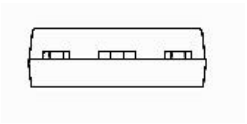


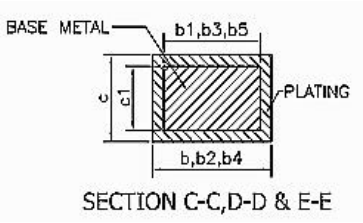
SYMBOL	MIN	NOM	MAX
A	4.6	4.8	5.0
A1	1.2	1.4	1.6
b	0.8	1	1.2
b1	2.8	3	3.2
b2	1.8	2	2.2
c	0.5	0.6	0.7
c1	1.45	1.55	1.65
D	15.45	15.65	15.85
E	13.7	13.9	14.1
E1	3.3REF		
E2	3.2REF		

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

Disclaimer

Brunei has madereasonable commercial efforts to ensure that the information given in this datasheet is correct. However, it must clearly be understood that such information is for guidance only and does not constitute any representation or form part of any offer or contract.

For documents and material available from this datasheet,Bruneidoes not warrant or assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, product, technology or process disclosed hereunder.

Bruneireserves the rights to at its own discretion to make any changes or improvements to this datasheet. Unless said datasheet is incorporated into the formal contract, any customer should not rely on the information as any specification or product parameters duly committed by Brunei Customers are hereby advised to verify that the information contained herein is current and complete before the entering of any contract or acknowledgement of any purchase order. Accordingly, all products specified hereunder shall be sold subject to Brunėi s terms and conditions supplied at the time of order acknowledgement. Except where agreed upon by contractual agreement, testing of all parameters of each product is not necessarily performed.

Brunei does not warrant or convey any license either expressed or implied under its patent rights, nor the rights of others. Reproduction of information contained herein shall be only permissible if such reproduction is without any modification or alteration. Reproduction of this information with any alteration is an unfair and deceptive business practice. Brunei is not responsible or liable for such altered documentation.

Resale of Brunėi s products with statements different from or beyond the parameters stated by Brunei for that product or service voids all express or implied warrantees for the associated Brunėi s product or service and is unfair and deceptive business practice. Brunei is not responsible or liable for any such statements.

Brunėi s products are not authorized for use as critical components in life support devices or systems without the express written approval of Brunei. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.