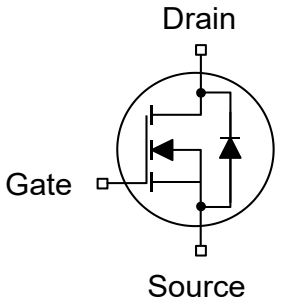
WLP10N20

200V N-Channel MOSFET

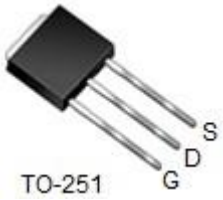
FEATURES

- Fast switching
- 100% avalanche tested
- Improved dv/dt capability



APPLICATIONS

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



Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter	Symbol	Value				Unit
		TO-220F	TO-220	TO-251	TO-252	
Drain-Source Voltage (V_{GS} = 0V)	V_{DSS}	200				V
Continuous Drain Current	I_D	9				A
Pulsed Drain Current (note1)	I_{DM}	36				A
Gate-Source Voltage	V_{GSS}	±20				V
Single Pulse Avalanche Energy (note2)	E_{AS}	115				mJ
Avalanche Current (note1)	I_{AS}	5				A
Repetitive Avalanche Energy (note1)	E_{AR}	69				mJ
Power Dissipation (T_C = 25ºC)	P_D	34	74			W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+150				ºC

Thermal Resistance

Parameter	Symbol	Value				Unit
		TO-220F	TO-220	TO-251	TO-252	
Thermal Resistance, Junction-to-Case	R_{thJC}	3.65	1.7			K/W
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62.5	60			

Specifications T_J = 25ºC, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	200	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 200V, V_{GS} = 0V, T_J = 25ºC	--	--	1	μA
Gate-Source Leakage	I_{GSS}	VGS = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, V_{DS} = 250μA	2.0	--	4.0	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	V_{GS} = 10V, I_D = 4.5A	--	0.25	0.3	Ω
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1.0MHz	--	605	--	pF
Output Capacitance	C_{oss}		--	87	--	
Reverse Transfer Capacitance	C_{rss}		--	37	--	
Total Gate Charge	Q_g	V_{DD} = 160V, I_D = 9A, V_{GS} = 10V	--	19	--	nC
Gate-Source Charge	Q_{gs}		--	3	--	
Gate-Drain Charge	Q_{gd}		--	8	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} =100V, I_D =9A, R_G = 25 Ω	--	35	--	ns
Turn-on Rise Time	t_r		--	7	--	
Turn-off Delay Time	$t_{d(off)}$		--	98	--	
Turn-off Fall Time	t_f		--	32	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25 ºC	--	--	9	A
Pulsed Diode Forward Current	I_{SM}		--	--	36	
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 4.5A, V_{GS} = 0V	--	--	1.4	V
Reverse Recovery Time	t_{rr}	V_{GS} = 0V,I_S = 9A, di_F/dt =100A /μs	--	145	--	ns
Reverse Recovery Charge	Q_{rr}		--	0.82	--	μC

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. L=10mH, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25 ºC
3. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics (T_J= 25ºC)

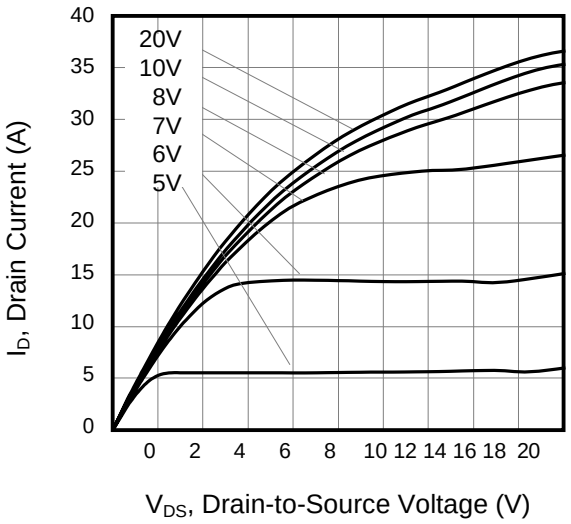


Figure 2. Body Diode Forward Voltage

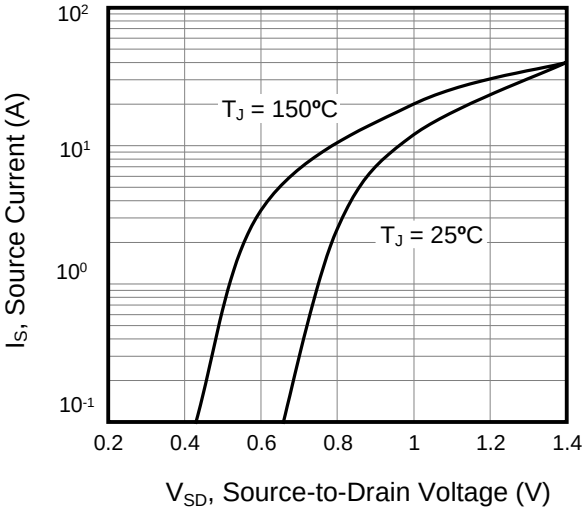


Figure 3. Drain Current vs. Temperature

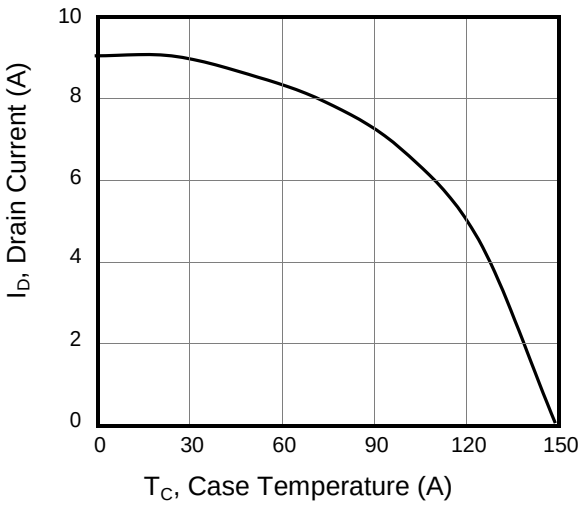


Figure 4. BV_{DSS} Variation vs. Temperature

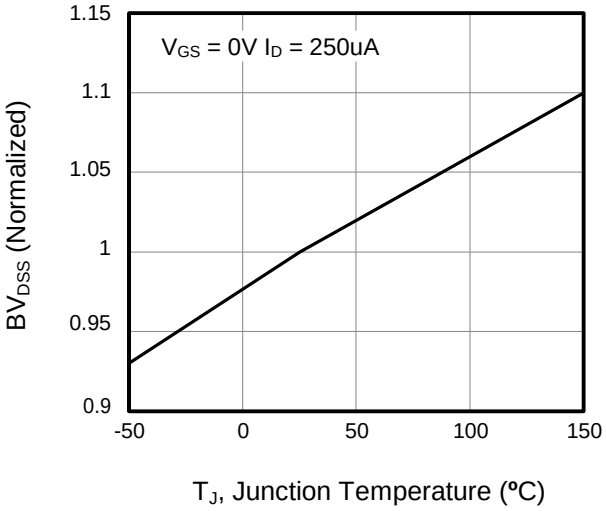


Figure 5. Transfer Characteristics

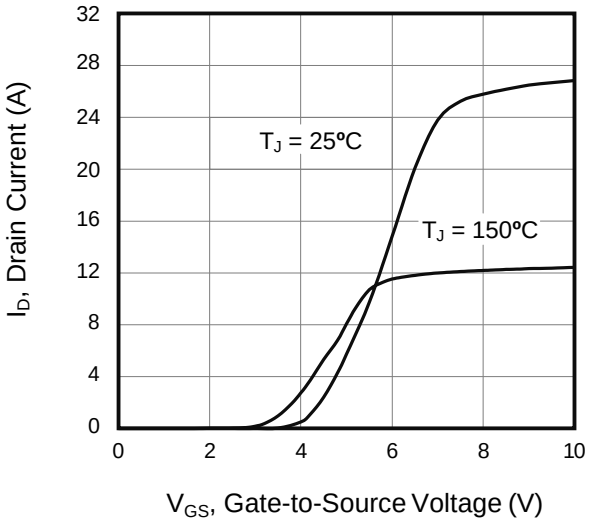
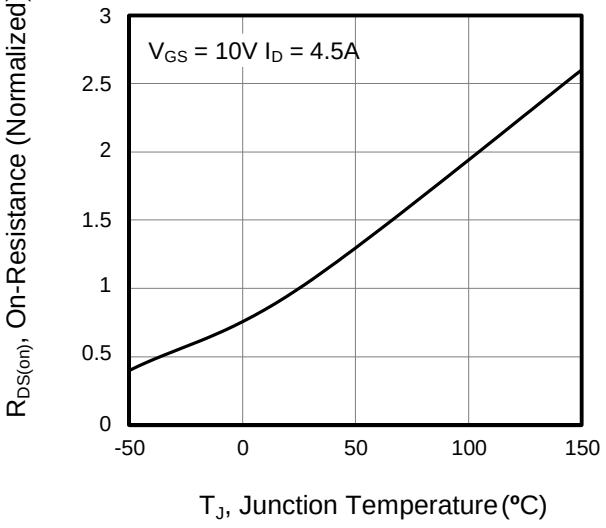


Figure 6. On-Resistance vs. Temperature



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. Capacitance

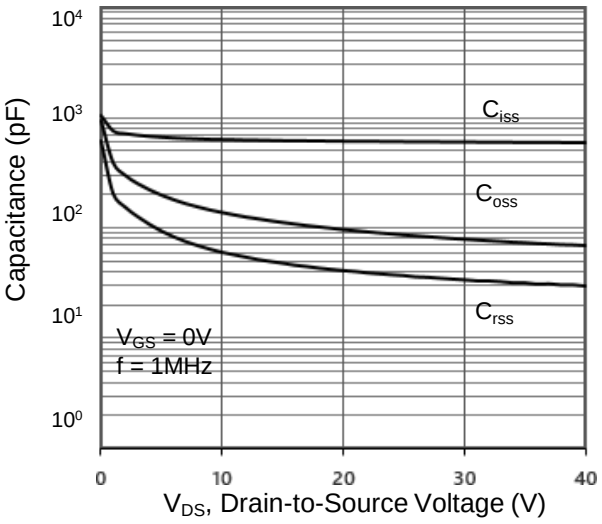


Figure 8. Gate Charge

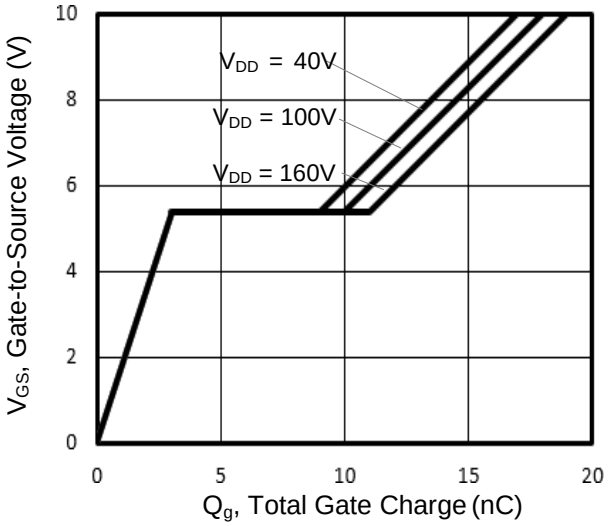


Figure 9. Transient Thermal Impedance TO-220F

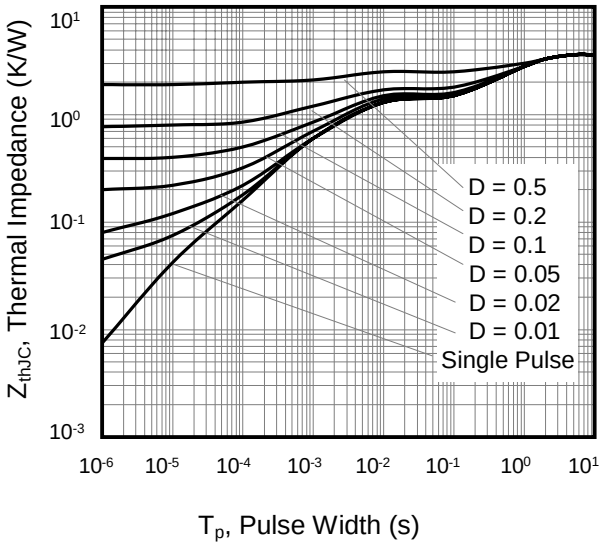


Figure 10. Transient Thermal Impedance TO-251,TO-252

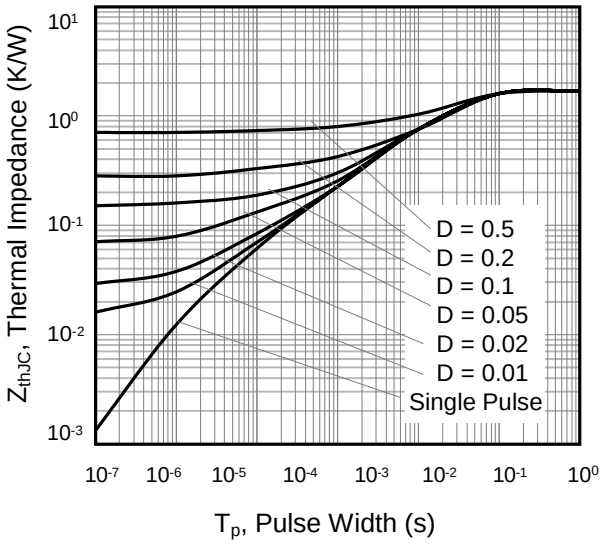


Figure A：Gate Charge Test Circuit and Waveform

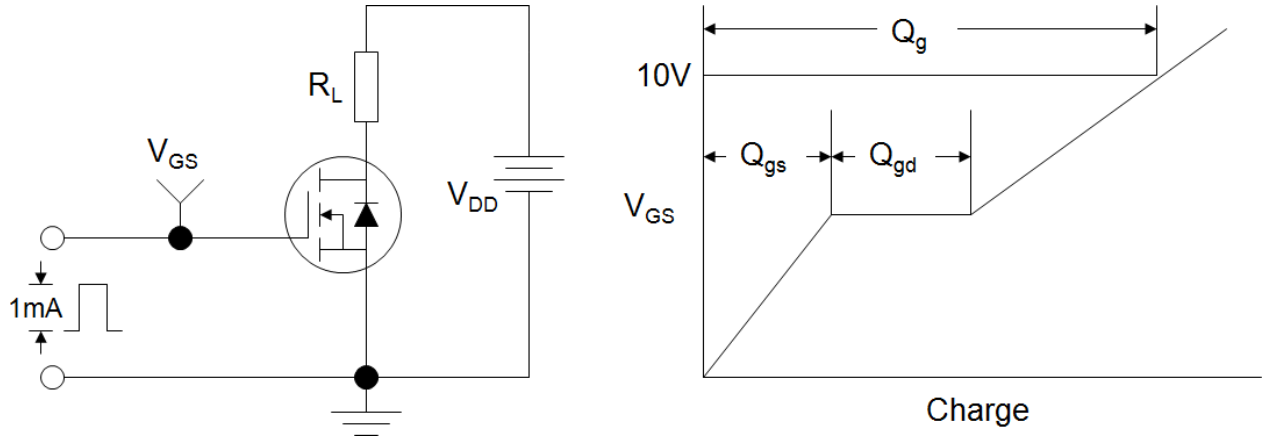


Figure B：Resistive Switching Test Circuit and Waveform

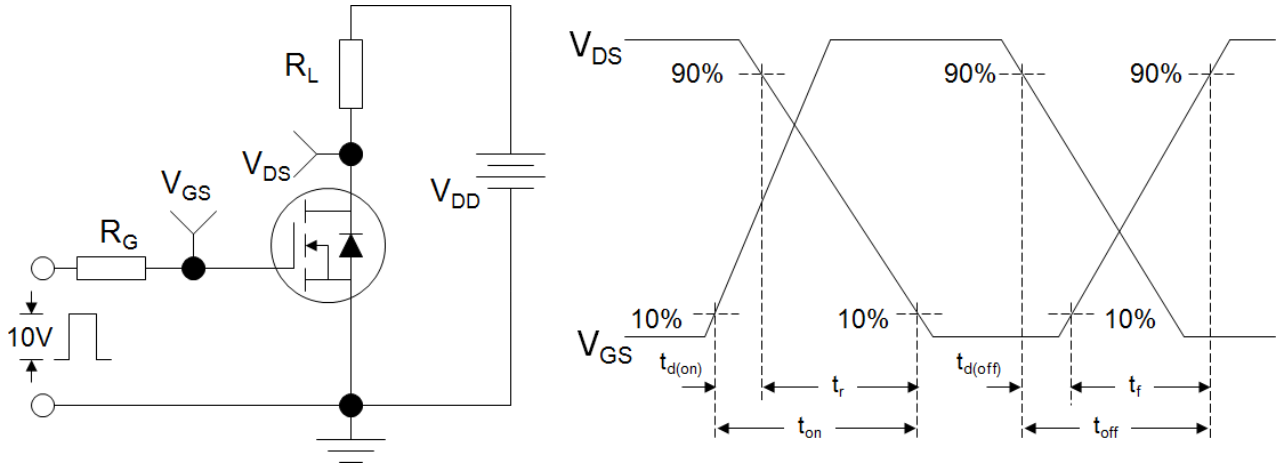
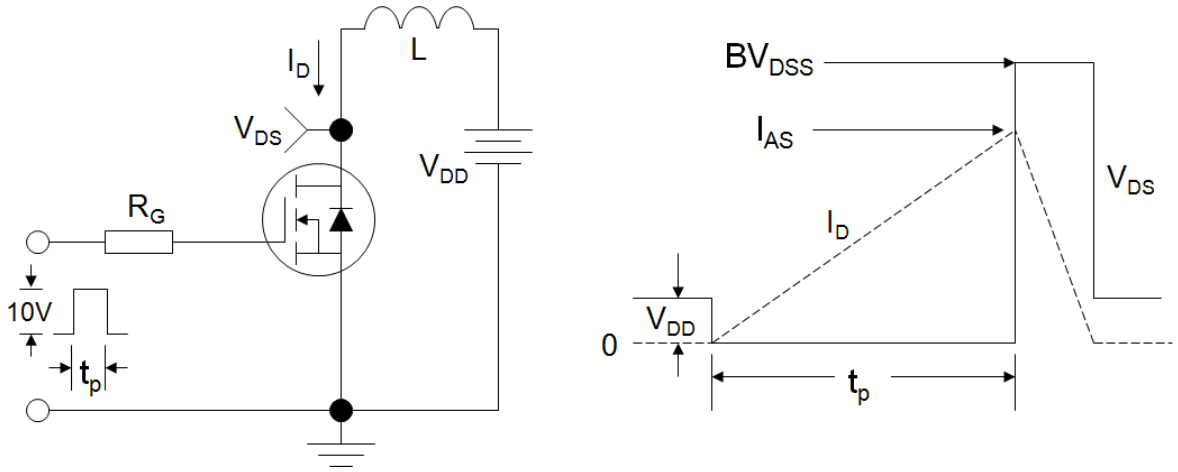
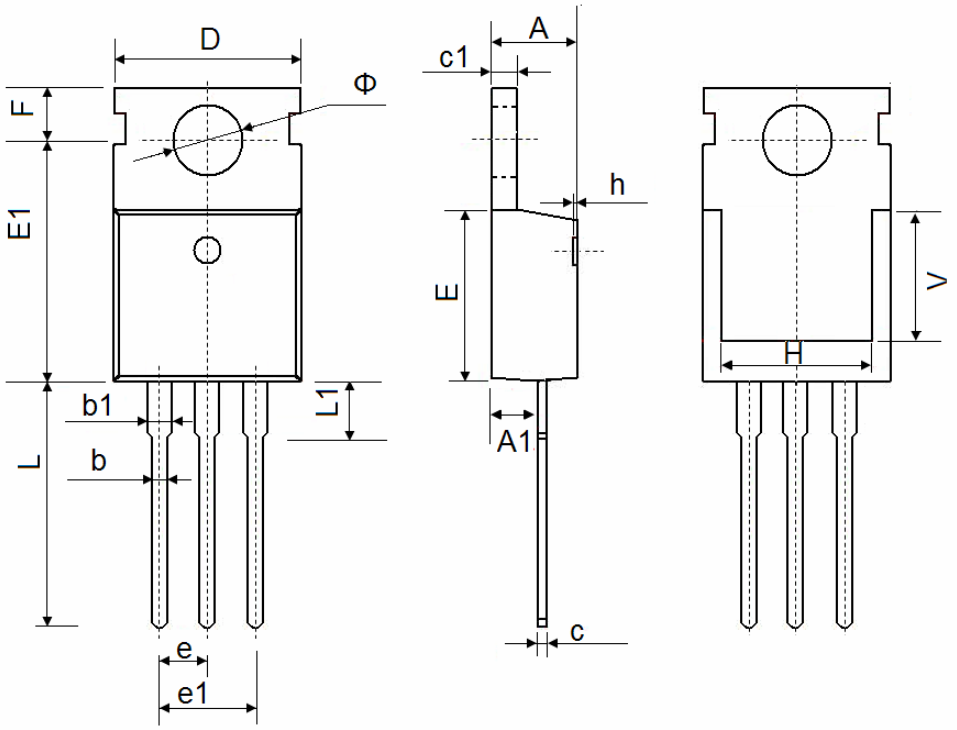


Figure C：Unclamped Inductive Switching Test Circuit and Waveform

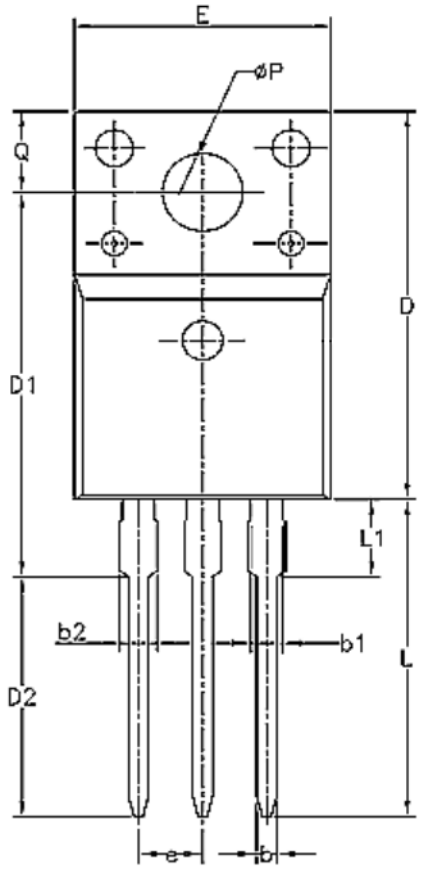


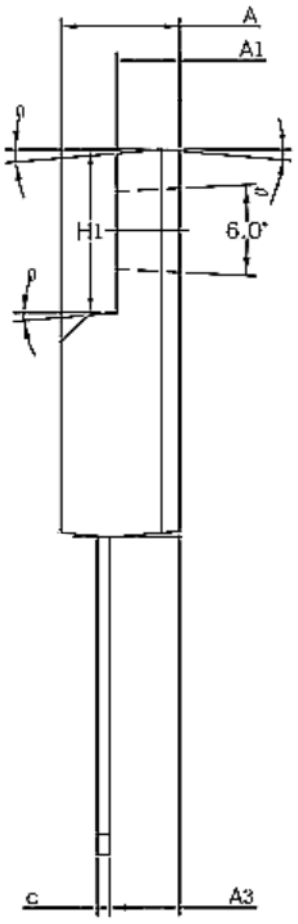
TO-220-3L Package Information

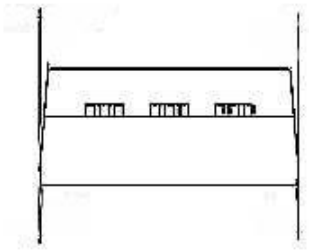


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.9500	9.750	0.352	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	6.900 REF.		0.276 REF.	
Φ	3.400	3.800	0.134	0.150

Outlines TO-220F Package

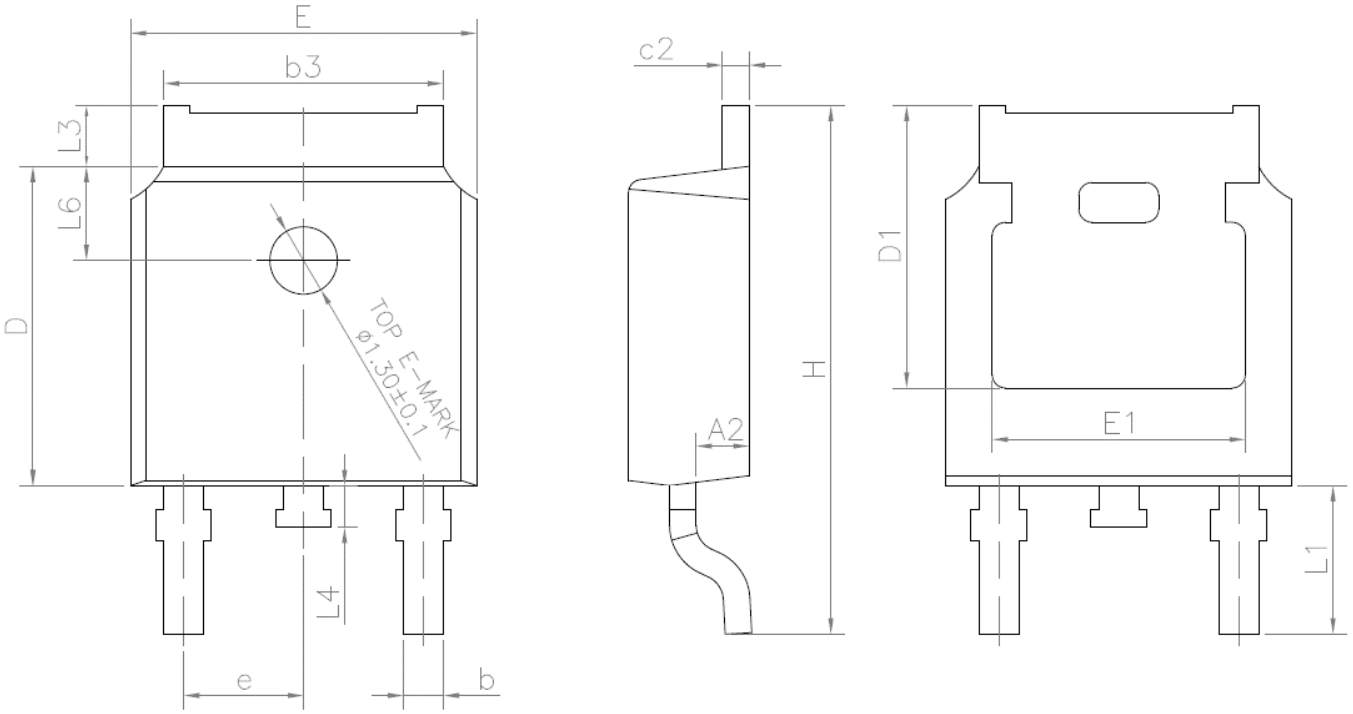


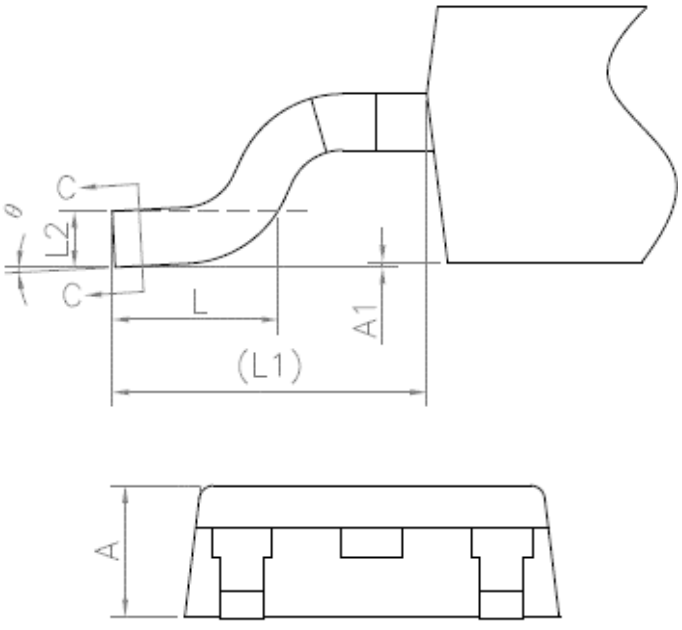




SYMBOL	MIN	NOM	MAX
A	4.5	4.7	4.9
A1	2.34	2.54	2.74
A3	2.56	2.76	2.96
b	0.7	---	0.95
b1	1.18	---	1.43
b2	---	---	1.55
c	0.4	0.5	0.65
D	15.57	15.87	16.17
D1	15.35	15.675	15.95
D2	9.6	9.875	10.15
E	9.96	10.16	10.36
e	2.54 BSC		
H1	6.48	6.68	6.88
L	12.68	12.98	13.28
L1	---	---	3.5

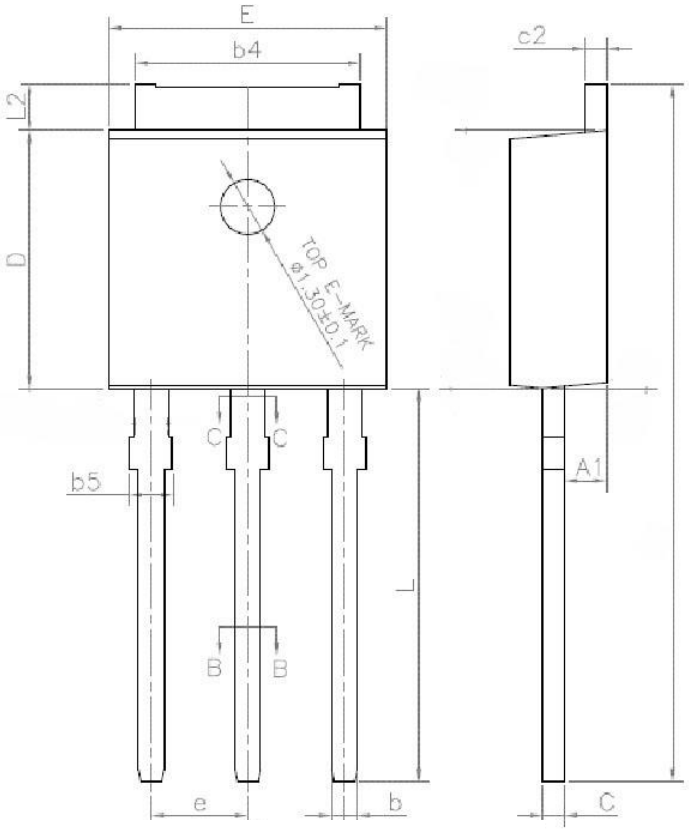
Outlines TO-252 Package

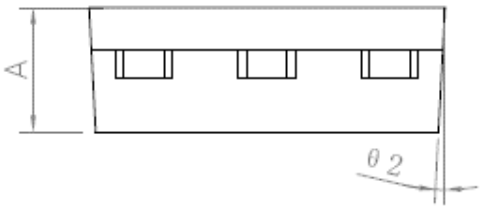


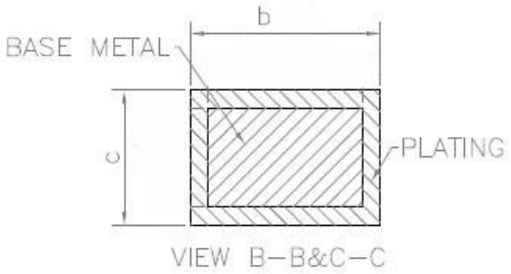


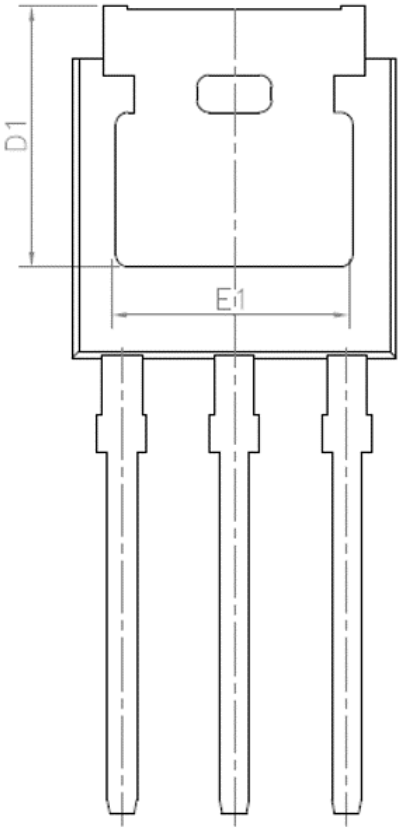
SYMBOL	MIN	NOM	MAX
A	2.2	2.3	2.4
A1	0	--	0.2
A2	0.9	1.035	1.17
b	0.645	--	0.9
b3	5.13	5.326	5.46
c	0.43	--	0.61
c2	0.41	--	0.61
D	5.98	6.1	6.22
D1	5.244	--	--
E	6.4	6.6	6.73
E1	4.63	--	--
e	2.186	2.286	2.386
H	9.4	10.04	10.5
L	1.38	1.5	1.75
L1	2.6	2.872	3
L2	0.5	0.509	0.52
L3	0.88	--	1.28
L4	0.5	--	1
L6	1.5	1.7	1.95
θ	0°	--	10°

Outlines TO-251 Package









SYMBOL	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0.90	1.04	1.17
b	0.56	--	0.90
b4	5.20	5.33	5.46
b5	--	--	1.05
c	0.43	--	0.61
c2	0.43	--	0.61
D	5.98	6.10	6.22
D1	5.2	--	--
E	6.40	6.60	6.73
E1	4.60	--	--
e	2.24	2.29	2.34
e1	4.47	4.57	4.67
H	16.18	16.50	16.82
L	9	9.35	9.65
L2	0.88	1.05	1.28

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