
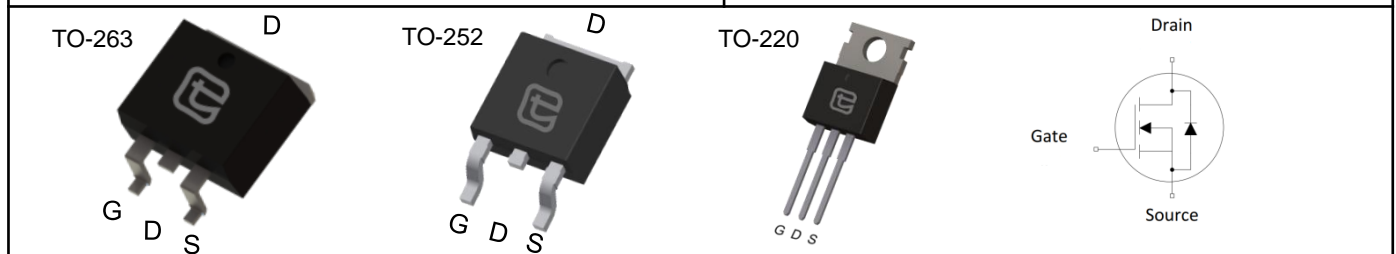




68V N-Channel Trench MOSFET

<p>Features</p> <ul style="list-style-type: none"> ● Trench Power Technology ● Low $R_{DS(ON)}$ ● Low Gate Charge ● Optimized for Fast-switching Applications <p>Applications</p> <ul style="list-style-type: none"> ● Synchronous Rectification in DC/DC and AC/DC Converters ● Isolated DC/DC Converters in Telecom and Industrial 	<p>Product Summary</p> <p>V_{DS} 68V</p> <p>$R_{DS(ON)}$ (at $V_{GS}=10V$) < 7.5mΩ</p> <p>I_D (at $V_{GS}=10V$) 95A</p> <p>100% UIS Tested</p> 
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Device	Package	Marking
TTB95N68A	TO-263	95N68A
TTD95N68A	TO-252	95N68A
TTP95N68A	TO-220	95N68A

Absolute Maximum Ratings $T_C = 25^\circ C$, unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage ($V_{GS} = 0V$)	V_{DSS}	68	V
Continuous Drain Current	I_D	$T_C = 25^\circ C$	95
		$T_C = 100^\circ C$	66
Pulsed Drain Current (note1)	I_{DM}	380	A
Gate-Source Voltage	V_{GSS}	± 20	V
Single Pulse Avalanche Energy (note2)	E_{AS}	380	mJ
Avalanche Current	I_{AS}	37	A
Power Dissipation (note3)	P_D	$T_C = 25^\circ C$	130.5
		$T_C = 100^\circ C$	65.5
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+175	$^\circ C$

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	R_{thJC}	1.15	$^\circ C/W$
Thermal Resistance, Junction-to-Ambient	R_{thJA}	65	



Specifications $T_J = 25^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	68	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 68V, V_{GS} = 0V, T_J = 25^\circ\text{C}$	--	--	1	μA
		$V_{DS} = 68V, V_{GS} = 0V, T_J = 100^\circ\text{C}$	--	--	25	
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 20V$	--	--	± 100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	3	4	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 30A$	--	6.5	7.5	m Ω
Forward Transconductance	g_{fs}	$V_{DS} = 5V, I_D = 20A$	20	--	--	S
Dynamic						
Input Capacitance	C_{iss}	$V_{GS} = 0V,$ $V_{DS} = 30V,$ $f = 1.0\text{MHz}$	--	4169	--	pF
Output Capacitance	C_{oss}		--	274	--	
Reverse Transfer Capacitance	C_{rss}		--	222	--	
Total Gate Charge	Q_g	$V_{DD} = 30V, I_D = 20A,$ $V_{GS} = 10V$	--	70	--	nC
Gate-Source Charge	Q_{gs}		--	20	--	
Gate-Drain Charge	Q_{gd}		--	18	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 30V, I_D = 30A,$ $R_G = 2.5\Omega$	--	15	--	ns
Turn-on Rise Time	t_r		--	94	--	
Turn-off Delay Time	$t_{d(off)}$		--	46	--	
Turn-off Fall Time	t_f		--	32	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	$T_C = 25^\circ\text{C}$	--	--	95	A
Pulsed Diode Forward Current	I_{SM}		--	--	380	
Body Diode Voltage	V_{SD}	$T_J = 25^\circ\text{C}, I_{SD} = 20A, V_{GS} = 0V$	--	--	1.2	V
Reverse Recovery Time	t_{rr}	$I_F = 20A,$ $di_F/dt = 100A/\mu s$	--	78	--	ns
Reverse Recovery Charge	Q_{rr}		--	51	--	nC

Notes

1. Repetitive Rating: Pulse Width limited by maximum junction temperature
2. $I_{AS} = 37A, V_{DD} = 50V, R_G = 25\Omega, \text{Starting } T_J = 25^\circ\text{C}$
3. The power dissipation PD is based on $T_J(\text{MAX})=175^\circ\text{C}$, using junction-to-case thermal resistance.



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

Figure 1. Output Characteristics

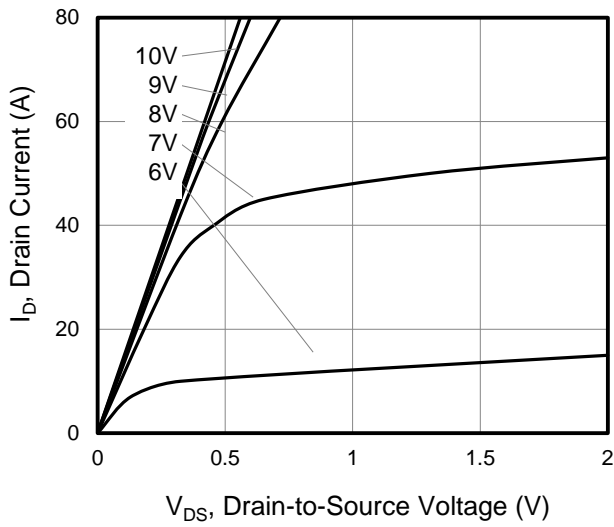


Figure 2. Transfer Characteristics

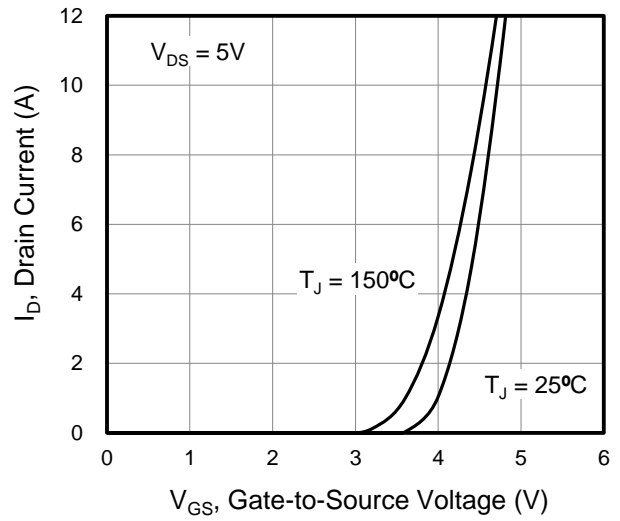


Figure 3. On-Resistance vs. Drain Current

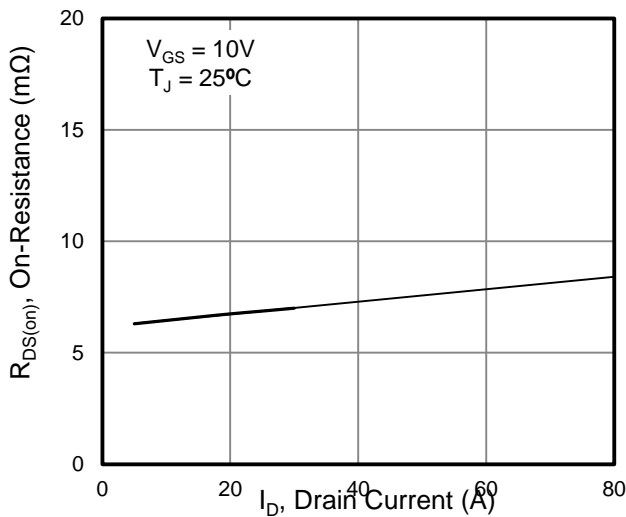


Figure 4. Capacitance

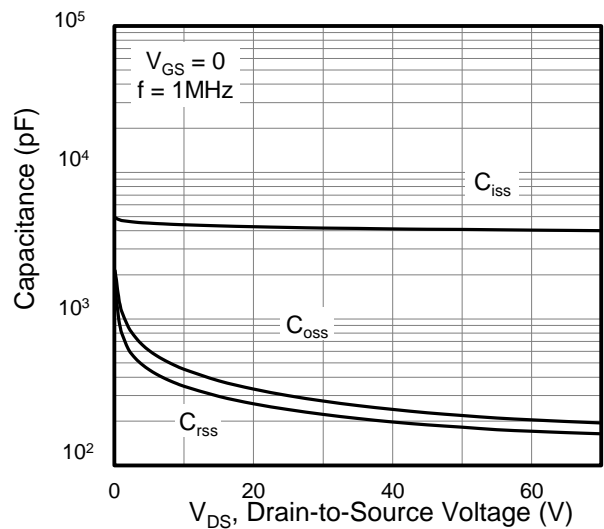


Figure 5. Gate Charge

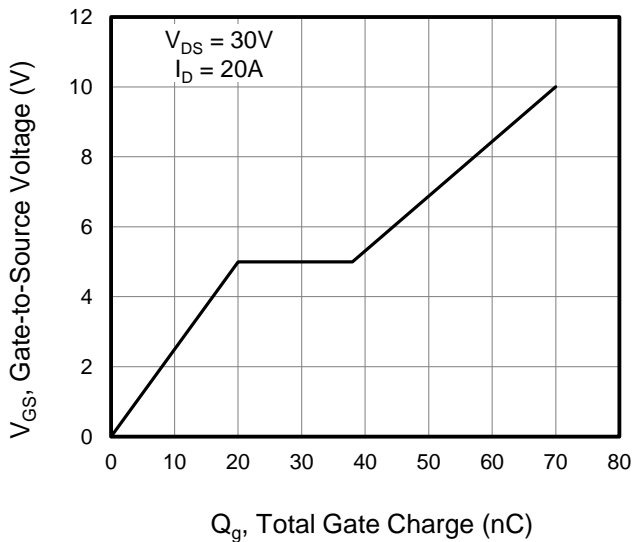
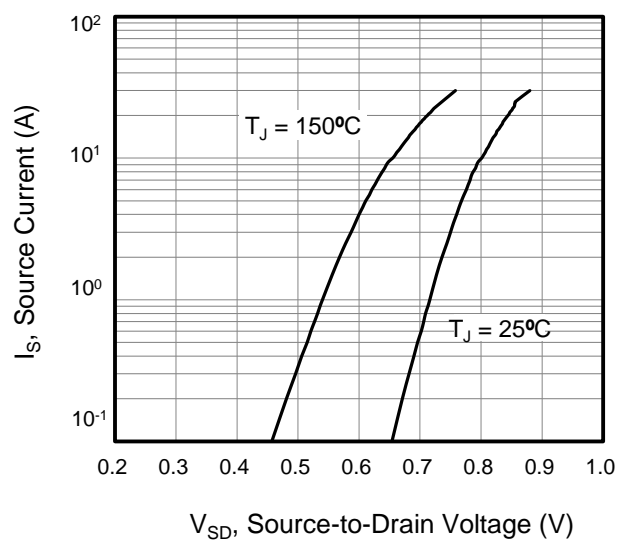


Figure 6. Body Diode Forward Voltage





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

Figure 7. On-Resistance vs. Temperature

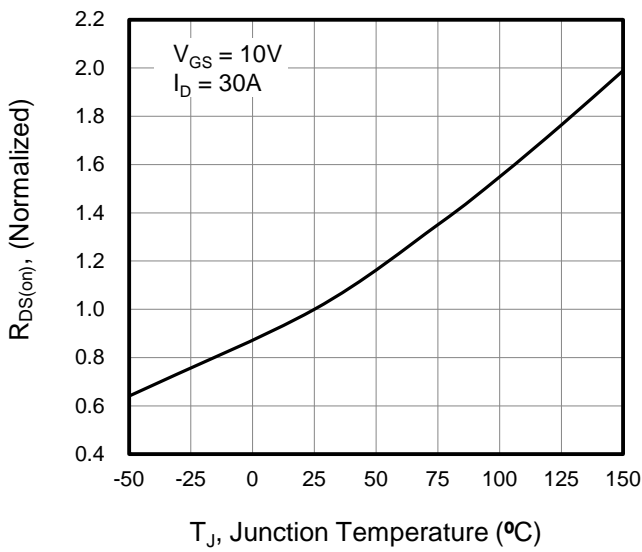


Figure 8. Threshold Voltage vs. Temperature

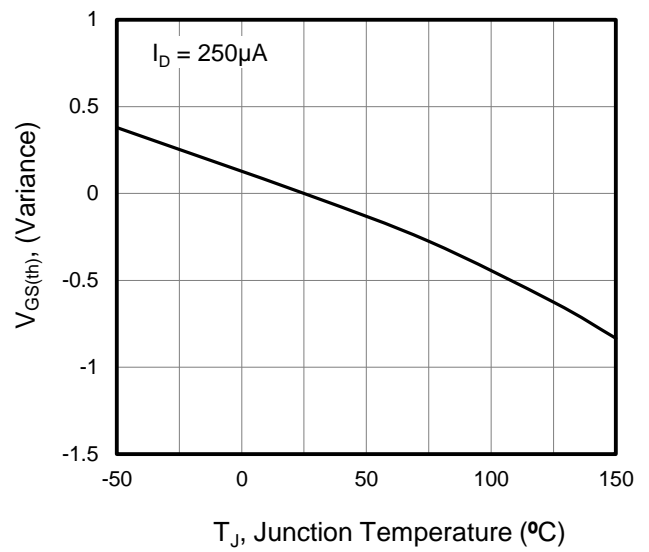


Figure 9. Transient Thermal Impedance

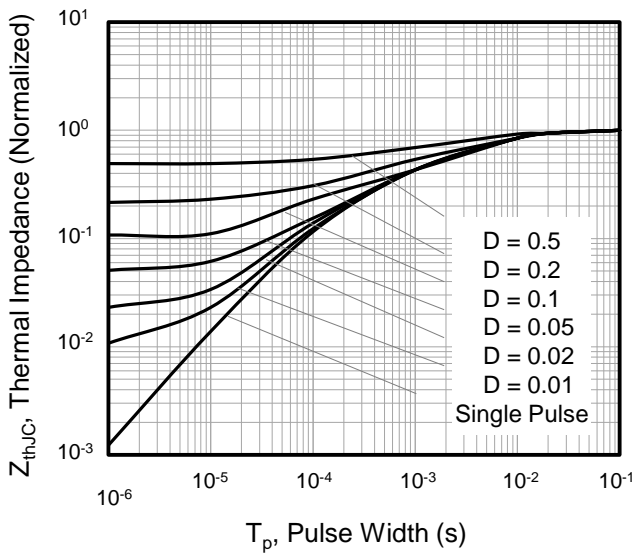


Figure 10. Safe operation area

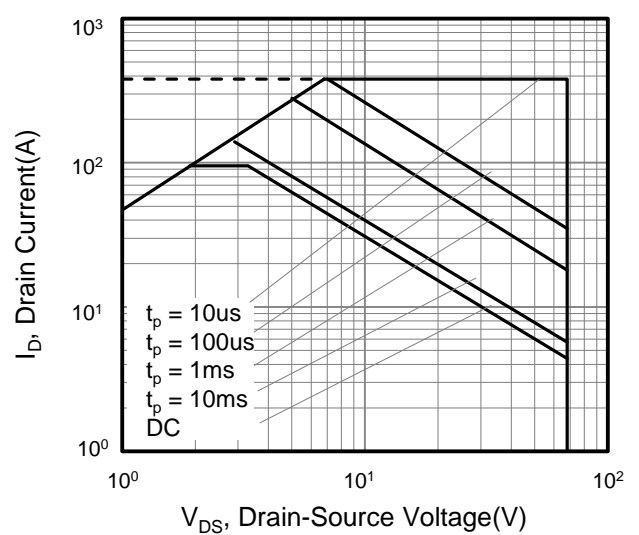




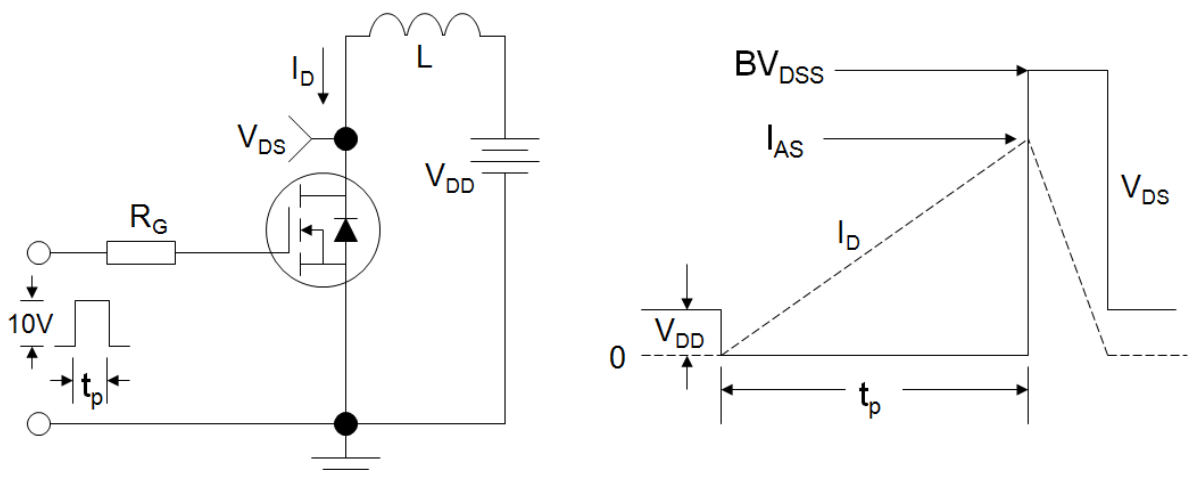
Figure A: Gate Charge Test Circuit and Waveform



Figure B: Resistive Switching Test Circuit and Waveform

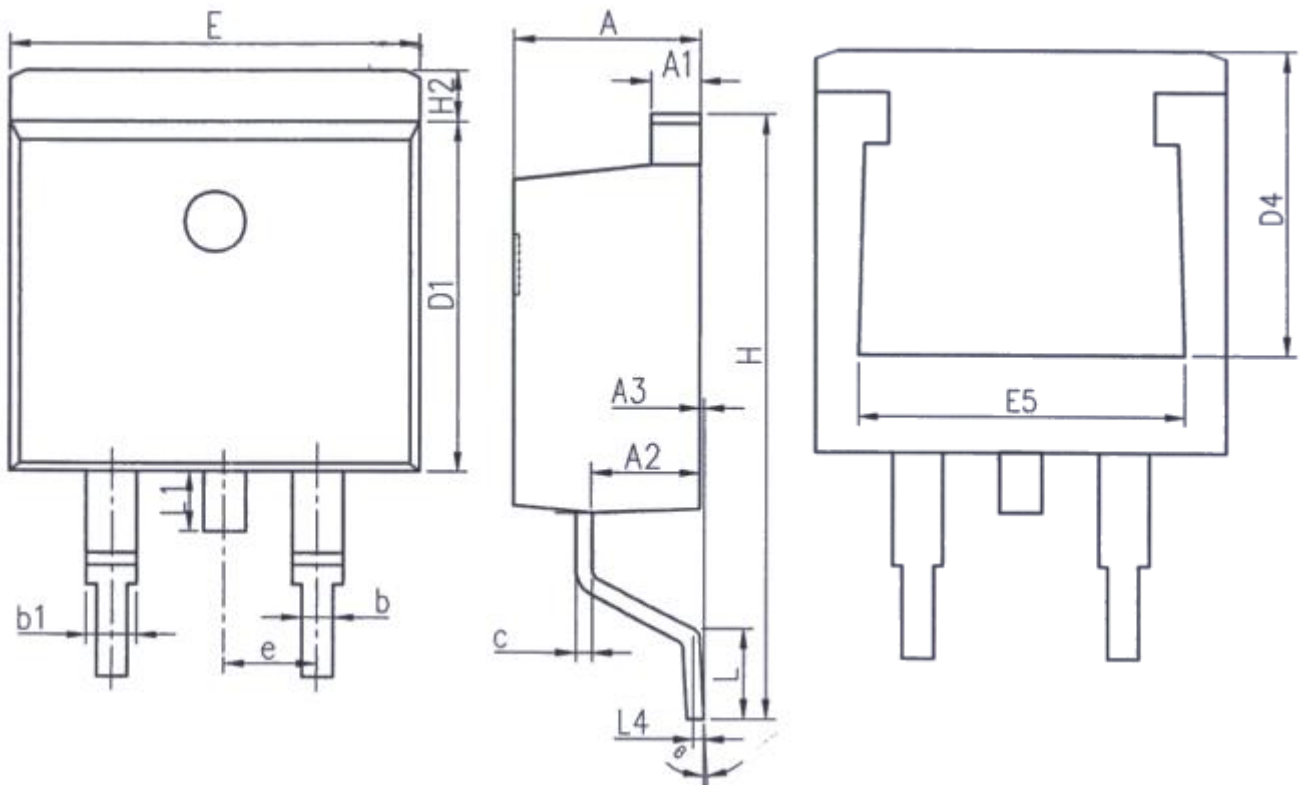


Figure C: Unclamped Inductive Switching Test Circuit and Waveform





TO-263

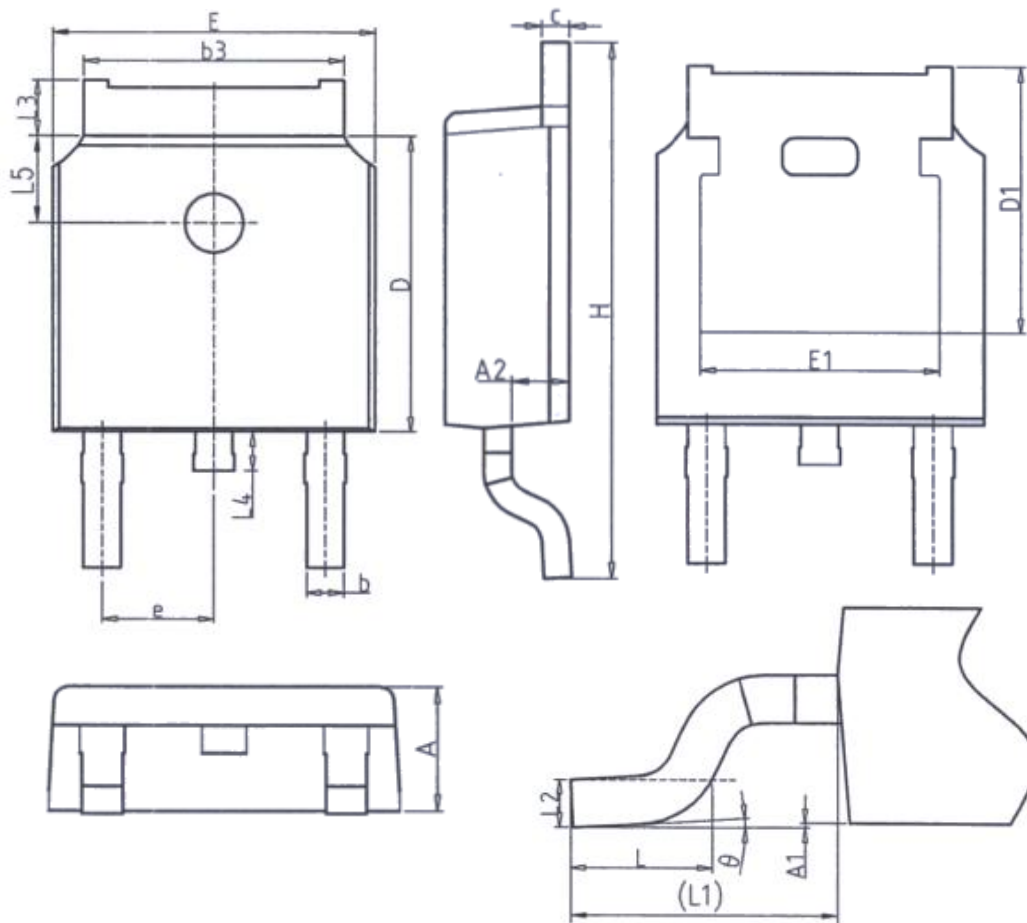


Unit: mm		
Symbol	Min.	Max.
A	4.37	4.77
A1	1.22	1.42
A2	2.49	2.89
A3	0.00	0.25
b	0.70	0.96
b1	1.17	1.47
c	0.30	0.53
D1	8.50	8.90
D4	6.60	-

Unit: mm		
Symbol	Min.	Max.
E	9.86	10.36
E5	7.06	-
e	2.54BSC	
H	14.70	15.50
H2	1.07	1.47
L	2.00	2.60
L1	1.40	1.70
L4	0.25BSC	
θ	0°	9°



TO-252

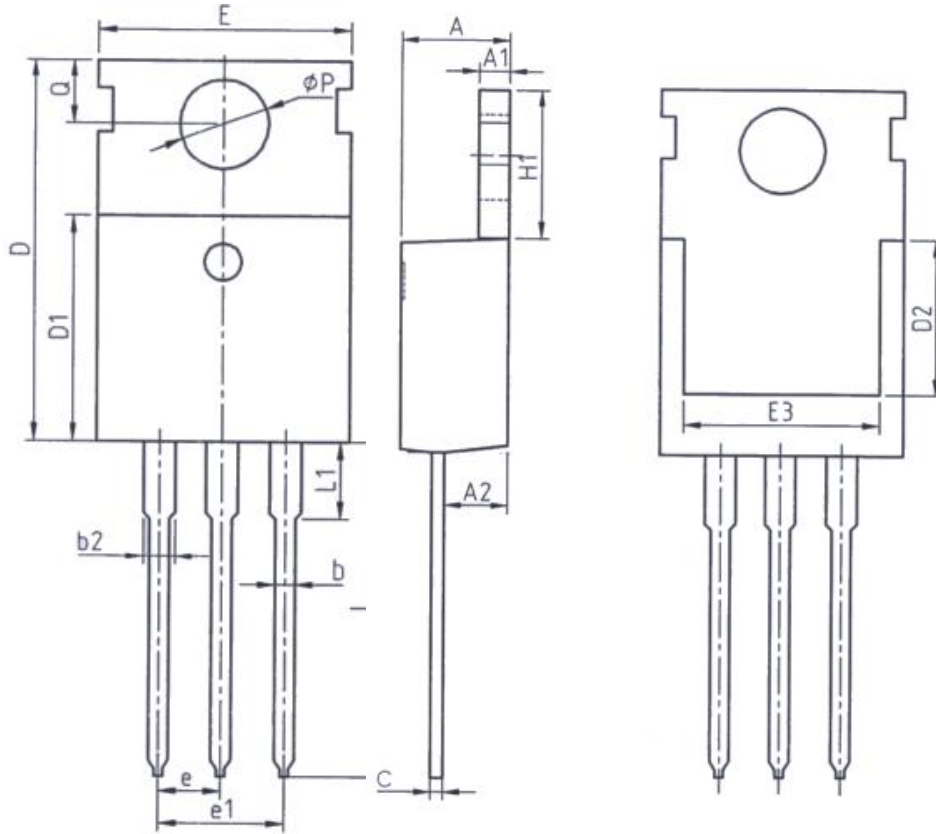


Unit: mm		
Symbol	Min.	Max.
A	2.20	2.40
A1	0.00	0.20
A2	0.97	1.17
b	0.68	0.90
b3	5.20	5.50
c	0.43	0.63
D	5.98	6.22
D1	5.30REF	
E	6.40	6.80
E1	4.63	-

Unit: mm		
Symbol	Min.	Max.
e	2.286BSC	
H	9.40	10.50
L	1.38	1.75
L1	2.90REF	
L2	0.51BSC	
L3	0.88	1.28
L4	-	1.00
L5	1.65	1.95
θ	0°	8°



TO-220



Unit: mm		
Symbol	Min.	Max.
A	4.37	4.77
A1	1.25	1.45
A2	2.20	2.60
b	0.70	0.95
b2	1.17	1.47
c	0.40	0.65
D	15.10	16.10
D1	8.80	9.40
D2	5.50	-

Unit: mm		
Symbol	Min.	Max.
E	9.70	10.30
E3	7.00	-
e	2.54BSC	
e1	5.08BSC	
H1	6.25	6.85
L	12.75	13.80
L1	-	3.40
P	3.40	3.80
Q	2.60	3.00



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