
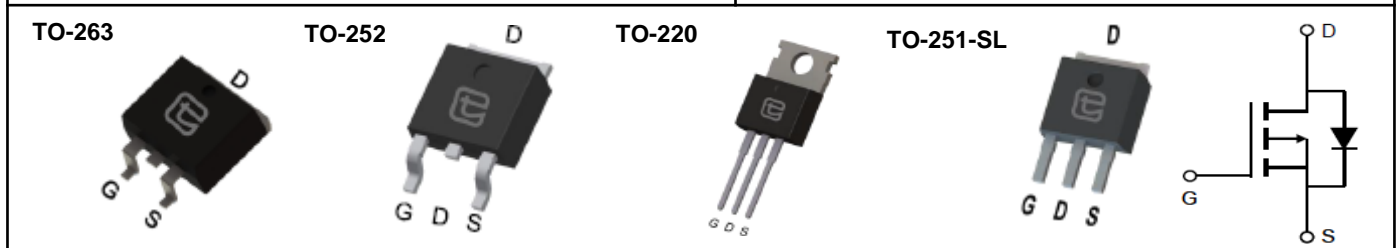




100V P-Channel Trench MOSFET(Preliminary)

<p>General Description</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} -100V</p> <p>I_D (at $V_{GS}=-10V$) -30A</p> <p>$R_{DS(ON)}$ (at $V_{GS}=-10V$) < 46mΩ</p> <p>$R_{DS(ON)}$ (at $V_{GS}=-4.5V$) < 50mΩ</p> <p>100% UIS Tested</p> 
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Part Number	Package Type	Form	Marking
TTB30P10AT	TO-263	Tape&Reel	30P10AT
TTD30P10AT	TO-252	Tape&Reel	30P10AT
TTP30P10AT	TO-220	Tube	30P10AT
TTU30P10AT	TO-251-SL	Tape&Reel	30P10AT

Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	- 100	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^B	I_D	$T_C = 25^\circ C$	-30
		$T_C = 100^\circ C$	-21
Pulsed Drain Current ^A	I_{DM}	-90	A
Avalanche Current ^A	I_{AS}	-30	A
Single Pulse Avalanche Energy $L = 0.3mH$ ^A	E_{AS}	135	mJ
Power Dissipation ^C	P_D	$T_C = 25^\circ C$	136
		$T_C = 100^\circ C$	68.2
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Maximum	Units
Maximum Junction-to-Case	Steady-State $R_{\theta JC}$	1.1	$^\circ C/W$
Maximum Junction-to-Ambient	Steady-State $R_{\theta JA}$	100	



Electrical Characteristics($T_J = 25^\circ\text{C}$ unless otherwise noted)						
Symbol	Parameter	Conditions	Value			Units
			Min	Typ	Max	
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D = -250\mu\text{A}, V_{GS} = 0\text{V}$	-100			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = -100\text{V}, V_{GS} = 0\text{V}$	$T_J = 25^\circ\text{C}$		-1	μA
			$T_J = 100^\circ\text{C}$		-100	
I_{GSS}	Gate-Body Leakage Current	$V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$	-1	-1.7	-2.4	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = -10\text{V}, I_D = -15\text{A}$		35	46	$\text{m}\Omega$
		$V_{GS} = -4.5\text{V}, I_D = -15\text{A}$		38	50	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS} = -50\text{V}, I_D = -10\text{A}$		11		S
V_{SD}	Diode Forward Voltage	$I_S = -15\text{A}, V_{GS} = 0\text{V}$			-1	V
I_S	Maximum Body-Diode Continuous Current ^B				-30	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS} = 0\text{V}, V_{DS} = -50\text{V}, f = 1\text{MHz}$		2513		pF
C_{oss}	Output Capacitance			625		
C_{rss}	Reverse Transfer Capacitance			376		
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS} = -10\text{V}, V_{DS} = -50\text{V}, I_D = -15\text{A}$		140		nC
Q_{gs}	Gate Source Charge			23		
Q_{gd}	Gate Drain Charge			27		
$t_{D(on)}$	Turn-On Delay Time	$V_{GS} = -10\text{V}, V_{DS} = -50\text{V}, I_D = -15\text{A}, R_G = 2.5\Omega$		20		ns
t_r	Turn-On Rise Time			80		
$T_{D(off)}$	Turn-Off Delay Time			50		
t_f	Turn-Off Fall Time			70		
t_{rr}	Body Diode Reverse Recovery Time	$I_F = -15\text{A}, di/dt = 100\text{A}/\mu\text{s}$		90		ns
Q_{rr}	Body Diode Reverse Recovery Charge			70		nC

A. Single pulse width limited by maximum junction temperature.

B. The maximum current rating is package limited.

C. The power dissipation P_D is based on $T_{J(MAX)} = 175^\circ\text{C}$, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.



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

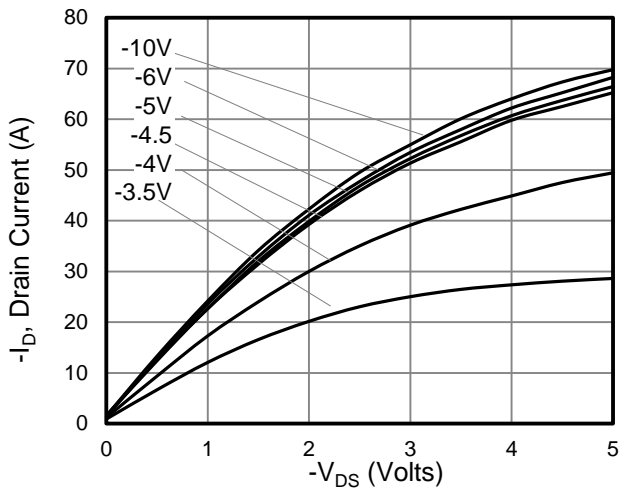


Figure 1: On-Region Characteristics

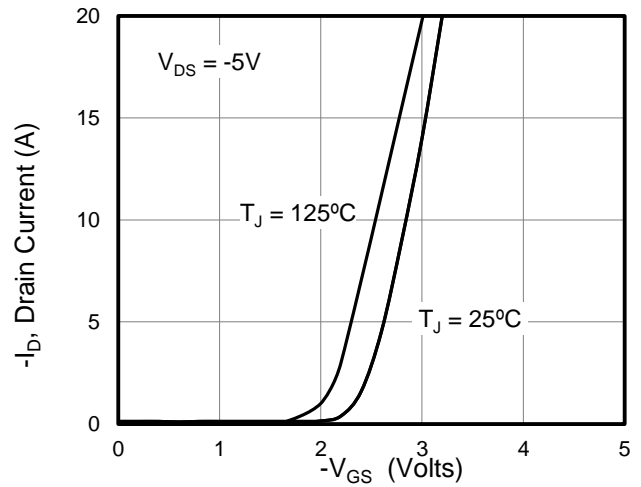


Figure 2: Transfer Characteristics

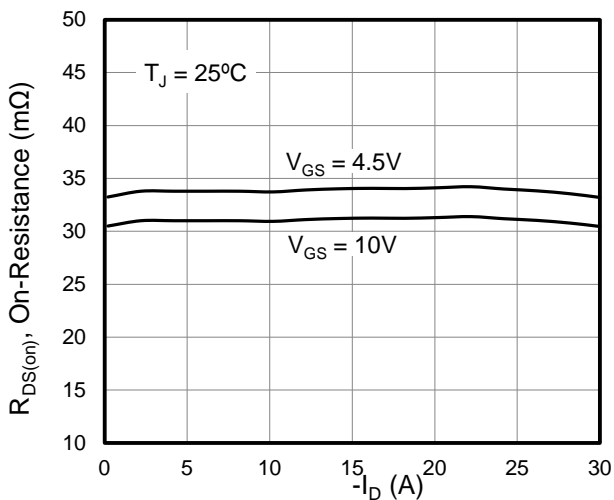


Figure 3: On-Resistance vs. Drain Current

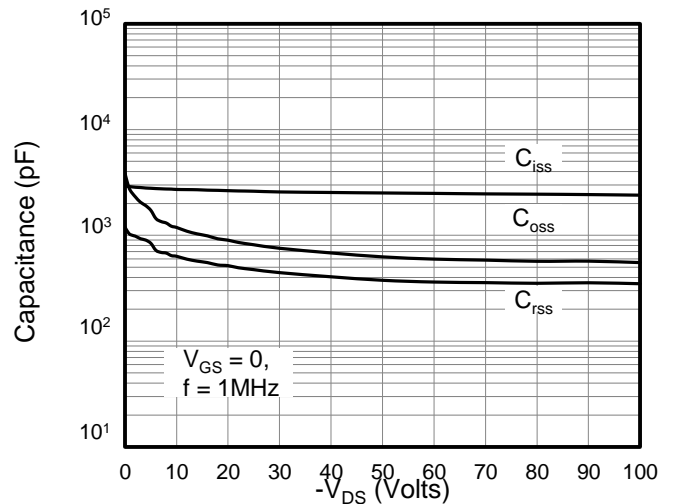


Figure 4: Capacitance Characteristics

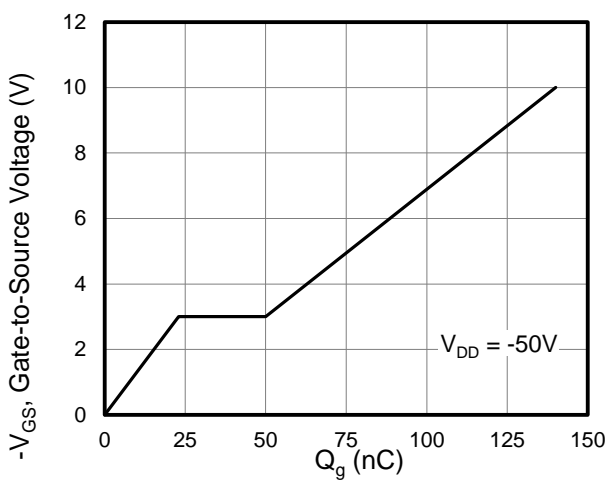


Figure 5: Gate Charge Characteristics

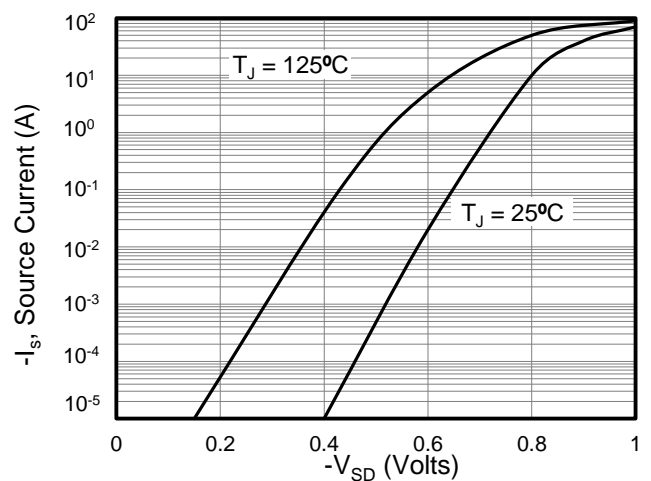


Figure 6: Body Diode Forward Voltage



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

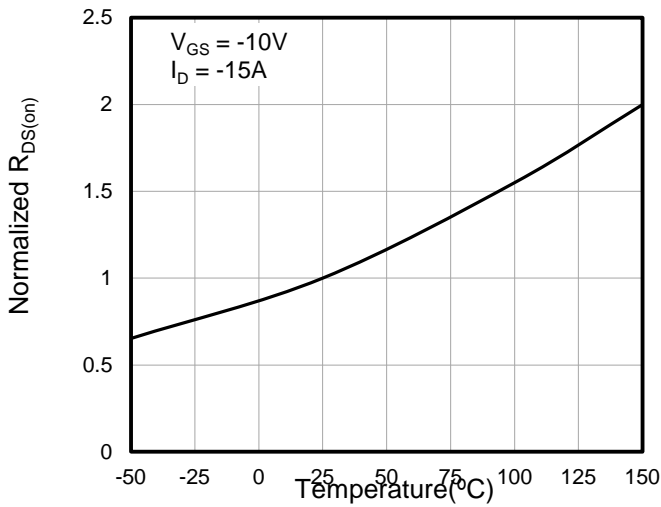


Figure 7: On-Resistance vs. Junction Temperature

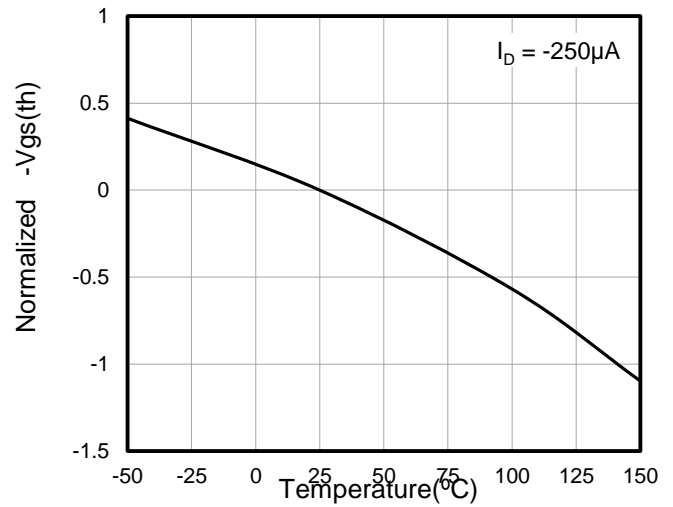


Figure 8: $V_{GS(th)}$ vs. Junction Temperature

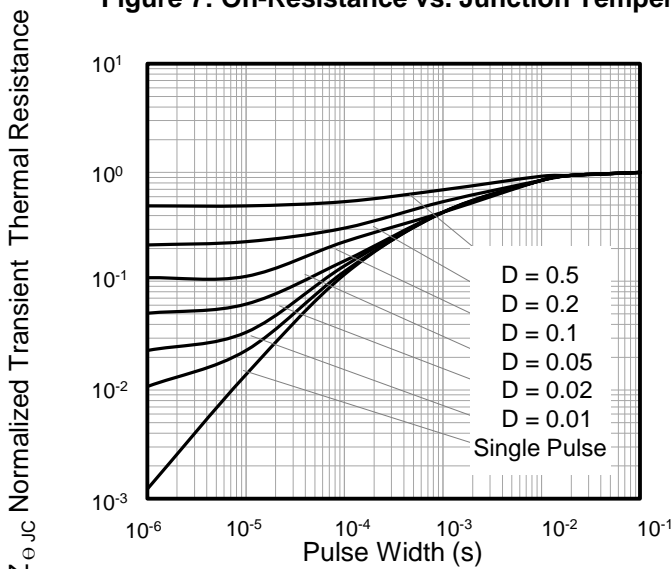


Figure 11: Normalized Transient Thermal Resistance

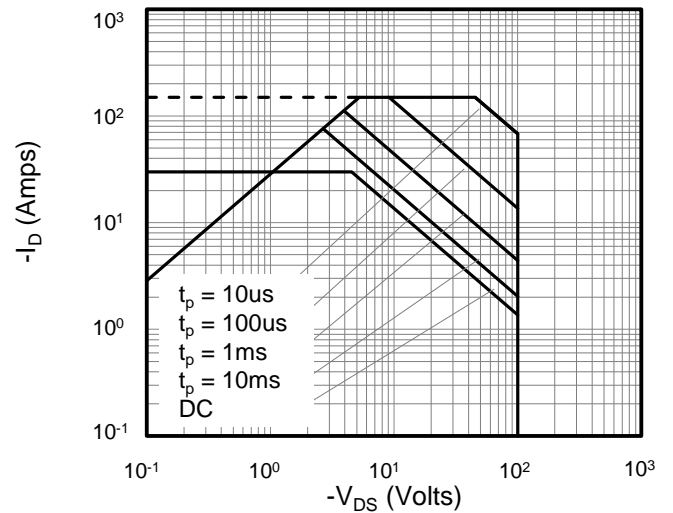


Figure 12: Safe Operating Area



Figure A: Gate Charge Test Circuit and Waveform

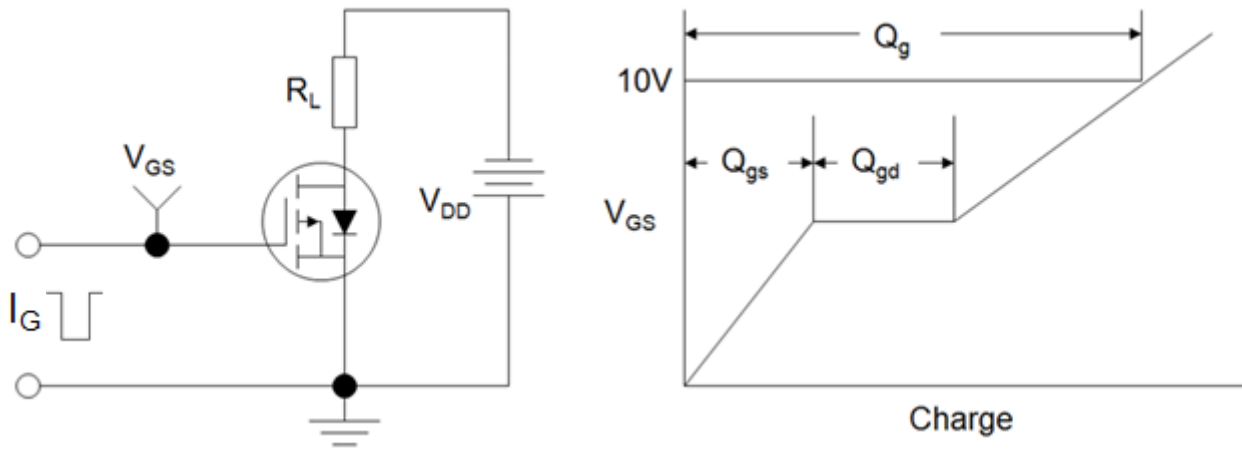


Figure B: Resistive Switching Test Circuit and Waveform

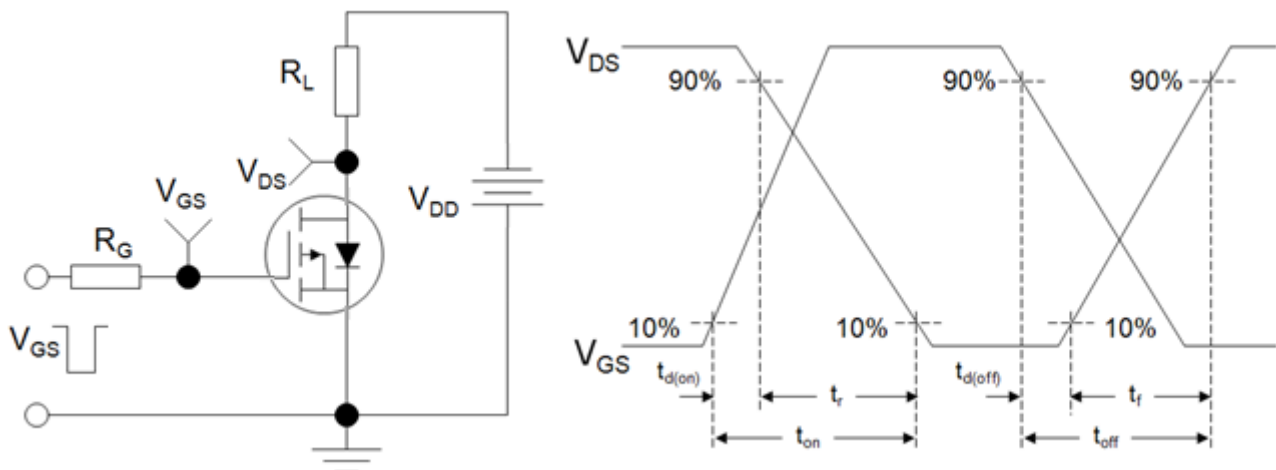
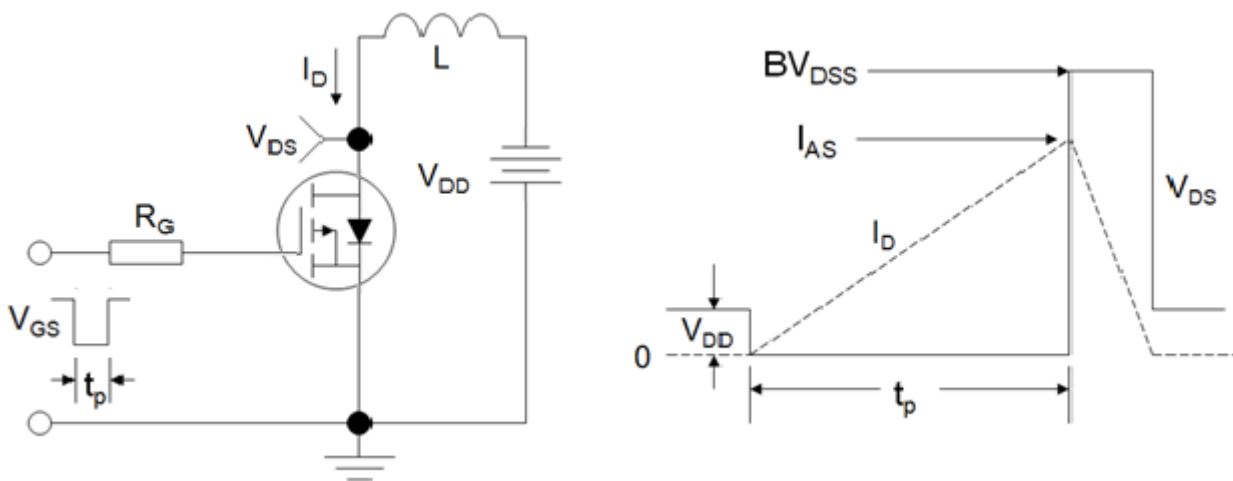
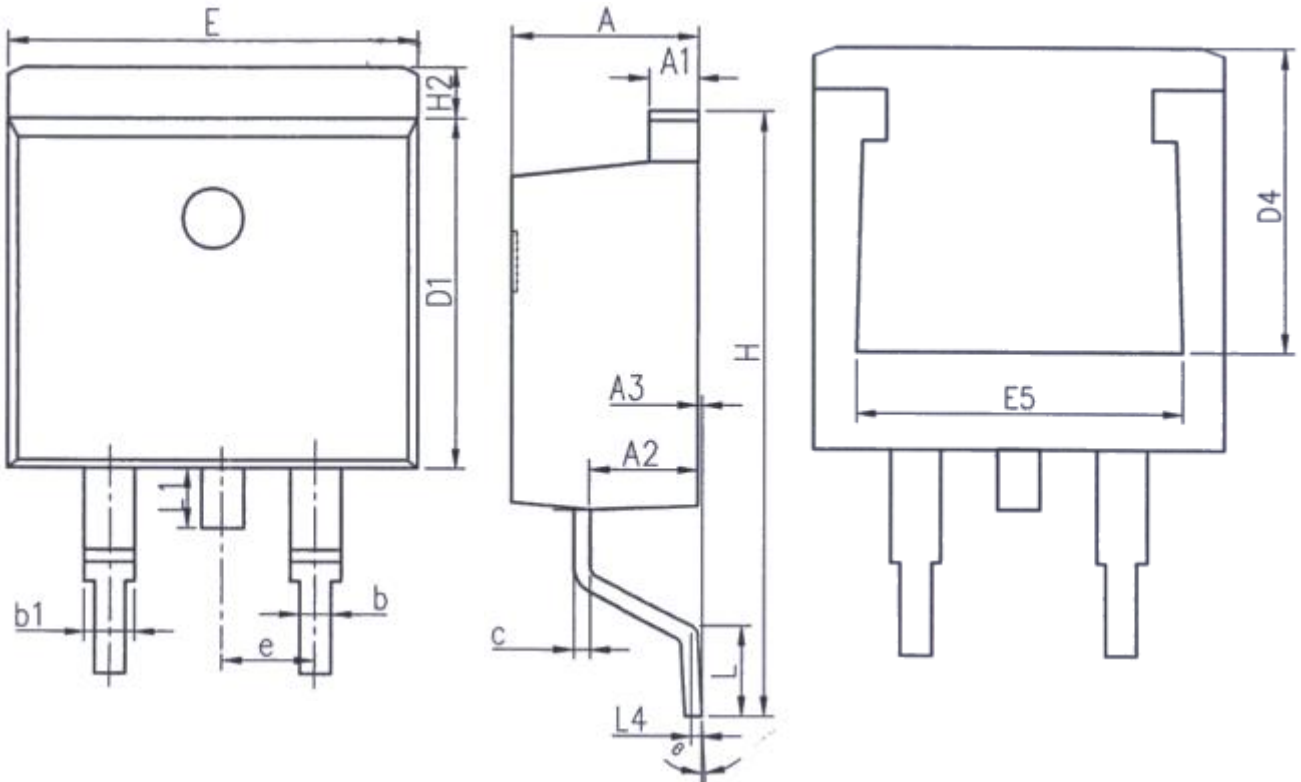


Figure C: Unclamped Inductive Switching Test Circuit and Waveform





TO-263(H)

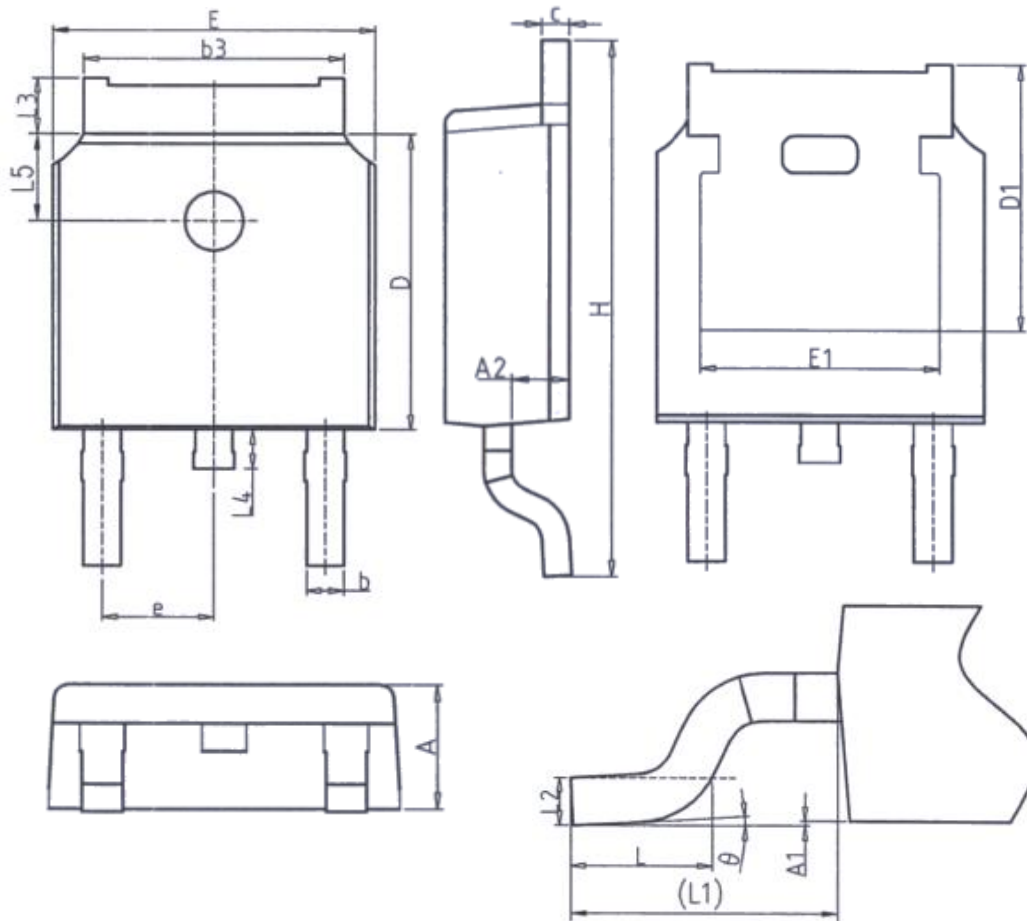


Unit: mm		
Symbol	Min.	Max.
A	4.37	4.77
A1	1.22	1.42
A2	2.49	2.89
A3	0.00	0.25
b	0.70	0.96
b1	1.17	1.47
c	0.30	0.53
D1	8.50	8.90
D4	6.60	-

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(H)

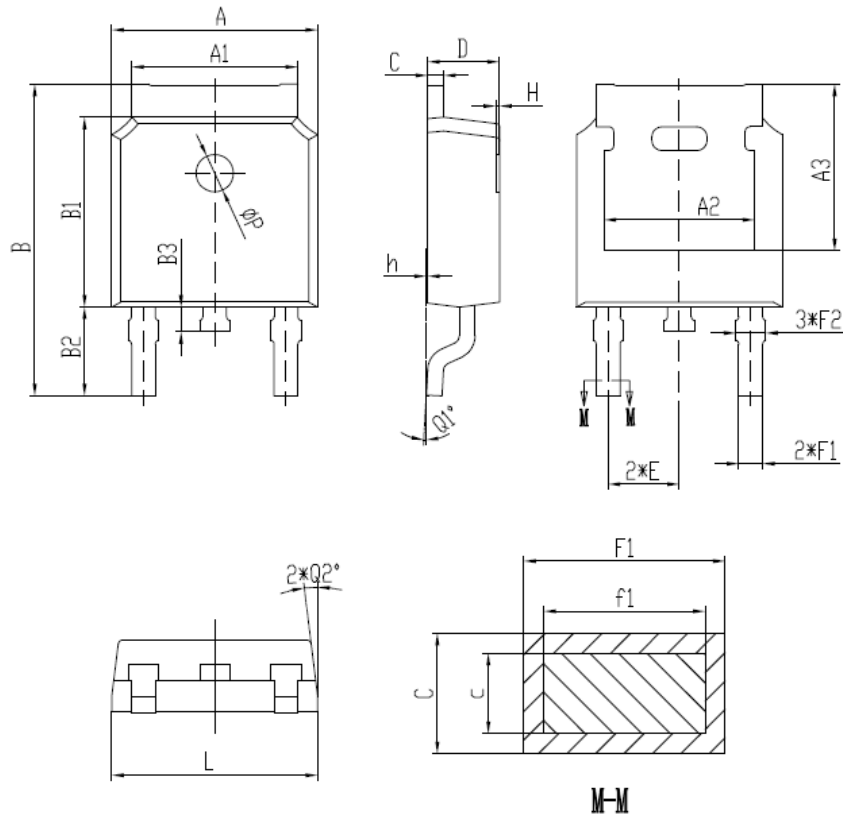


Unit: mm		
Symbol	Min.	Max.
A	2.20	2.40
A1	0.00	0.20
A2	0.97	1.17
b	0.68	0.90
b3	5.20	5.50
c	0.43	0.63
D	5.98	6.22
D1	5.30REF	
E	6.40	6.80
E1	4.63	-

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
theta	0°	8°



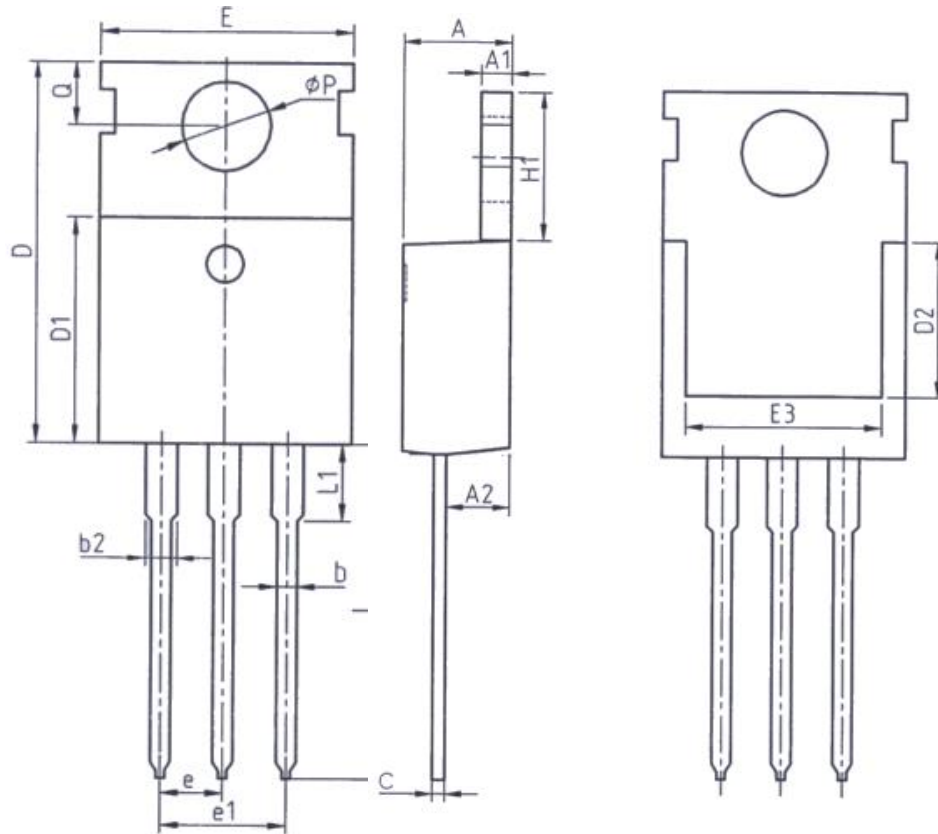
TO-252(T)



SYMBOL	MIN	NOM	MAX
A	6.50	6.60	6.70
A1	5.16	5.31	5.46
A2	4.83 REF		
A3	5.30 REF		
B	9.77	9.97	10.17
B1	6.00	6.10	6.20
B2	2.60	2.80	3.00
B3	0.70	0.80	0.90
C	0.41	—	0.61
c	0.40	0.50	0.60
D	2.20	2.30	2.40
E	2.186	2.286	2.386
F1	0.67	—	0.87
f1	0.66	0.76	0.86
F2	0.76	0.86	0.96
H	0.00	—	0.30
h	0.00	—	0.20
L	6.50	6.60	6.70
ϕP	1.10	1.20	1.30
$Q1^\circ$	0°	—	8°
$Q2^\circ$	6°	7°	8°



TO-220(H)

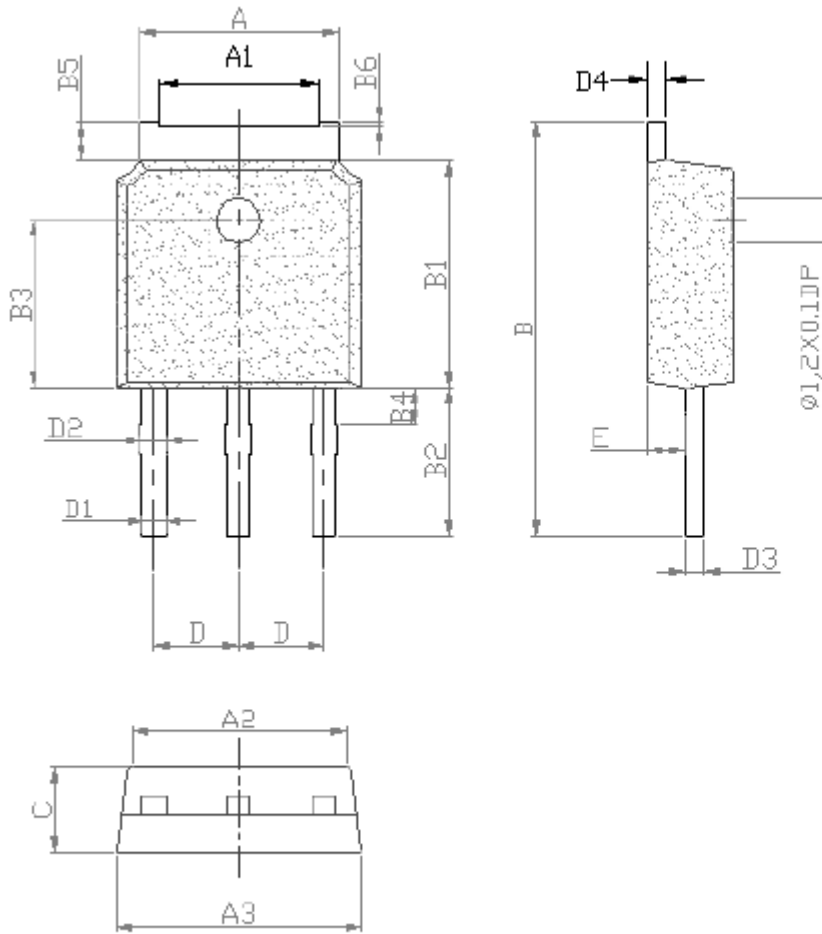


Unit: mm		
Symbol	Min.	Max.
A	4.37	4.77
A1	1.25	1.45
A2	2.20	2.60
b	0.70	0.95
b2	1.17	1.47
c	0.40	0.65
D	15.10	16.10
D1	8.80	9.40
D2	5.50	-

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



TO-251-SL(Z)



DIM	MILLIMETERS
A	5.33 ± 0.2
A1	4.33 ± 0.2
A2	5.80 ± 0.1
A3	6.6 ± 0.2
B	11.15 ± 0.5
B1	6.1 ± 0.3
B2	4.0 ± 0.5
B3	4.5 ± 0.15
B4	1.0 ± 0.1
B5	1.05 ± 0.1
B6	0.1 ± 0.05
C	2.3 ± 0.2
D	2.286 ± 0.05
D1	0.60 ± 0.1
D2	0.72 ± 0.12
D3	0.5 ± 0.08
D4	0.5 ± 0.08
E	1.01 ± 0.2
DIA	$\odot 1.2$ (deep 0.1)



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