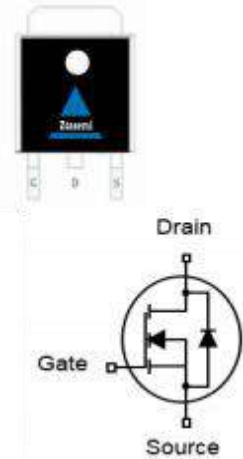


Features

- N-Channel
- Low $R_{DS(on)}$ & FOM
- Low C_{rss}
- 100% Avalanche Tested
- Fast switching
- Improved dv/dt capability
- 100% EAS Tested

V_{DS}	30	V
$R_{DS(on),TYP@ V_{GS}=10V}$	4.0	m Ω
$R_{DS(on),TYP@ V_{GS}=4.5V}$	7.0	m Ω
I_D	80	A

TO-252



Part ID	Package Type	Marking	Packing
ZT040N03D	TO-252	ZT040N03D	2500pcs/reel

Absolute Maximum Ratings $T_A = 25^\circ\text{C}$, unless otherwise specified

Symbol	Parameter	Rating	Unit	
Common Ratings ($T_C=25^\circ\text{C}$ Unless Otherwise Noted)				
V_{GS}	Gate-Source Voltage	± 20	V	
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	30	V	
T_J	Maximum Junction Temperature	150	$^\circ\text{C}$	
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$	
I_{DM}	Drain Current-Continuous@ Current-Pulsed (Note 1)	$T_C = 25^\circ\text{C}$ 320	A	
Mounted on Large Heat Sink				
I_D	Drain Current-Continuous	$T_C = 25^\circ\text{C}$	80	A
		$T_C = 100^\circ\text{C}$	45	A
P_D	Maximum Power Dissipation	83	W	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	1.5	$^\circ\text{C}/\text{W}$	
Drain-Source Avalanche Ratings				
EAS	Avalanche Energy, Single Pulsed (Note 2)	306	mJ	

Electrical Characteristics (T_J=25 °C unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ T_J=25 °C (unless otherwise stated)						
V(BR)DSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	30	--	--	V
IDSS	Zero Gate Voltage Drain Current	V _{DS} =30V, V _{GS} =0V	--	--	1	μA
IGSS	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.0	1.6	2.2	V
RDS(on)	Drain-Source On-State Resistance	V _{GS} =10V, I _D =30A	--	4.0	5.0	mΩ
RDS(on)	Drain-Source On-State Resistance	V _{GS} =4.5V, I _D =20A	--	7.0	8.9	mΩ
Dynamic Electrical Characteristics @ T_J = 25 °C (unless otherwise stated) (Note 3)						
Ciss	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	--	1968	--	pF
Coss	Output Capacitance		--	213	--	pF
Crss	Reverse Transfer Capacitance		--	175	--	pF
Rg	Gate Resistance	f=1MHz	--	1.0	--	Ω
Qg	Total Gate Charge	V _{DS} =15V, I _D =30A, V _{GS} =10V	--	37.1	--	nC
Qgs	Gate-Source Charge		--	5.6	--	nC
Qgd	Gate-Drain Charge		--	7.6	--	nC
Switching Characteristics (Note 3)						
Td(on)	Turn-on Delay Time	V _{DS} =15V, I _D =30A, R _G =2.7Ω, V _{GS} =10V	--	21	--	ns
Tr	Turn-on Rise Time		--	16	--	ns
Td(off)	Turn-Off Delay Time		--	59	--	ns
Tf	Turn-Off Fall Time		--	11	--	ns
Source- Drain Diode Characteristics @ T_J = 25 °C (unless otherwise stated)						
IS	Diode Forward Current		--	--	80	A
VSD	Forward on voltage	I _S =30A, V _{GS} =0V	--	--	1.2	V
Trr	Reverse Recovery Time	T _J =25°C, I _F =80A di/dt=100A/μs	--	32	--	ns
Qrr	Reverse Recovery Charge		--	12	--	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: T_J =25°C, V_{DD} = 15V, V_G = 10V, R_G =25Ω, L=0.5mH,
3. Pulse Test: Pulse Width≤300μs, Duty Cycles≤0.5%

N-Channel Typical Characteristics

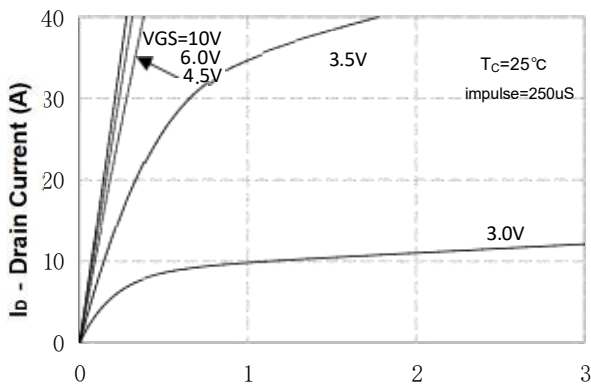


Figure 1. On-Region Characteristics

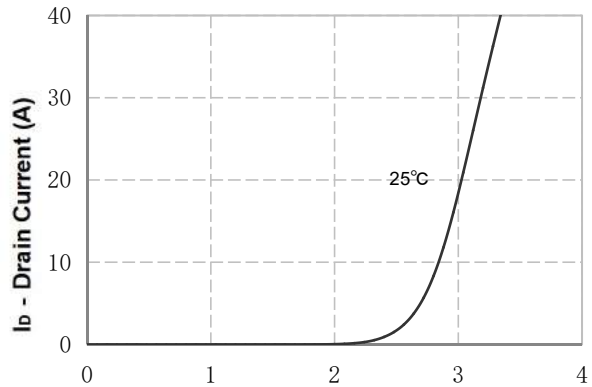


Figure 4. Transfer Characteristics

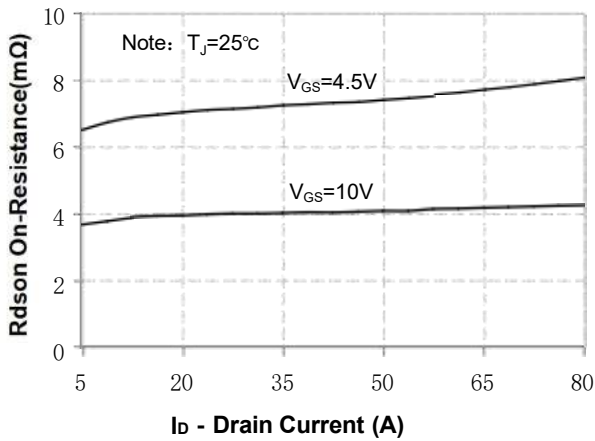


Figure 2. On-Resistance Variation vs Drain Current and Gate Voltage

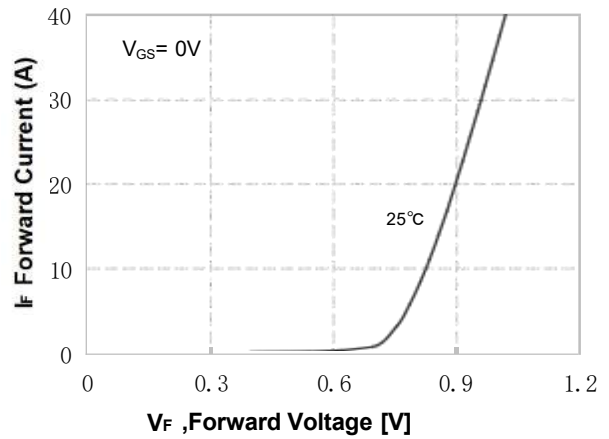


Figure 5. Body Diode Forward Voltage Variation vs Source Current

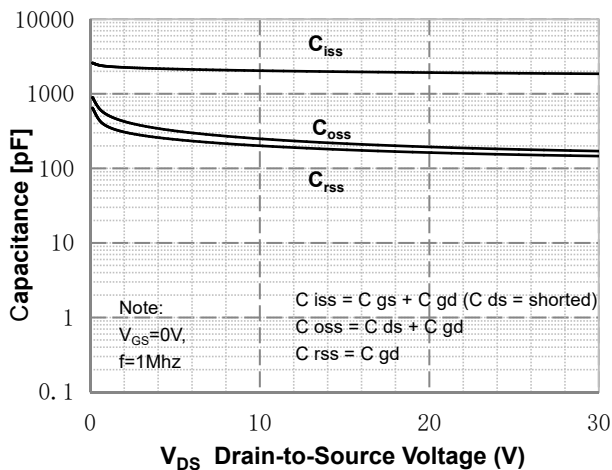


Figure 3. Capacitance Characteristics

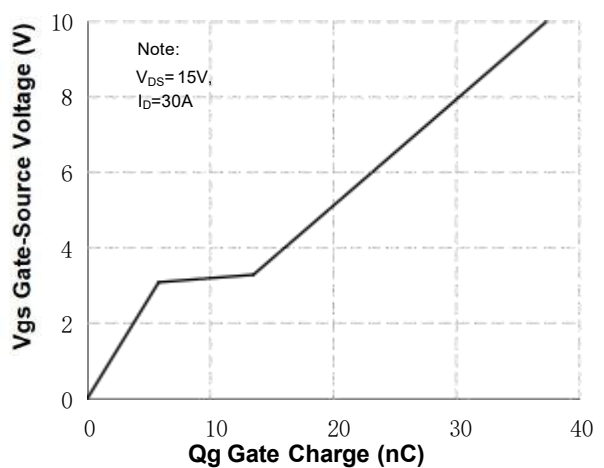


Figure 6. Gate Charge Characteristics

N-Channel Typical Characteristics (Continued)

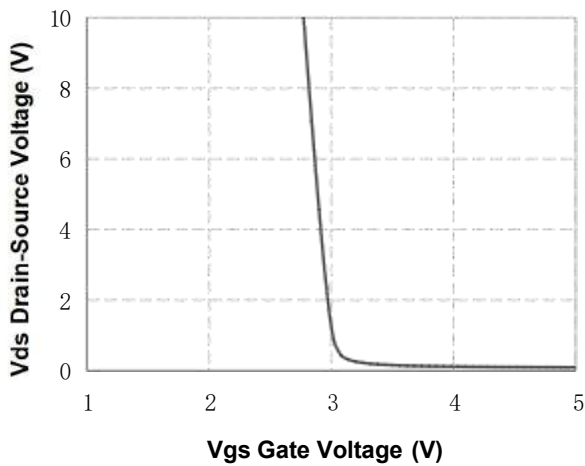


Figure 7. Vds Drain-Source Voltage vs Gate Voltage

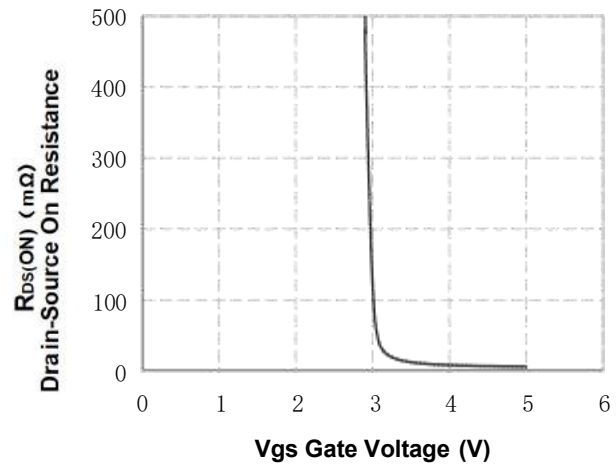


Figure 9. On-Resistance vs Gate Voltage

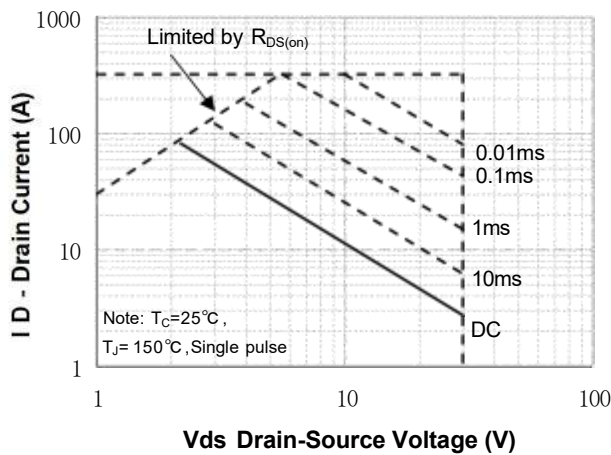


Figure 8. Maximum Safe Operating Area

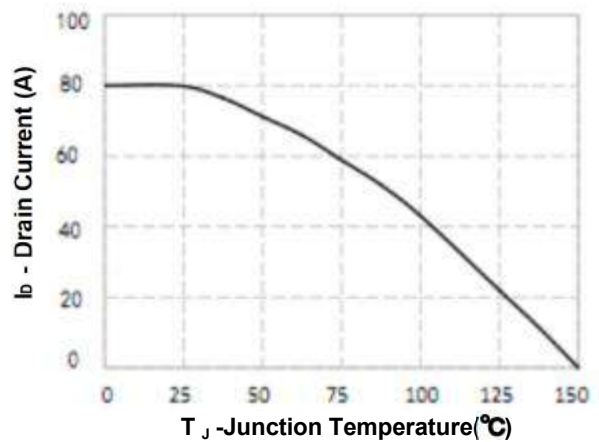


Figure 10. Maximum Continuous Drain Current vs Temperature

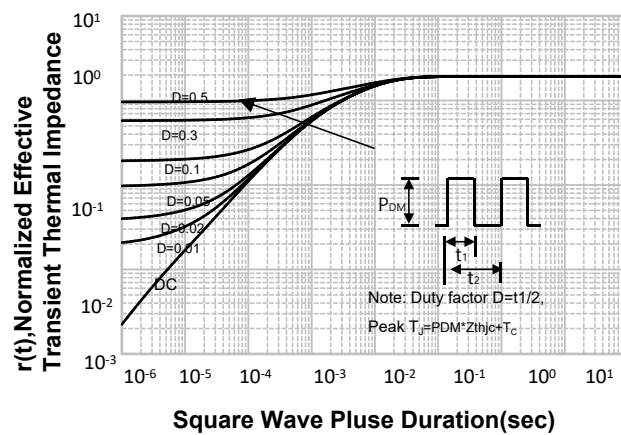


Figure 11. Transient Thermal Response Curve

Figure A: Gate Charge Test Circuit and Waveform

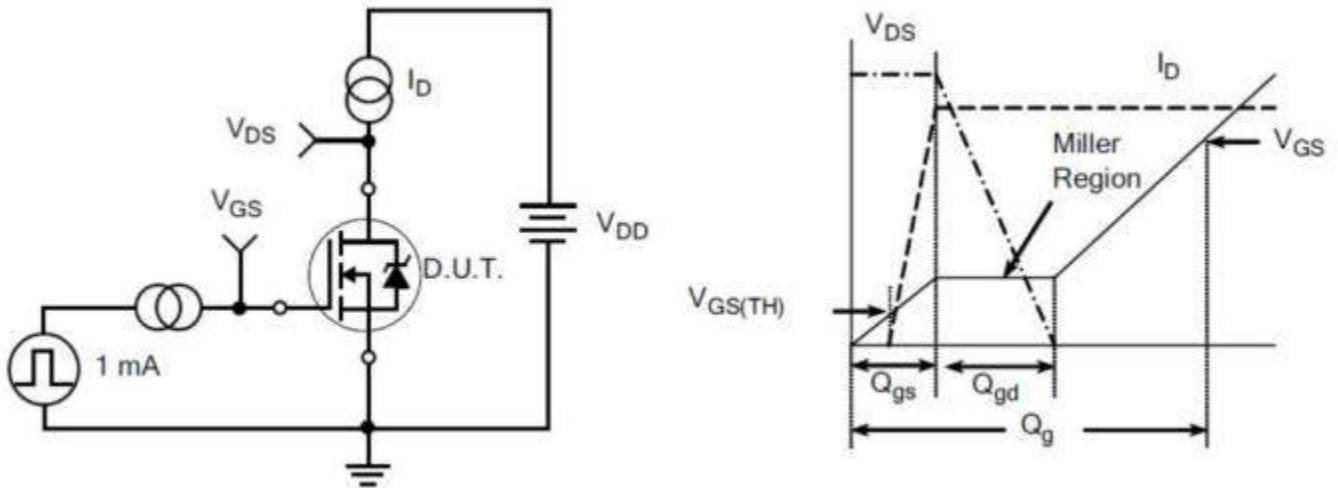


Figure B: Resistive Switching Test Circuit and Waveform

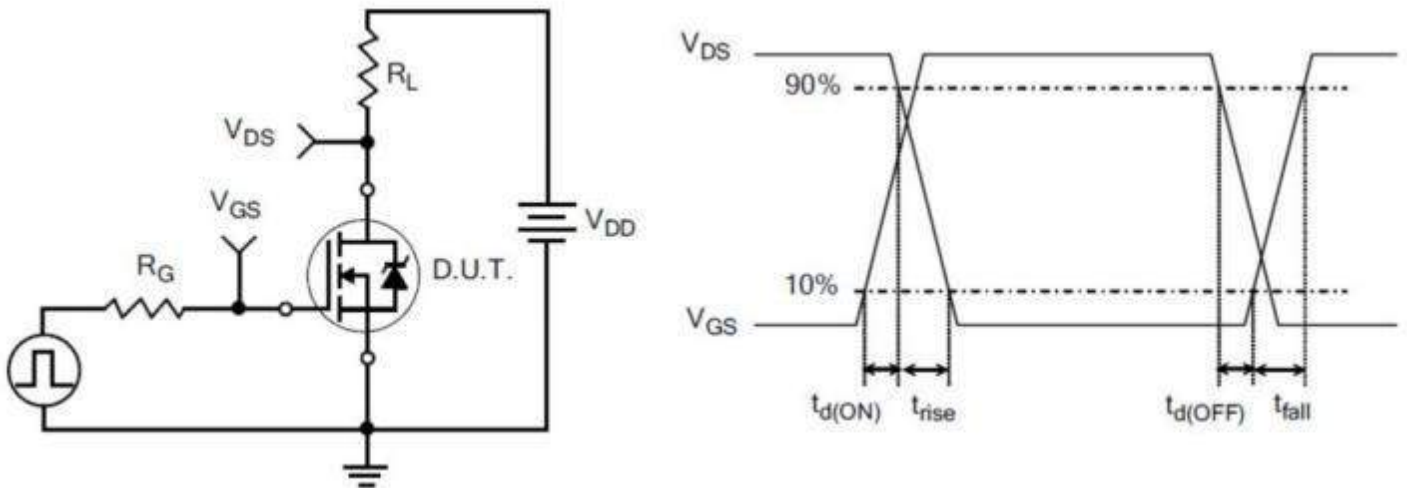
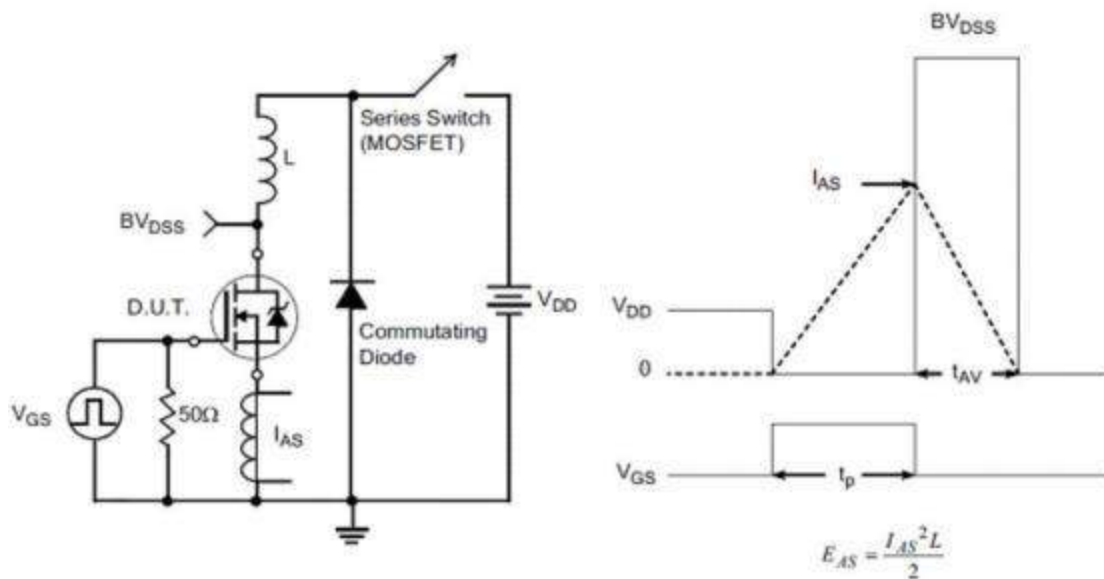
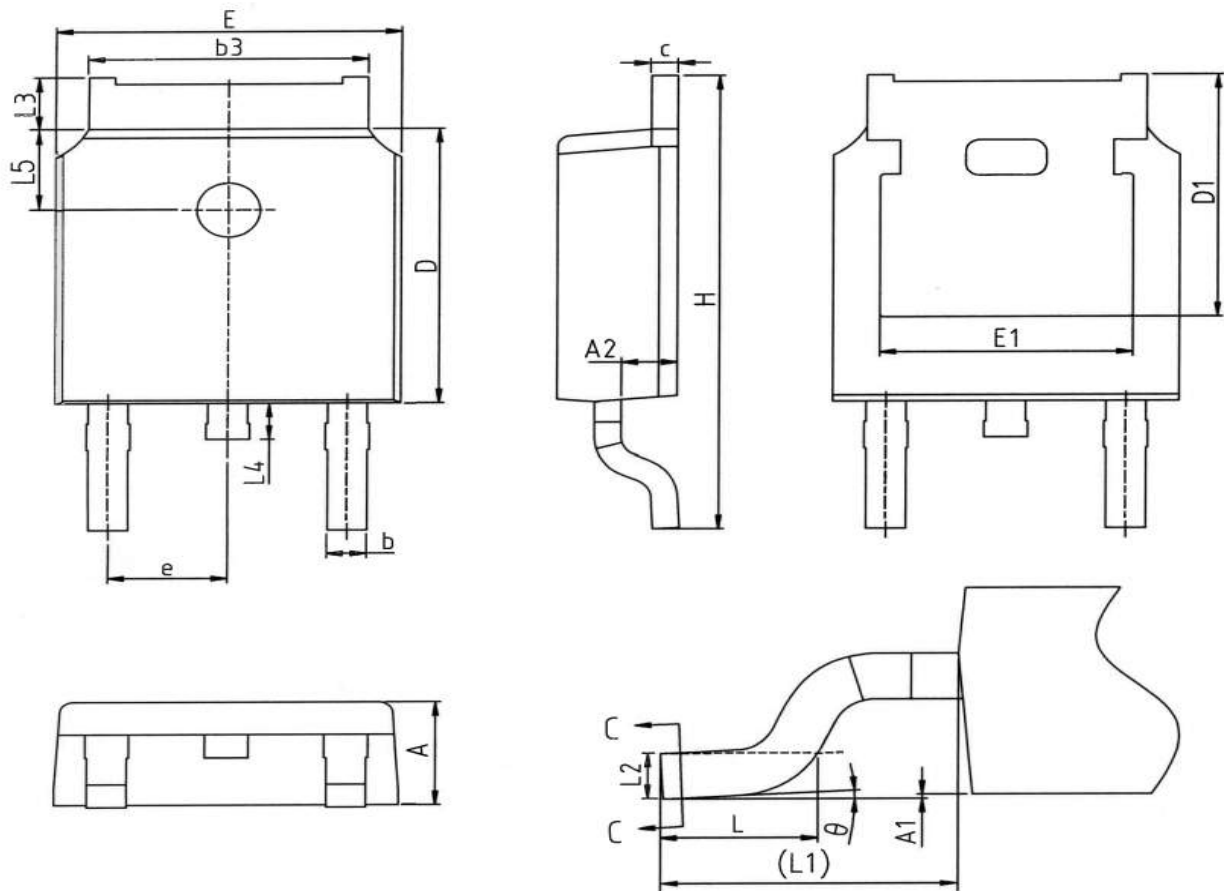


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



TO-252 Package Information



SYMBOL	mm		
	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0.00	-	0.12
A2	0.97	1.07	1.17
b	0.68	0.78	0.90
b3	5.20	5.33	5.46
c	0.43	0.53	0.61
D	5.98	6.10	6.22
D1	5.30REF		
E	6.40	6.60	6.73
E1	4.63	-	-
e	2.286BSC		
H	9.40	10.10	10.50
L	1.38	1.50	1.75
L1	2.90REF		
L2	0.51BSC		
L3	0.88	-	1.28
L4	0.50	-	1.00
L5	1.65	1.80	1.95
θ	0°	-	8°

Customer Service

Sales and Service:

zj@ztasemi.com