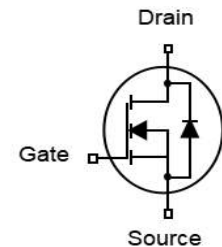


Features

- N-Channel
- Low $R_{DS(on)}$ & FOM
- Easy to use/drive
- 100% Avalanche Tested
- RoHS compliant
- 100% EAS Tested

V_{DS}	60	V
$R_{DS(on),TYP@ V_{GS}=10V}$	12	$m\Omega$
$R_{DS(on),TYP@ V_{GS}=4.5V}$	18	$m\Omega$
I_D	50	A

TO-252



Part ID	Package Type	Marking	Packing
ZT12N06D	TO-252	ZT12N06D	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	60	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 3)	$T_C = 25^\circ\text{C}$ 200	A	
Mounted on Large Heat Sink				
I_D	Drain Current-Continuous (Note 2)	$T_C = 25^\circ\text{C}$	50	A
		$T_C = 100^\circ\text{C}$	32	A
P_D	Maximum Power Dissipation	62.5	W	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	2	$^\circ\text{C/W}$	
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	62	$^\circ\text{C/W}$	
Drain-Source Avalanche Ratings				
EAS	Avalanche Energy, Single Pulsed (Note 1)	98	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	60	--	--	V
IDSS	Zero Gate Voltage Drain Current	V _{DS} =60V, 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	1.2	1.8	2.5	V
RDS(on)	Drain-Source On-State Resistance	V _{GS} =10V, I _D =20A	--	12	17	mΩ
RDS(on)	Drain-Source On-State Resistance	V _{GS} =4.5V, I _D =20A	--	18	23	mΩ
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
Ciss	Input Capacitance	V _{DS} =30V, V _{GS} =0V, f=1MHz	--	1889	--	pF
Coss	Output Capacitance		--	113	--	pF
Crss	Reverse Transfer Capacitance		--	92	--	pF
Rg	Gate Resistance	f=1MHz	--	1.4	--	Ω
Qg	Total Gate Charge	V _{DS} =30V, I _D =20A, V _{GS} =10V	--	40	--	nC
Qgs	Gate-Source Charge		--	7.7	--	nC
Qgd	Gate-Drain Charge		--	8.2	--	nC
Switching Characteristics						
Td(on)	Turn-on Delay Time	V _{DS} =30V, I _D =20A, R _G =3.0Ω, V _{GS} =10V	--	13	--	ns
Tr	Turn-on Rise Time		--	25	--	ns
Td(off)	Turn-Off Delay Time		--	60	--	ns
Tf	Turn-Off Fall Time		--	9	--	ns
Source- Drain Diode Characteristics @ T_J = 25°C (unless otherwise stated)						
IS	Diode Forward Current		--	--	50	A
VSD	Forward on voltage	I _S =20A, V _{GS} =0V	--	--	1.2	V
Trr	Reverse Recovery Time	T _J =25°C, I _F =20A	--	29	--	ns
Qrr	Reverse Recovery Charge	di/dt=100A/μs	--	21	--	nC

Notes:

1. L=0.5mH, V_{DD}=30V, Start T_J=25°C.
2. Limited by maximum junction temperature.
3. Repetitive Rating: Pulse width limited by maximum junction temperature.

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

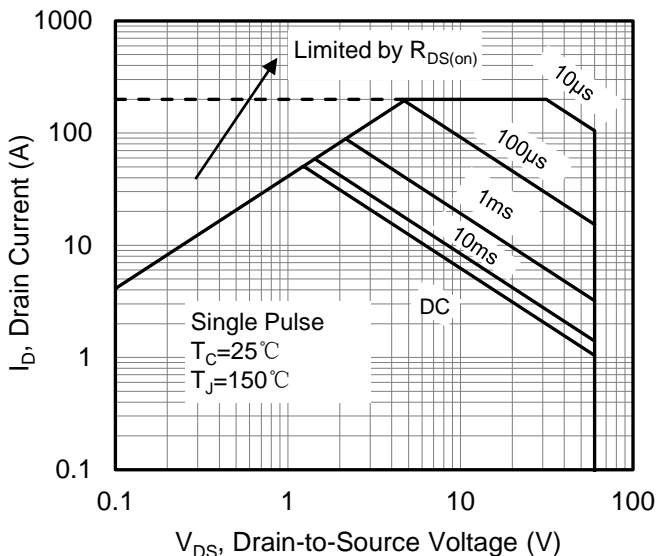


Figure 1. Maximum Safe Operating Area

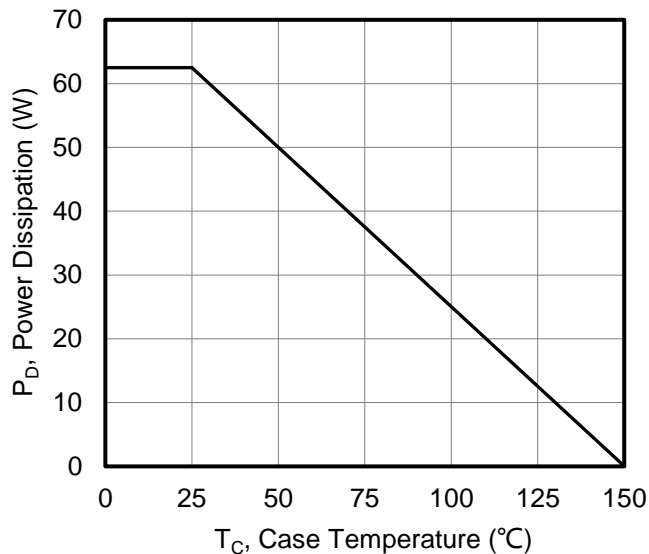


Figure 4. Maximum Power Dissipation vs Case Temperature

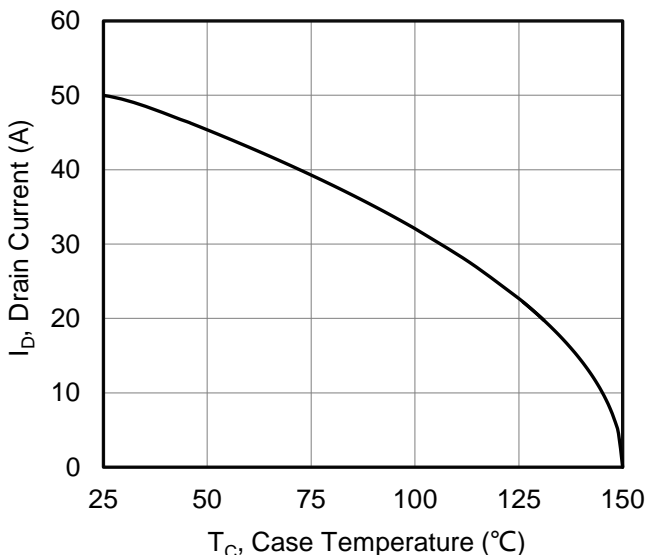


Figure 2. Maximum Continuous Drain Current vs Case Temperature

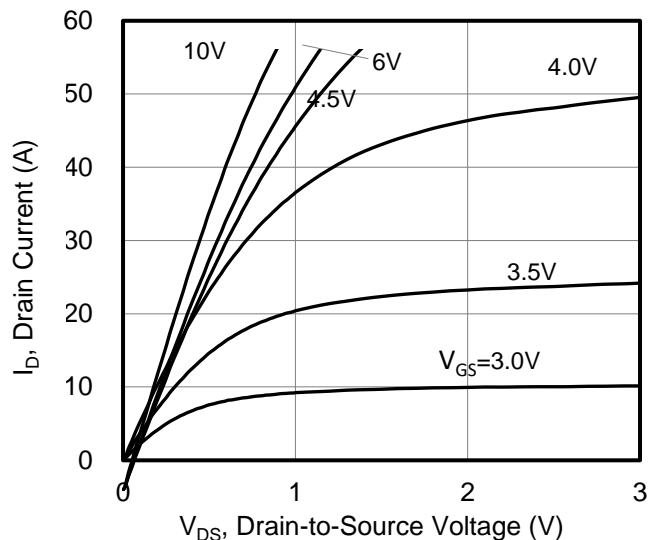


Figure 5. Typical output Characteristics

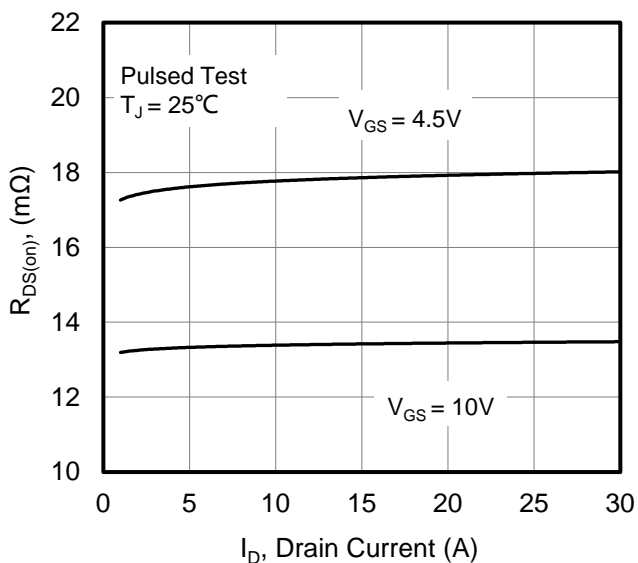


Figure 3. Drain-to-Source On Resistance vs Drain Current

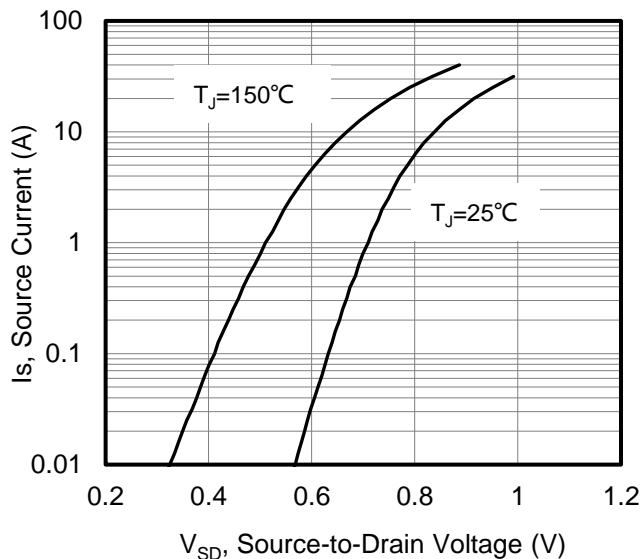


Figure 6. Typical Body Diode Transfer Characteristics

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

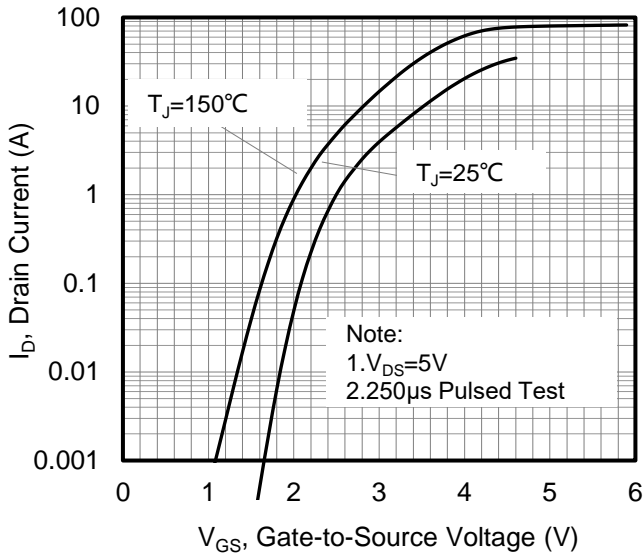


Figure 7. Typical Transfer Characteristics

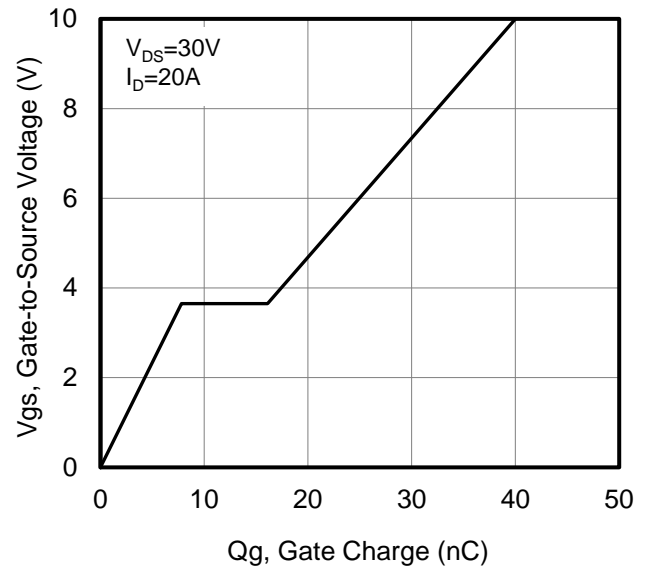


Figure 10. Typical Gate Charge vs Gate to Source Voltage

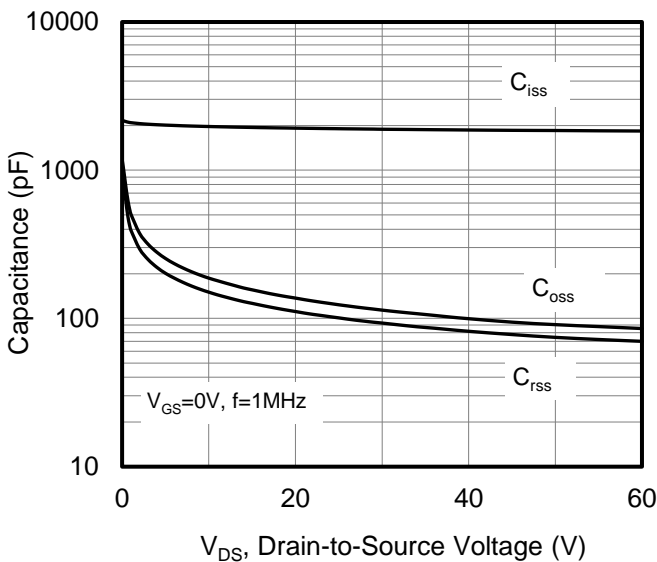


Figure 8. Capacitance Characteristics

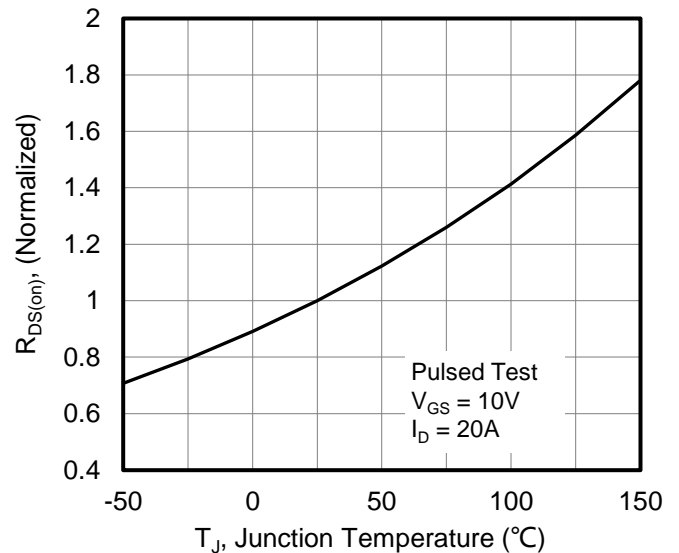


Figure 11. Normalized On Resistance vs Junction Temperature

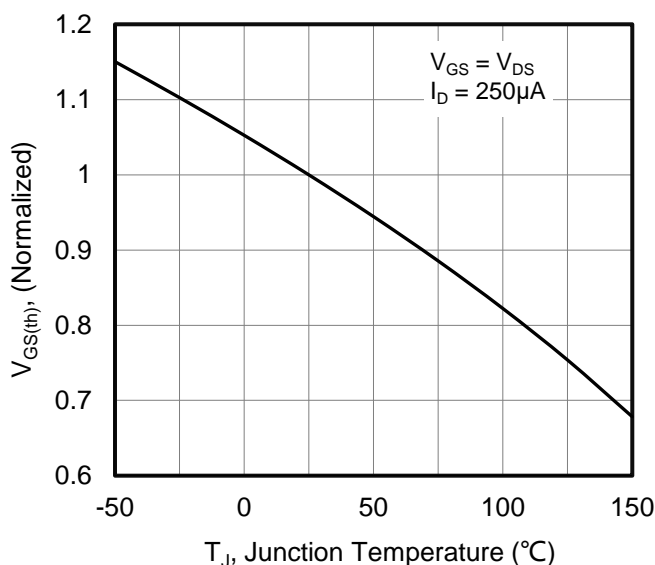


Figure 9. Normalized Threshold Voltage vs Junction Temperature

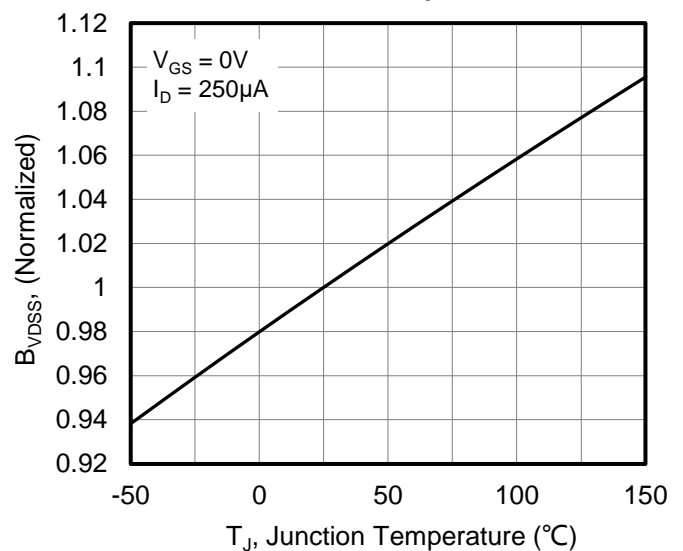


Figure 12. Normalized Breakdown Voltage vs Junction Temperature

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

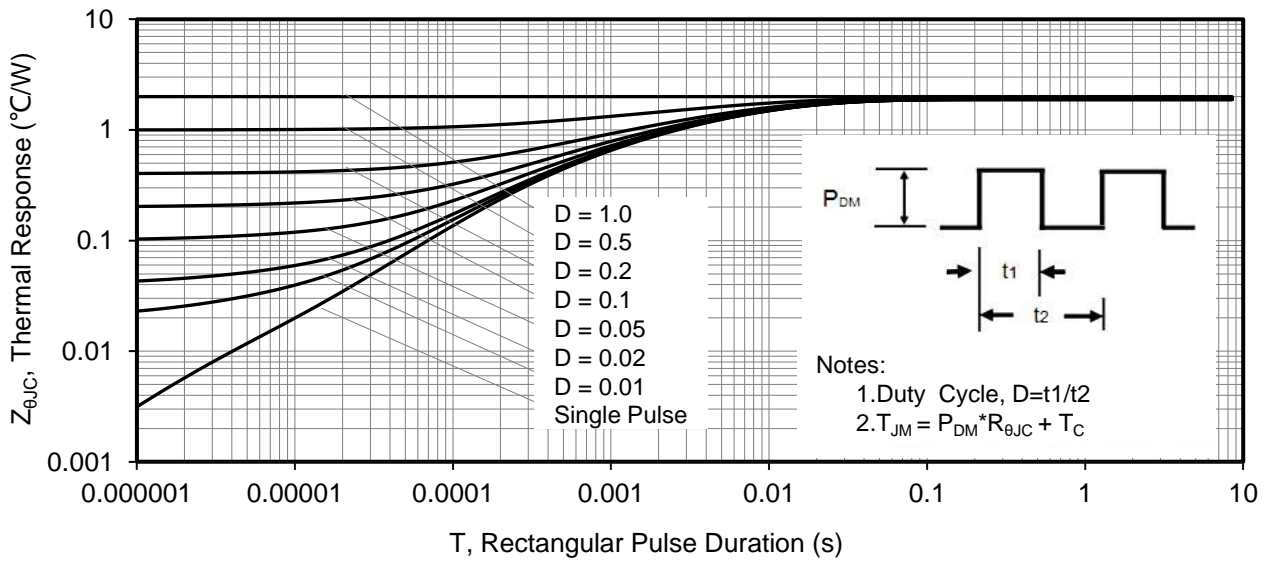


Figure 13. Maximum Effective Thermal Impedance, Junction to Case

Figure A: Gate Charge Test Circuit and Waveform

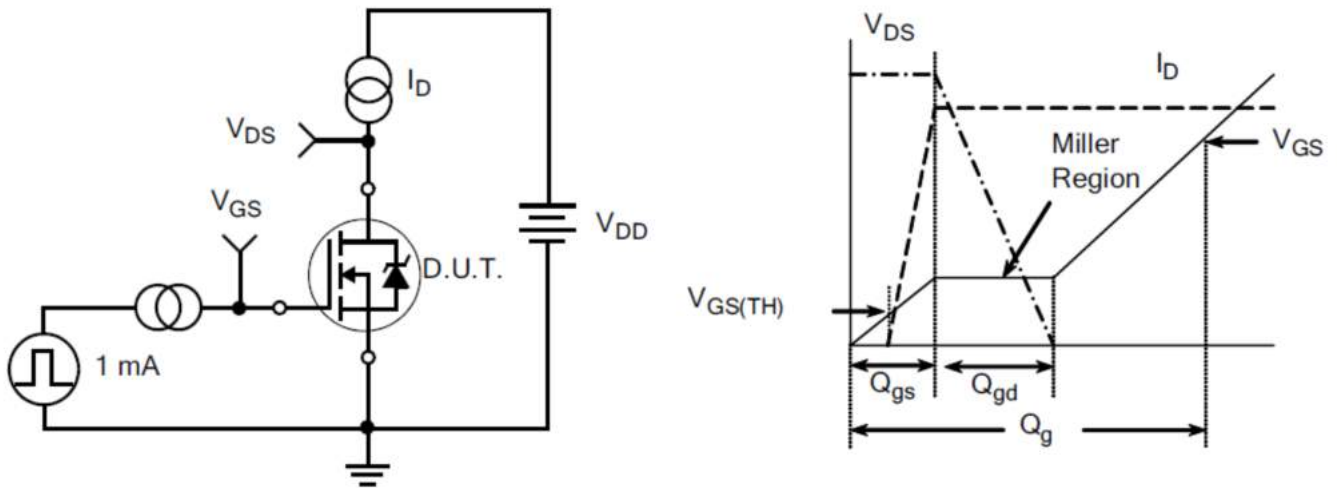


Figure B: Resistive Switching Test Circuit and Waveform

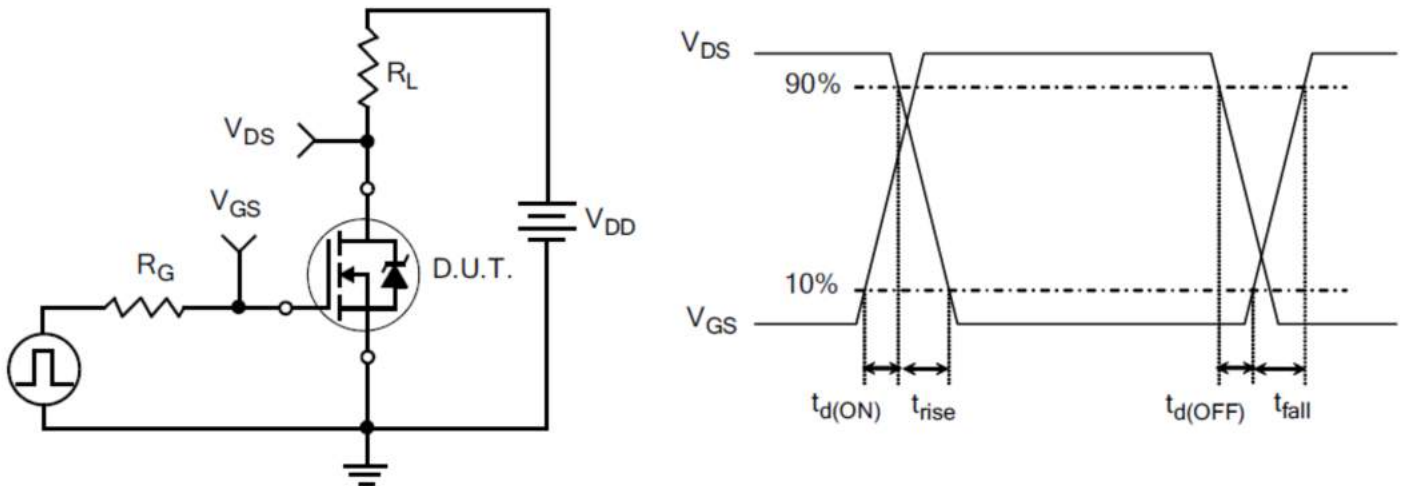
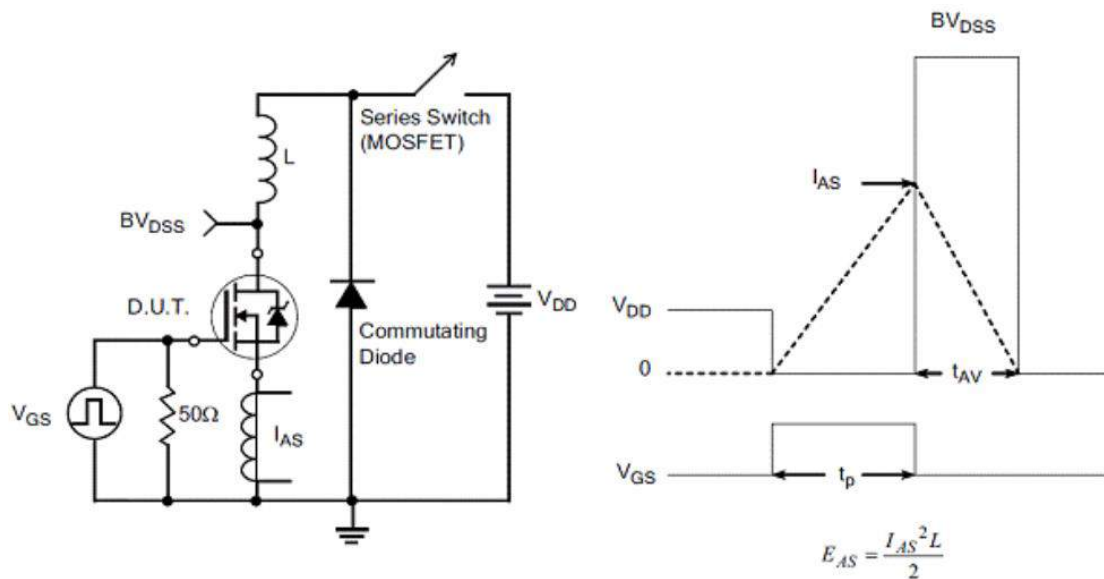
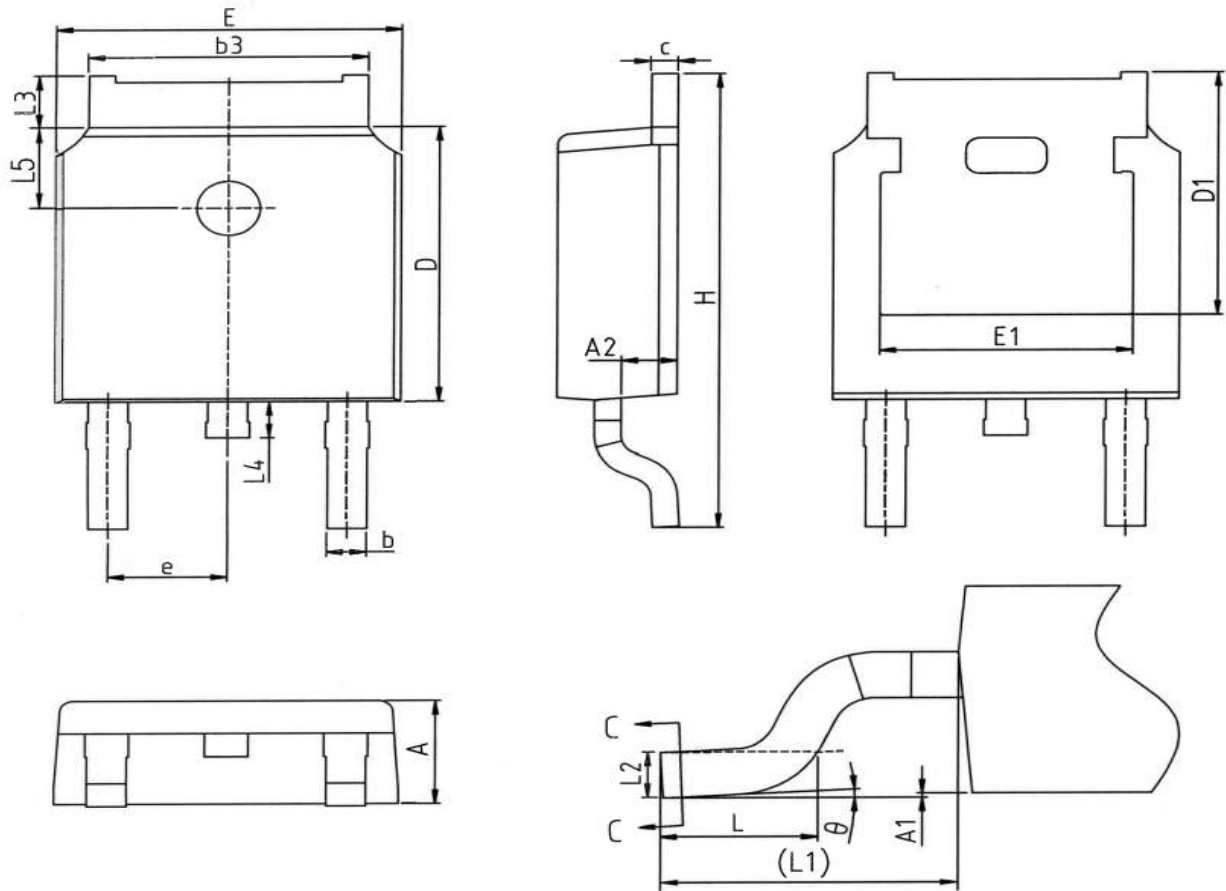


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



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