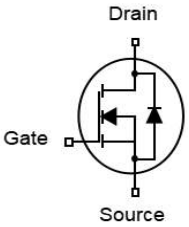
Features

- N-Channel
- Very low on-resistance $R_{DS(on)}$ @ V_{GS}=4.5 V
- High Power and current handing capability
- 100% Avalanche Tested
- Pb-free lead plating; RoHS compliant
- 100% EAS Tested

V_{DS}	40	V
$R_{DS(on),TYP}$@ V_{GS}=10 V	2.5	mΩ
$R_{DS(on),TYP}$@ V_{GS}=4.5 V	4.0	mΩ
I_D	125	A

TO-252



Part ID	Package Type	Marking	Packing
ZT025N04D	TO-252	ZT025N04D	2500pcs/reel

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T_C=25°C Unless Otherwise Noted)				
V_{GS}	Gate-Source Voltage		±20	V
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage		40	V
T_J	Maximum Junction Temperature		175	°C
T_{STG}	Storage Temperature Range		-55 to 175	°C
I_{DM}	Drain Current-Continuous@ Current-Pulsed (Note 1)	T_C =25°C	500	A
Mounted on Large Heat Sink				
I_D	Drain Current-Continuous	T_C =25°C	125	A
		T_C =100°C	88	A
P_D	Maximum Power Dissipation	T_C =25°C	107	W
		T_C =100°C	53	W
$R_{\theta JC}$	Thermal Resistance-Junction to Case		1.4	°C/W
Drain-Source Avalanche Ratings				
EAS	Avalanche Energy, Single Pulsed (Note 2)		576	mJ

Electrical Characteristics (T_J=25℃ 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	40	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=40V,V_{GS}=0V	--	--	1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V	--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	1.0	1.7	2.5	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=20A	--	2.5	3.6	mΩ
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=4.5V, I_D=20A	--	4.0	5.3	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V ,I_D=20A	--	38	--	S
Dynamic Electrical Characteristics @ T_j = 25°C (unless otherwise stated)						
Ciss	Input Capacitance	V_{DS}=20V,V_{GS}=0V, f=1MHz	--	6412	--	pF
Coss	OutputCapacitance		--	464	--	pF
Crss	ReverseTransferCapacitance		--	280	--	pF
Rg	Gate Resistance	f=1MHz	--	0.67	--	Ω
Qg	Total Gate Charge	V_{DS}=20V,I_D=20A, V_{GS}=10V	--	110	--	nC
Qgs	Gate-SourceCharge		--	16.1	--	nC
Qgd	Gate-DrainCharge		--	26.9	--	nC
Switching Characteristics						
Td(on)	Turn-on Delay Time	V_{DD}=20V, R_L=1Ω, R_G=3Ω, V_{GS}=10V	--	18	--	ns
Tr	Turn-on Rise Time		--	4.4	--	ns
Td(off)	Turn-Off Delay Time		--	67	--	ns
Tf	Turn-Off Fall Time		--	9.4	--	ns
Source- Drain Diode Characteristics@ T_j = 25°C (unless otherwise stated)						
I_{SD}	Source-Drain Current (Body Diode)		--	--	125	A
V_{SD}	Forward on voltage (Note 3)	I_S =20A,V_{GS}=0V	--	--	1.2	V
Trr	Reverse Recovery Time	T_j=25℃,I_F =20A, V_{GS}=0V di/dt=500A/μs	--	6	--	ns
Qrr	Reverse Recovery Charge		--	14	--	nC

Notes :

1.Repetitive Rating: Pulse width limited by maximum junction temperature.
2.E_{AS} condition: T_J=25℃,V_{DD}=40V,V_G=10V, Rg=25Ω, L=0.5mH.
3.Repetitive Rating: Pulse width limited by maximum junction temperature.

Typical Electrical And Thermal Characteristics (Curves)

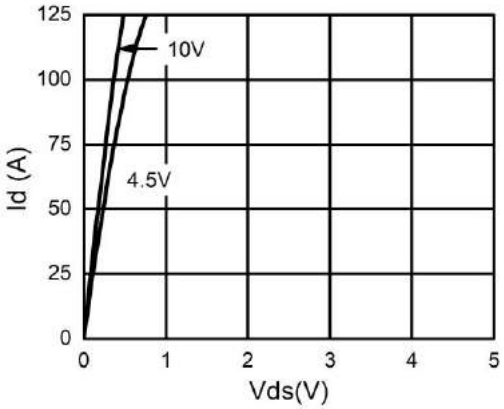


Figure 1. Output Characteristics

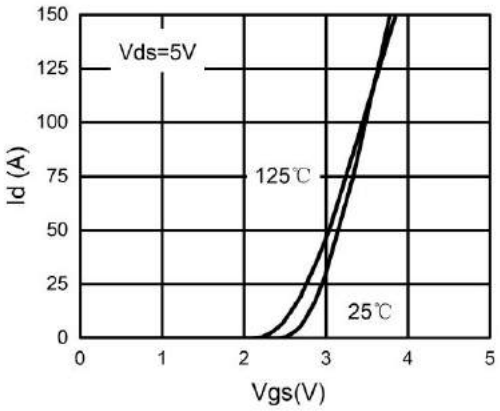


Figure 4. Transfer Characteristics

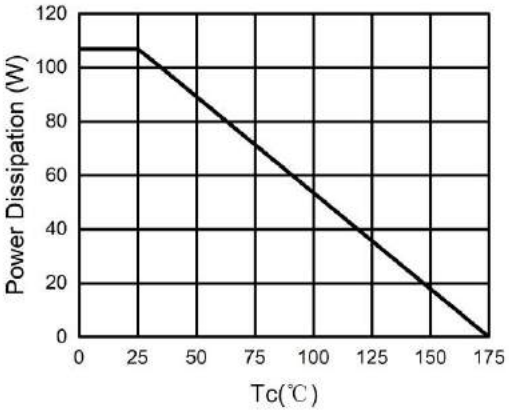


Figure 2. Power Dissipation

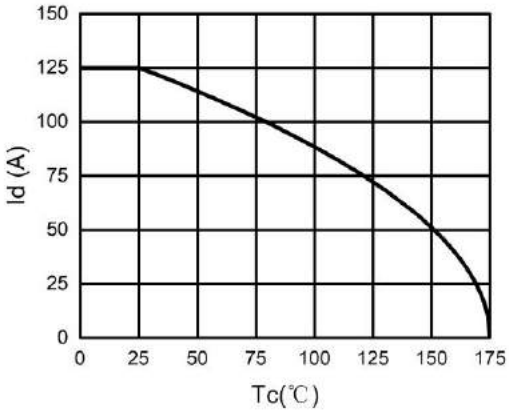


Figure 5. Drain Current

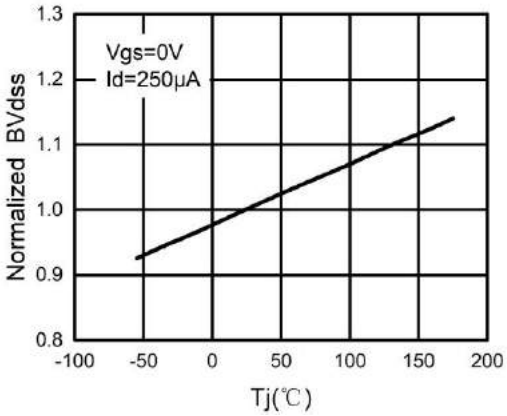


Figure 3. BV_{DSS} vs Junction Temperature

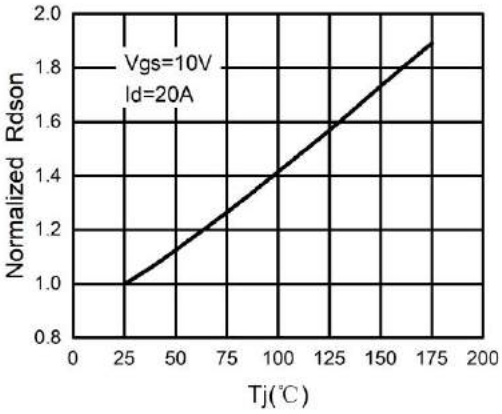


Figure 6. $R_{DS(ON)}$ vs Junction Temperature

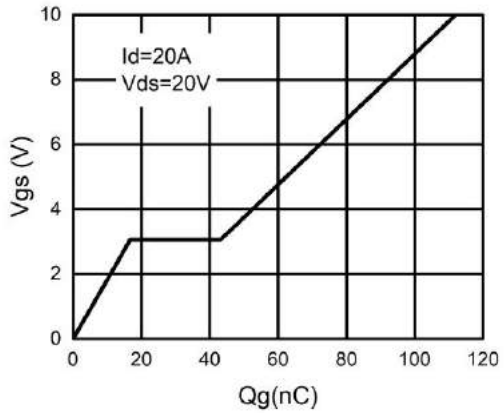


Figure 7. Gate Charge Waveforms

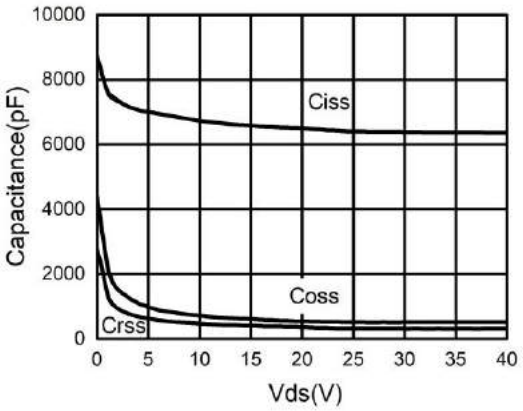


Figure 9. Capacitance

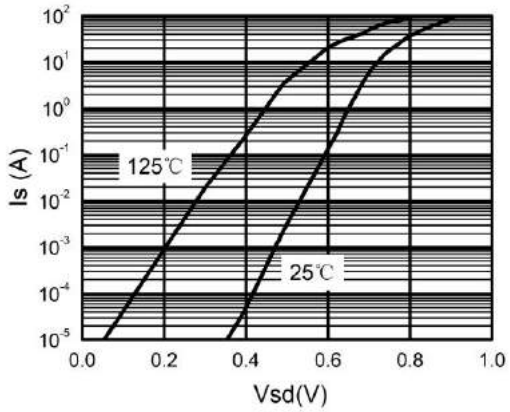


Figure 8. Body-Diode Characteristics

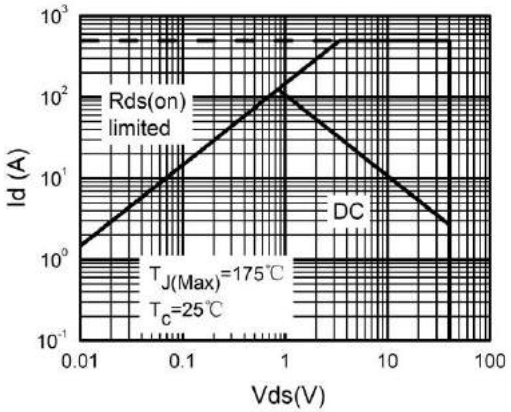
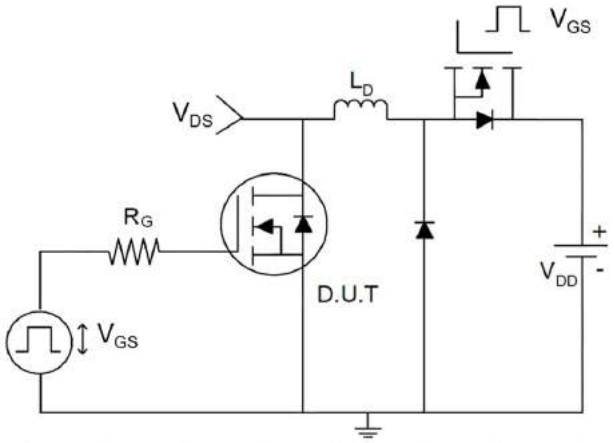
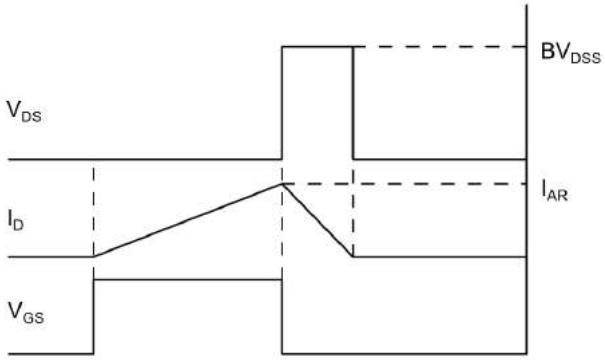


Figure 10. Maximum Safe Operating Area

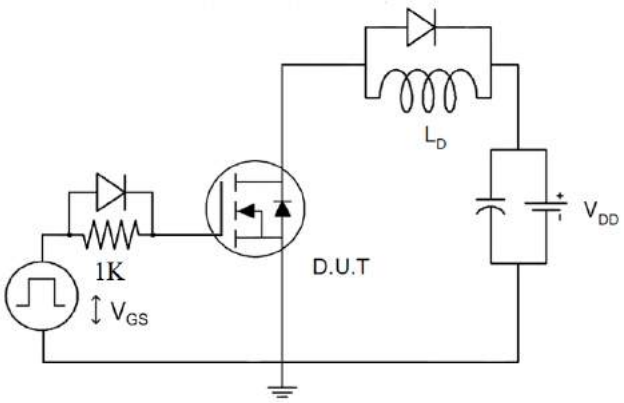
Test Circuit

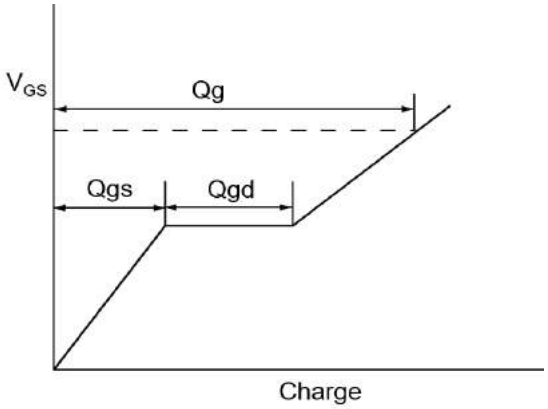
1) E_{AS} Test Circuits



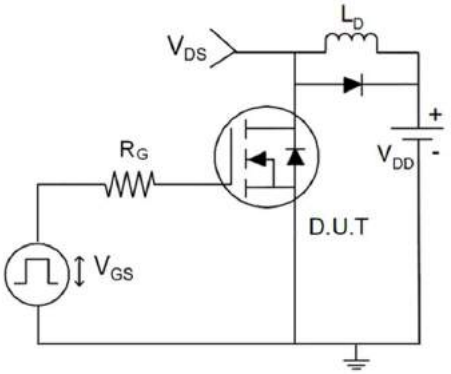


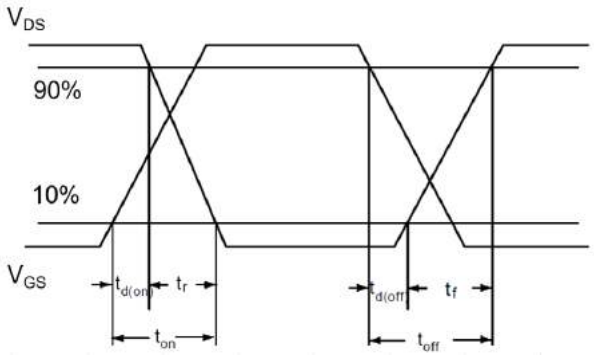
2) Gate Charge Test Circuit



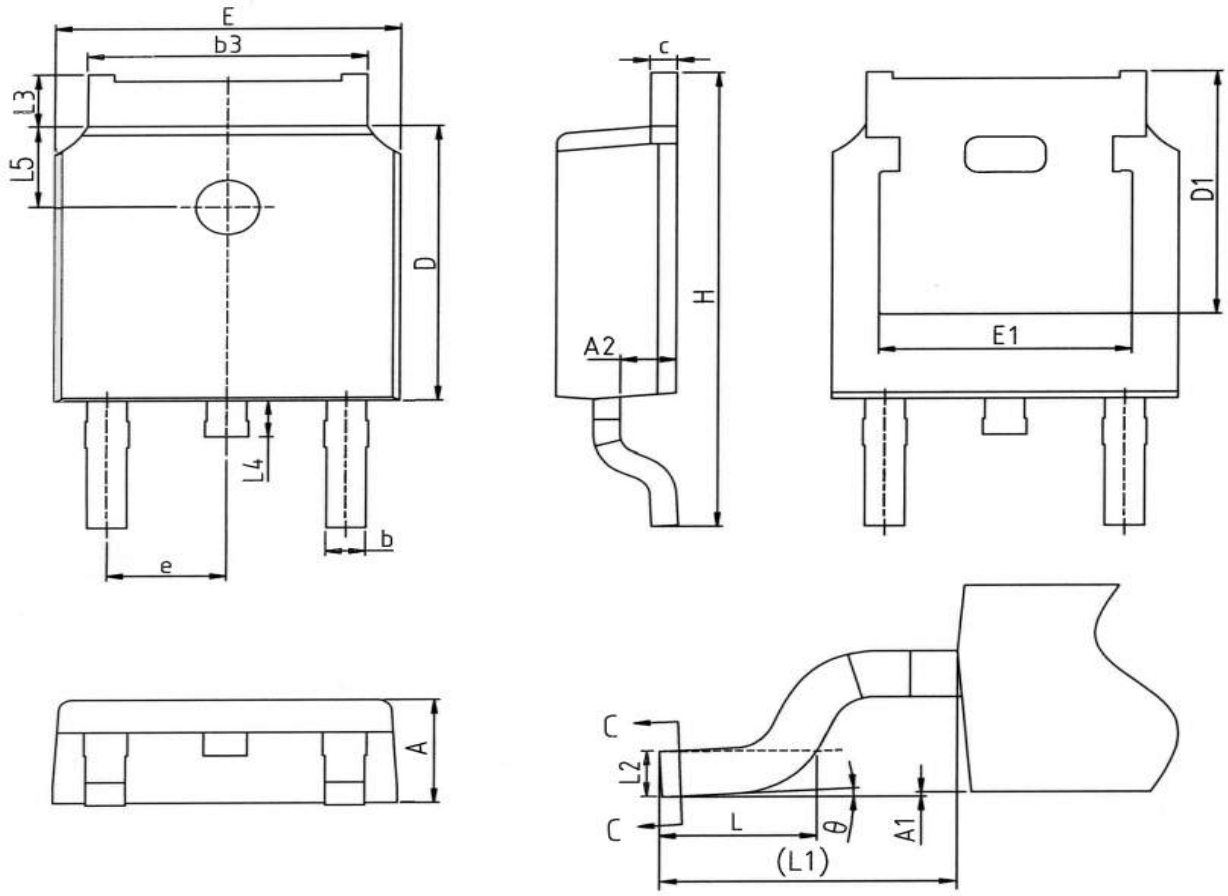


3) Switch Time Test Circuit





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