

Features

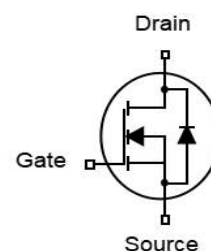
- N-Channel
- Low $R_{DS(on)}$ & FOM
- Extremely low switching loss
- Excellent reliability and uniformity
- Fast switching and soft recovery
- 100% EAS Tested

V_{DS}	40	V
$R_{DS(on),TYP@ V_{GS}=10V}$	1.1	m Ω
$R_{DS(on),TYP@ V_{GS}=4.5V}$	1.8	m Ω
I_D	160	A

DFN5x6



Part ID	Package Type	Marking	Packing
ZTG012N04GC	DFN5x6	ZTG012N04GC	5000pcs/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	40	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)	$T_C = 25^\circ\text{C}$ 640	A	
Mounted on Large Heat Sink				
I_D	Drain Current-Continuous	$T_C = 25^\circ\text{C}$	160	A
		$T_C = 100^\circ\text{C}$	101	A
P_D	Maximum Power Dissipation (Note 2)	96	W	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	1.3	$^\circ\text{C/W}$	
$R_{\theta JA}$	Thermal Resistance Junction-Ambient (Note 3)	50	$^\circ\text{C/W}$	
Drain-Source Avalanche Ratings				
EAS	Avalanche Energy, Single Pulsed (Note 7)	115	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	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	1.3	1.8	2.4	V
R _{DS(on)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =50A	--	1.1	1.35	mΩ
R _{DS(on)}	Drain-Source On-State Resistance	V _{GS} =4.5V, I _D =50A	--	1.8	2.3	mΩ
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated) (Note 5)						
C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, f=1MHz	--	4822	--	pF
C _{oss}	Output Capacitance		--	2123	--	pF
C _{rss}	Reverse Transfer Capacitance		--	129	--	pF
R _g	Gate Resistance	f=1MHz	--	1.2	--	Ω
Q _g	Total Gate Charge	V _{DS} =20V, I _D =40A, V _{GS} =10V	--	72	--	nC
Q _{gs}	Gate-Source Charge		--	24	--	nC
Q _{gd}	Gate-Drain Charge		--	7.9	--	nC
Switching Characteristics (Note 5)						
T _{d(on)}	Turn-on Delay Time	V _{DD} =20V, I _D =40A, R _G =2.7Ω, V _{GS} =10V	--	20	--	ns
T _r	Turn-on Rise Time		--	63	--	ns
T _{d(off)}	Turn-Off Delay Time		--	58	--	ns
T _f	Turn-Off Fall Time		--	16	--	ns
Source- Drain Diode Characteristics @ T_J = 25°C (unless otherwise stated)						
I _S	Diode Forward Current (Note 3)		--	--	160	A
V _{SD}	Forward on voltage (Note 6)	I _S =50A, V _{GS} =0V	--	--	1.4	V
T _{rr}	Reverse Recovery Time (Note 4)	T _J =25°C, I _F =40A	--	58	--	ns
Q _{rr}	Reverse Recovery Charge	di/dt=100A/μs	--	67	--	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature. Ratings are based on low frequency and duty cycles to keep initial T_J =25° C.
2. The power dissipation PD is based on T_J(MAX)=150°C, using junction-to-case thermal resistance.
3. Surface Mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C.
4. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
5. Guaranteed by design, not subject to production.
6. The maximum current limited by package
7. EAS condition : T_J=25°C, V_{DD}=32V, L=0.1mH, R_g=25Ω

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

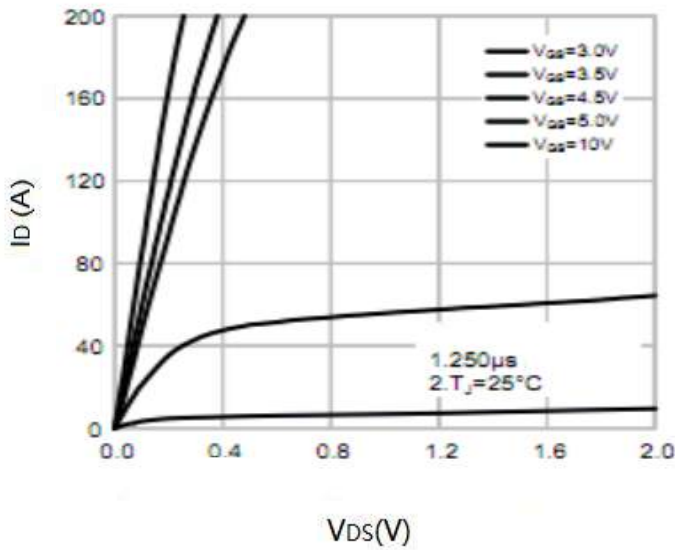


Figure 1 Output Characteristics

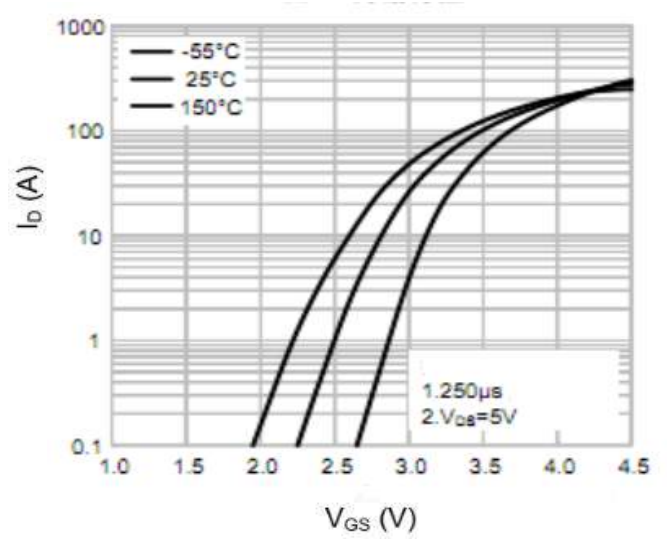


Figure 4 Transfer Characteristics

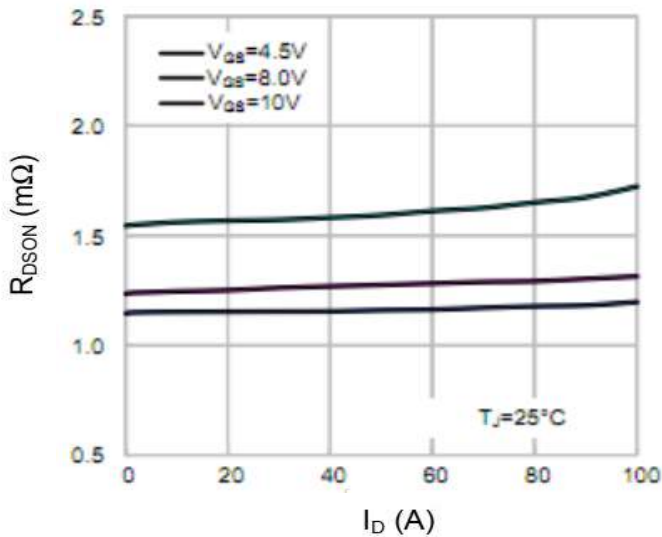


Figure 2 Rdson- Drain Current

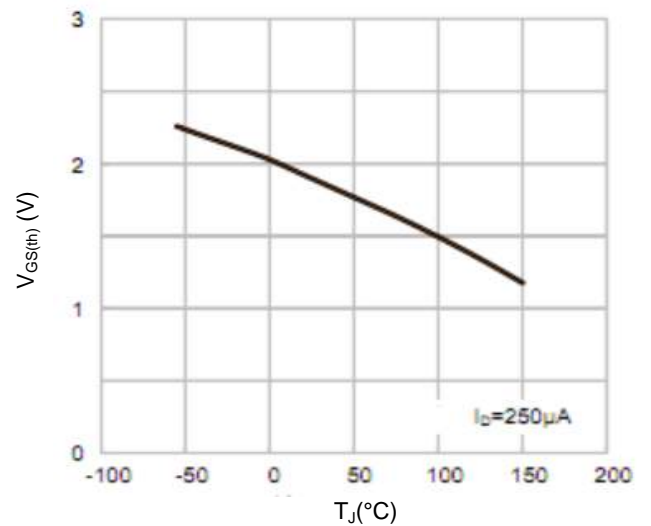


Figure 5 $V_{GS(th)}$ - Junction Temperature

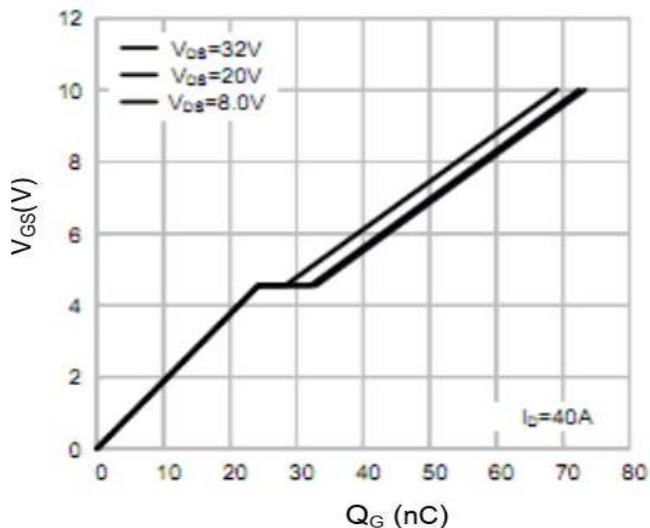


Figure 3 Gate Charge

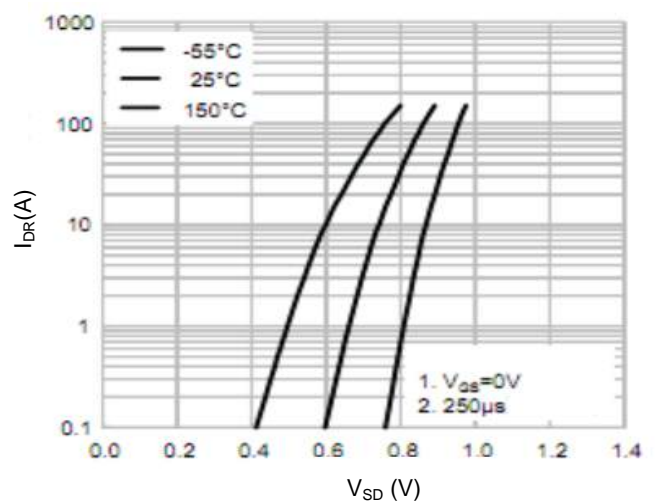


Figure 6 Drain current and temperature - Drain Diode Forward

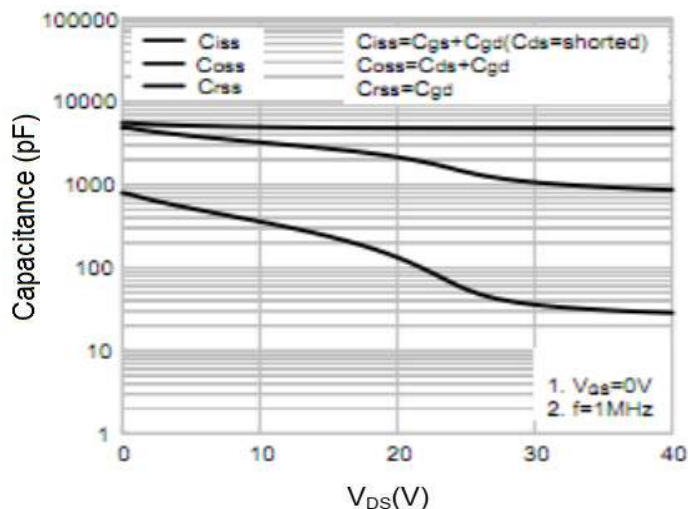


Figure 7 Capacitance vs Vds

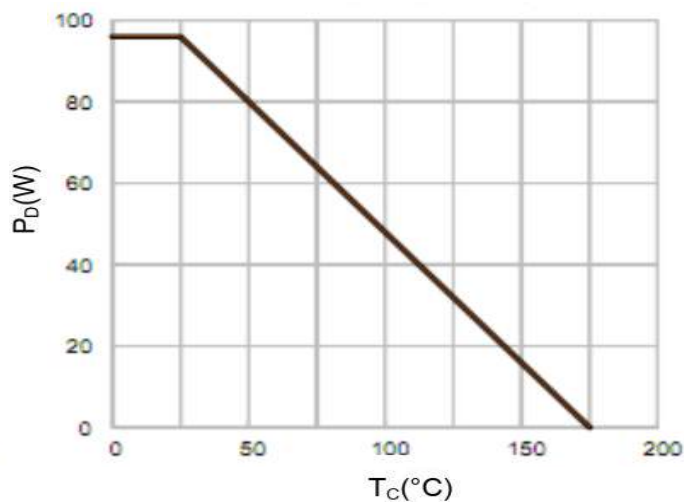


Figure 10 Power De-rating

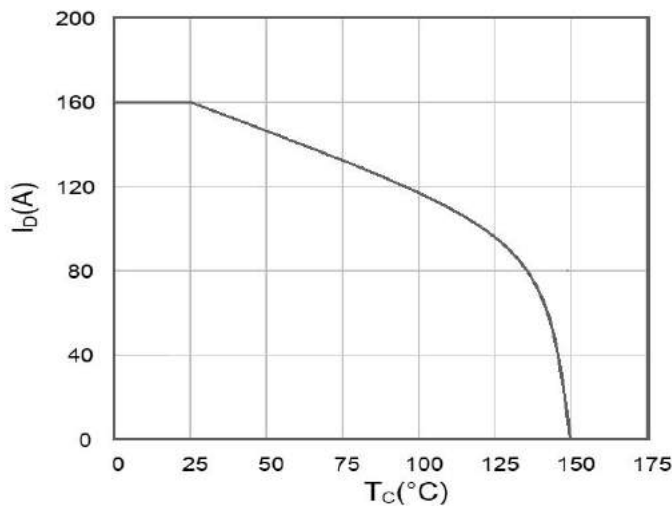


Figure 8 Current De-rating

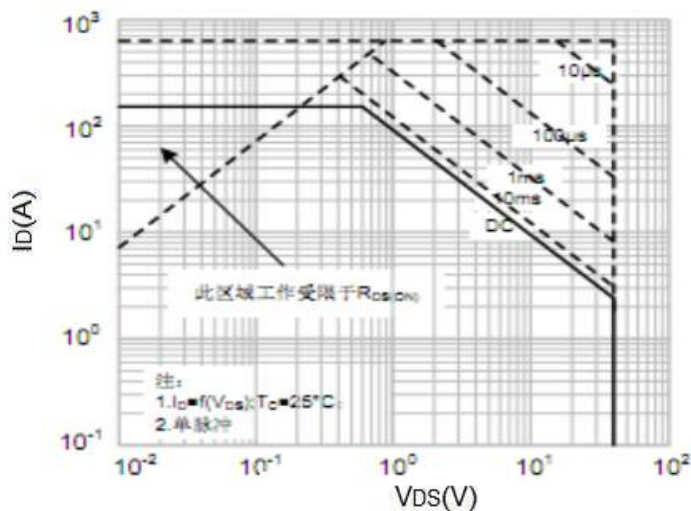


Figure 11 Safe Operation Area

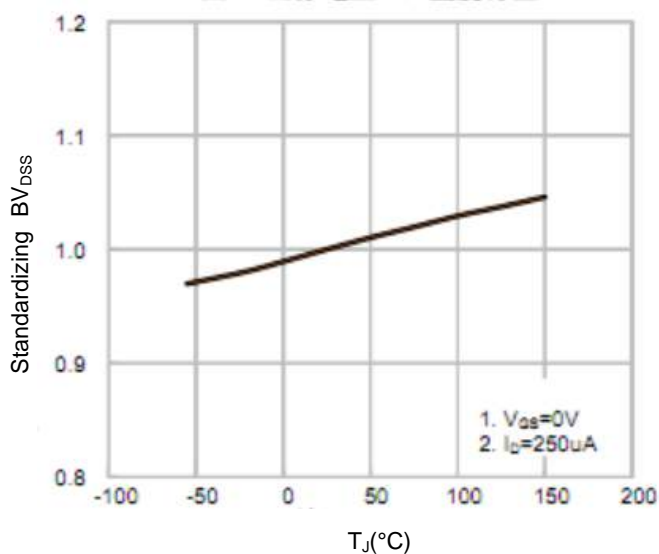


Figure 9 Breakdown Voltage VS Temperature Characteristic

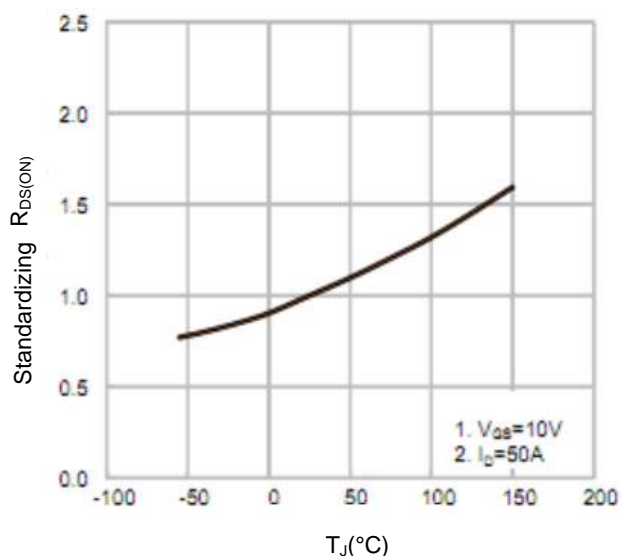


Figure 12 $R_{ds(on)}$ VS Temperature Characteristic

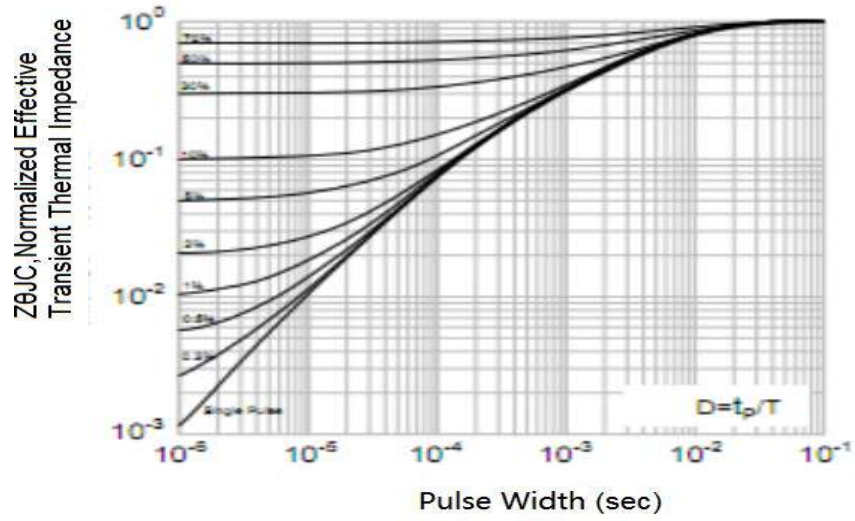
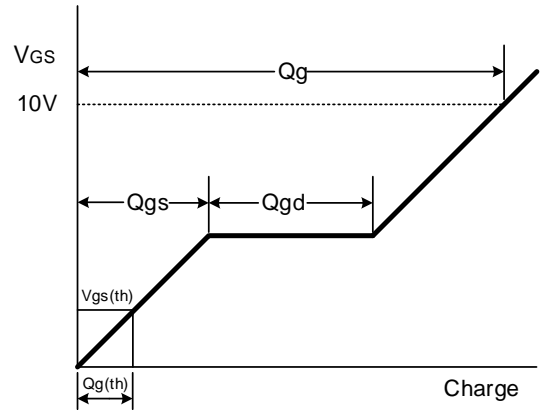
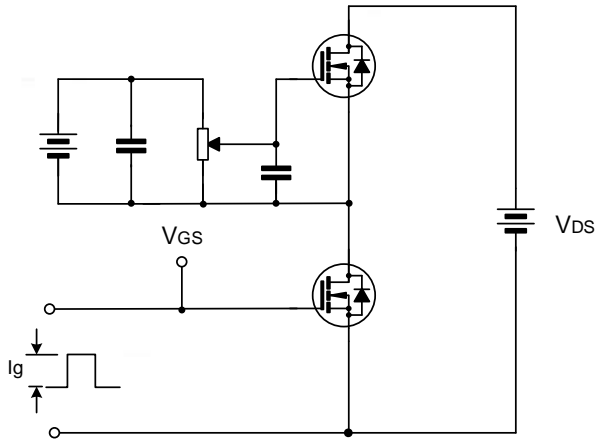


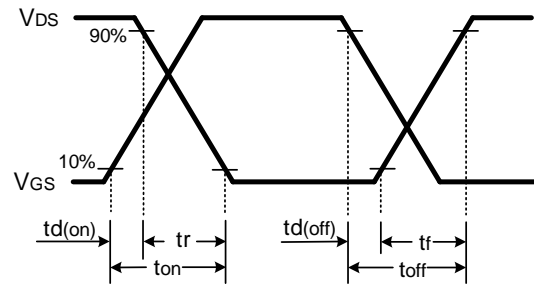
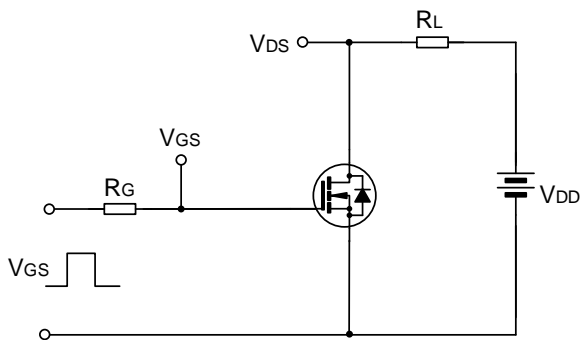
Figure 13 Normalized Maximum Transient Thermal Impedance

Test circuit&Waveform

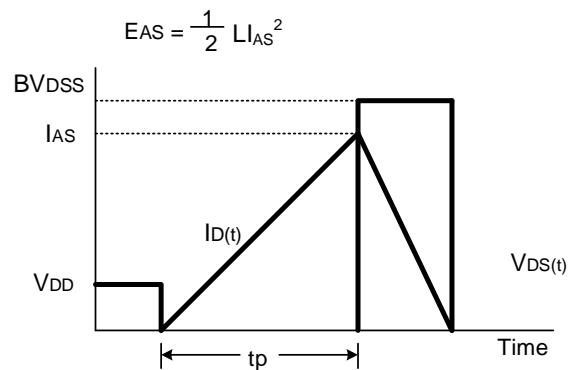
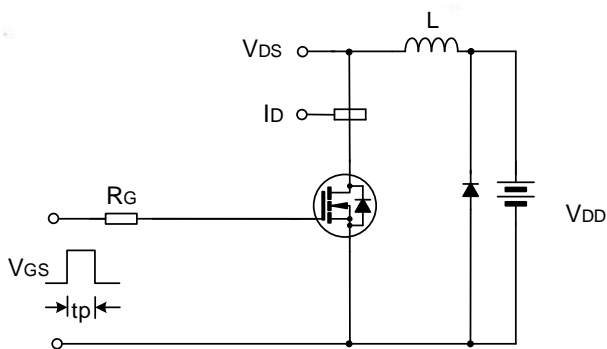
Gate Charge Test Circuit & Waveform



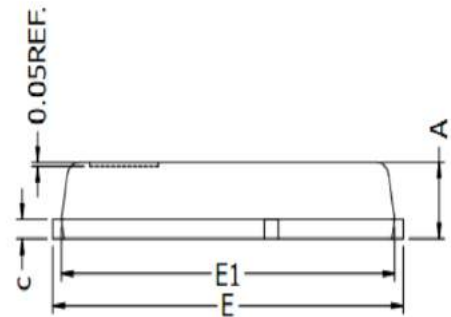
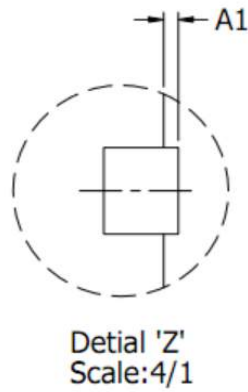
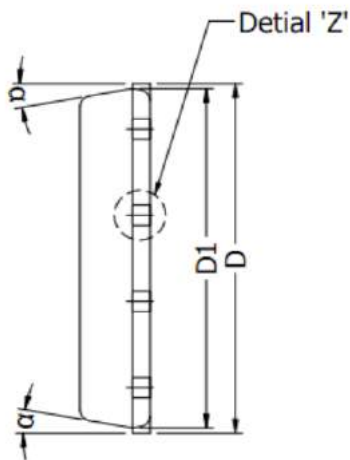
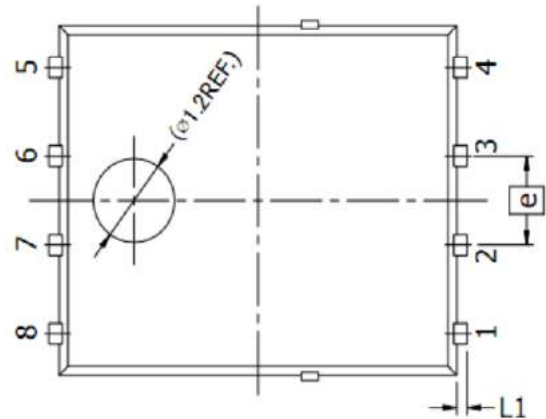
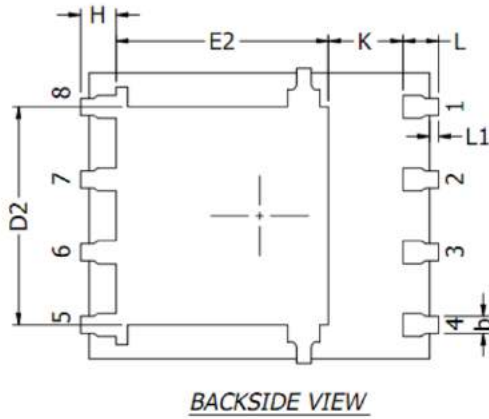
Resistive Switching Test Circuit & Waveforms



EAS Test Circuit & Waveforms



DFN5x6-8L Package Information



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0	-	0.05
b	0.30	0.40	0.50
c	0.20	0.25	0.30
D	5.15 BSC		
D1	5.00 BSC		
D2	3.76	3.81	3.86
E	6.15 BSC		
E1	5.80	5.85	5.90
E2	3.45	3.65	3.85
e	1.27 BSC		
H	0.51	0.61	0.71
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.08	0.15	0.23
α	10°	11°	12°

Customer Service

Sales and Service:
zj@ztasemi.com