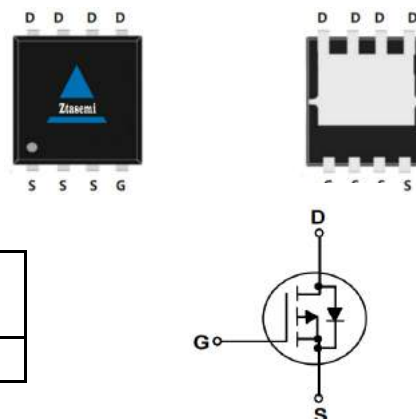


## Features

- P-Channel
- High Power and current handing capability
- Lead free product is acquired
- 100% EAS Tested

$V_{DS}$	-40	V
$R_{DS(on),TYP@ V_{GS}=-10V}$	4.3	m $\Omega$
$R_{DS(on),TYP@ V_{GS}=-4.5V}$	6	m $\Omega$
$I_D$	-80	A

**DFN5X6**


Part ID	Package Type	Marking	Packing
ZT045P04G	DFN5x6	ZT045P04G	5000pcs/reel

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

Symbol	Parameter	Rating	Unit	
<b>Common Ratings (<math>T_c=25^\circ\text{C}</math> Unless Otherwise Noted)</b>				
$V_{GS}$	Gate-Source Voltage	$\pm 20$	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)	$T_c = 25^\circ\text{C}$ -320	A	
<b>Mounted on Large Heat Sink</b>				
$I_D$	Drain Current-Continuous	$T_c = 25^\circ\text{C}$	-80	A
		$T_c = 100^\circ\text{C}$	-51	A
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ\text{C}$	58	W
		$T_c = 100^\circ\text{C}$	23	W
$R_{\theta JC}$	Thermal Resistance-Junction to Case	2.15	$^\circ\text{C/W}$	
<b>Drain-Source Avalanche Ratings</b>				
EAS	Avalanche Energy, Single Pulsed (Note 2)	576	mJ	

**Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>Static Electrical Characteristics @ T<sub>J</sub>=25°C (unless otherwise stated)</b>						
V(BR)DSS	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA	-40	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =-40V, V <sub>GS</sub> =0V	--	--	-1	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	--	--	±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-1.0	-1.7	-2.5	V
R <sub>DS(on)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =-10V, I <sub>D</sub> =-20A	--	4.3	5.3	mΩ
R <sub>DS(on)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-20A	--	6	7.6	mΩ
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =-5V, I <sub>D</sub> =-20A	--	63	--	S
<b>Dynamic Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V, f=1MHz	--	6636	--	pF
C <sub>oss</sub>	Output Capacitance		--	543	--	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		--	343	--	pF
R <sub>g</sub>	Gate Resistance	f=1MHz	--	2.2	--	Ω
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =-20V, I <sub>D</sub> =-20A, V <sub>GS</sub> =-10V	--	118	--	nC
Q <sub>gs</sub>	Gate-Source Charge		--	13	--	nC
Q <sub>gd</sub>	Gate-Drain Charge		--	22	--	nC
<b>Switching Characteristics</b>						
T <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =-20V, R <sub>L</sub> =1Ω, R <sub>G</sub> =3Ω, V <sub>GS</sub> =-10V	--	16	--	ns
T <sub>r</sub>	Turn-on Rise Time		--	17	--	ns
T <sub>d(off)</sub>	Turn-Off Delay Time		--	68	--	ns
T <sub>f</sub>	Turn-Off Fall Time		--	31	--	ns
<b>Source- Drain Diode Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
I <sub>SD</sub>	Source-Drain Current (Body Diode)		--	--	-80	A
V <sub>SD</sub>	Forward on voltage (Note 3)	I <sub>S</sub> = -20A, V <sub>GS</sub> =0V	--	--	-1.2	V
T <sub>rr</sub>	Reverse Recovery Time	T <sub>J</sub> =25°C, I <sub>F</sub> = -20A, V <sub>GS</sub> =0V	--	24	--	ns
Q <sub>rr</sub>	Reverse Recovery Charge	di/dt=500A/μs	--	140	--	nC

**Notes:**

- 1.Repetitive Rating: Pulse width limited by maximum junction temperature.
- 2.E<sub>AS</sub> condition: T<sub>J</sub>=25°C, V<sub>DS</sub>=15V, V<sub>GS</sub>=-10V, R<sub>G</sub>=25Ω, L=0.5mH.
- 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

## Typical Electrical And Thermal Characteristics (Curves)

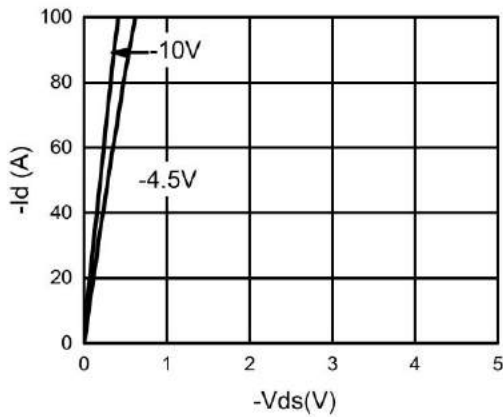


Figure 1. Output Characteristics

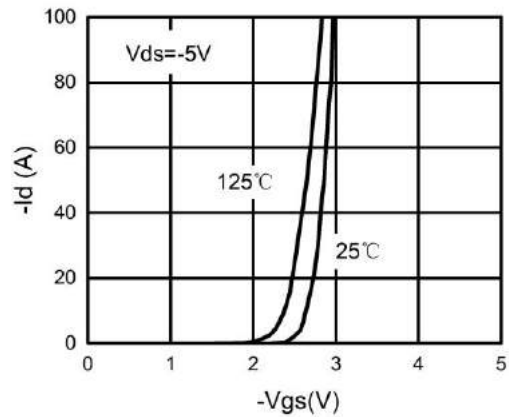


Figure 4. Transfer Characteristics

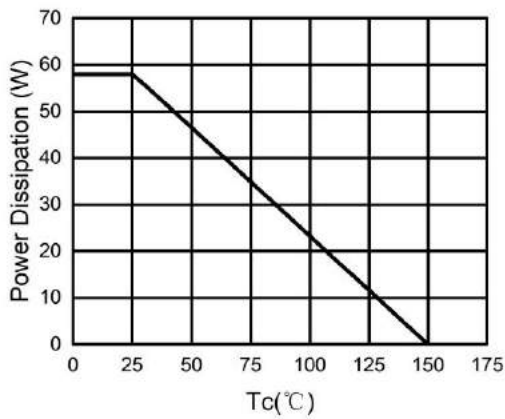


Figure 2. Power Dissipation

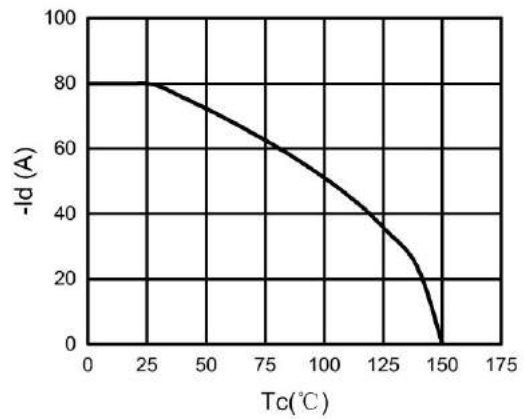


Figure 5. Drain Current

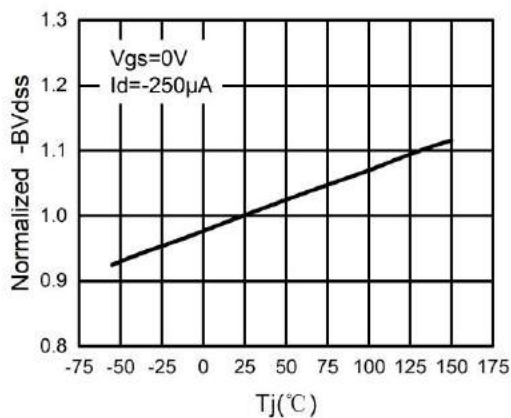


Figure 3.  $BV_{DSS}$  vs Junction Temperature

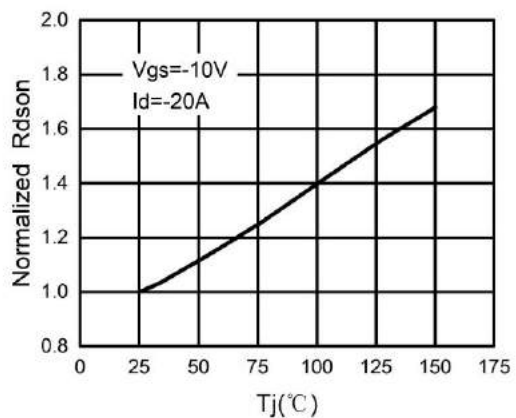


Figure 6.  $R_{DS(ON)}$  vs Junction Temperature

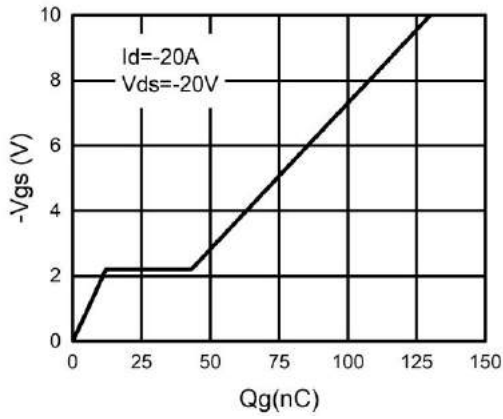


Figure 7. Gate Charge Waveforms

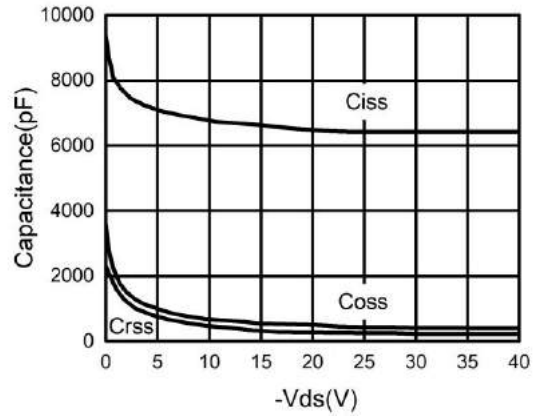


Figure 9. Capacitance

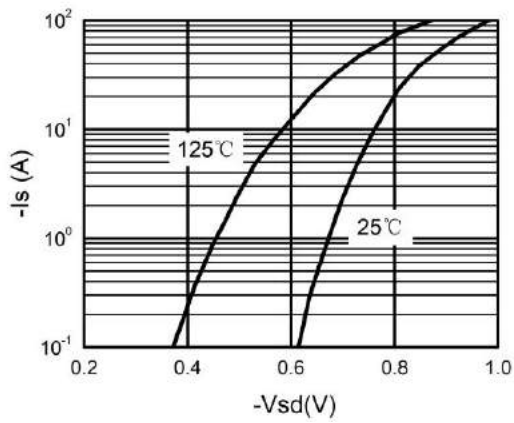


Figure 8. Body-Diode Characteristics

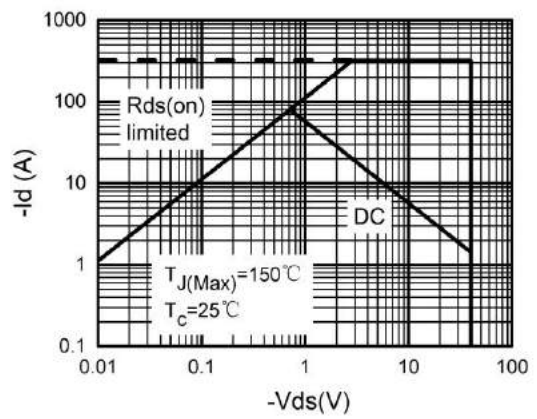
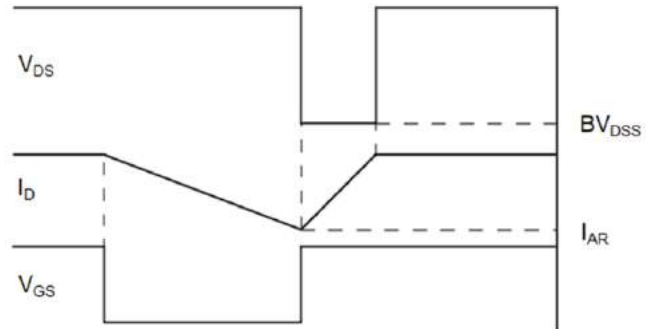
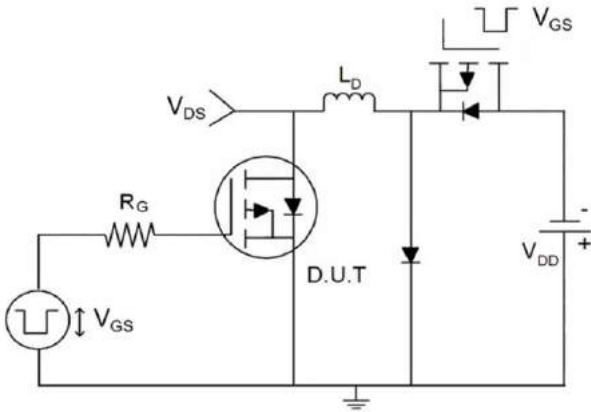


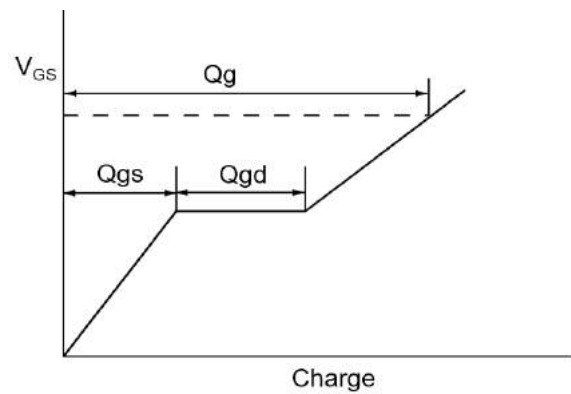
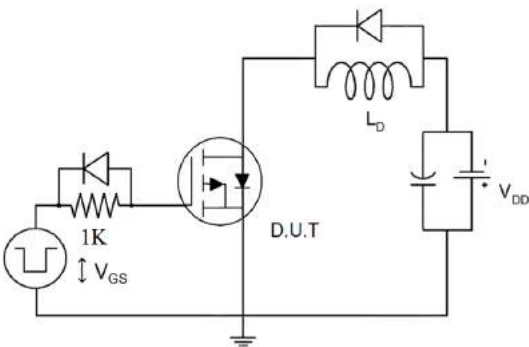
Figure 10. Maximum Safe Operating Area

## Test Circuit

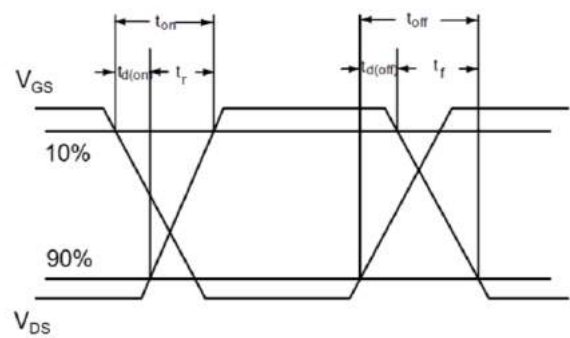
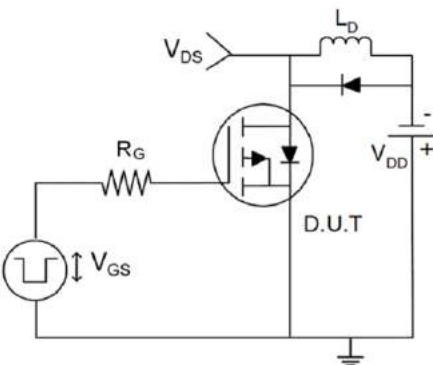
### 1) $E_{AS}$ Test Circuits



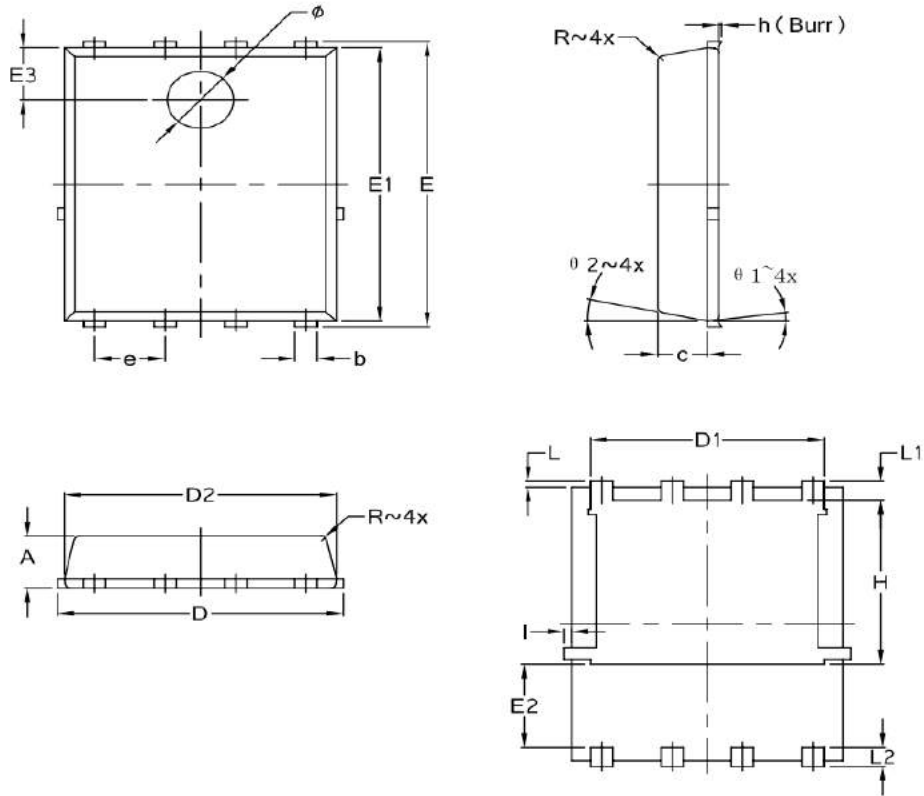
### 2) Gate Charge Test Circuit



### 3) Switch Time Test Circuit



## DFN5x6-8L Package Information



SYMBOL	COMMON			
	MM		INCH	
	MIN.	MAX.	MIN.	MAX.
A	1.03	1.17	0.0406	0.0461
b	0.35	0.46	0.0138	0.0181
c	0.84	0.95	0.0331	0.0374
D	4.83	5.37	0.1902	0.2114
D1	4.14	4.28	0.1630	0.1685
D2	4.83	4.97	0.1902	0.1957
E	6.03	6.13	0.2374	0.2413
E1	5.68	5.82	0.2236	0.2291
E2	1.65	—	0.0650	—
E3	1.03	1.17	0.0406	0.0461
e	1.27 BSC		0.0500 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.40	0.48	0.0157	0.0189
L2	0.40	0.48	0.0157	0.0189
H	3.315	3.475	0.1305	0.1368
I	—	0.16	—	0.0063
$\phi$	1.13	1.27	0.0445	0.0500
R	0.10		0.0039	
$\theta 1$	7° REF		7° REF	
$\theta 2$	12° REF		12° REF	
h	0.08 MAX		0.0031	

## Customer Service

Sales and Service:

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