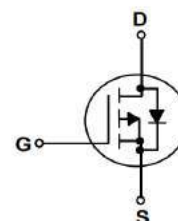


## Features

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

$V_{DS}$	-60	V
$R_{DS(on),TYP}@ V_{GS}=-10V$	80	m $\Omega$
$R_{DS(on),TYP}@ V_{GS}=-4.5V$	97	m $\Omega$
$I_D$	-13	A

### TO-252



Part ID	Package Type	Marking	Packing
ZT80P06D	TO-252	ZT80P06D	2500pcs/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	-60	V	
$T_J$	Maximum Junction Temperature	175	$^{\circ}\text{C}$	
$T_{STG}$	Storage Temperature Range	-55 to 175	$^{\circ}\text{C}$	
$I_{DM}$	Drain Current-Continuous@ Current-Pulsed (Note 1)	$T_C=25^{\circ}\text{C}$ -52	A	
<b>Mounted on Large Heat Sink</b>				
$I_D$	Drain Current-Continuous	$T_C=25^{\circ}\text{C}$	-13	A
		$T_C=100^{\circ}\text{C}$	-9.2	A
$P_D$	Maximum Power Dissipation	$T_C=25^{\circ}\text{C}$	40.5	W
		$T_C=100^{\circ}\text{C}$	20	W
$R_{\theta JC}$	Thermal Resistance-Junction to Case	3.7	$^{\circ}\text{C}/\text{W}$	
<b>Drain-Source Avalanche Ratings</b>				
EAS	Avalanche Energy, Single Pulsed (Note 2)	56	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	-60	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =-60V, 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	-1.8	-2.5	V
R <sub>DS(on)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =-10V, I <sub>D</sub> =-10A	--	80	100	mΩ
R <sub>DS(on)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-8A	--	97	129	mΩ
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =-5V, I <sub>D</sub> =-10A	--	15	--	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> =-30V, V <sub>GS</sub> =0V, f=1MHz	--	1436	--	pF
C <sub>oss</sub>	Output Capacitance		--	46	--	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		--	34	--	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =-30V, I <sub>D</sub> =-10A, V <sub>GS</sub> =-10V	--	25	--	nC
Q <sub>gs</sub>	Gate-Source Charge		--	3	--	nC
Q <sub>gd</sub>	Gate-Drain Charge		--	7	--	nC
<b>Switching Characteristics</b>						
T <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =-30V, R <sub>L</sub> =3Ω, R <sub>G</sub> =3Ω, V <sub>GS</sub> =-10V	--	9.5	--	ns
T <sub>r</sub>	Turn-on Rise Time		--	5.3	--	ns
T <sub>d(off)</sub>	Turn-Off Delay Time		--	28	--	ns
T <sub>f</sub>	Turn-Off Fall Time		--	5.8	--	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)		--	--	-13	A
V <sub>SD</sub>	Forward on voltage (Note 1)	I <sub>S</sub> =-10A, 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> =-10A, V <sub>GS</sub> =0V	--	34	--	ns
Q <sub>rr</sub>	Reverse Recovery Charge	di/dt=100A/μs	--	37	--	nC

Notes :

- 1.Repetitive Rating: Pulse width limited by maximum junction temperature.
- 2.EAS condition: T<sub>J</sub>=25°C, V<sub>DD</sub>=40V, V<sub>G</sub>=-10V, R<sub>G</sub>=25Ω, L=0.5mH.

### Typical Electrical And Thermal Characteristics (Curves)

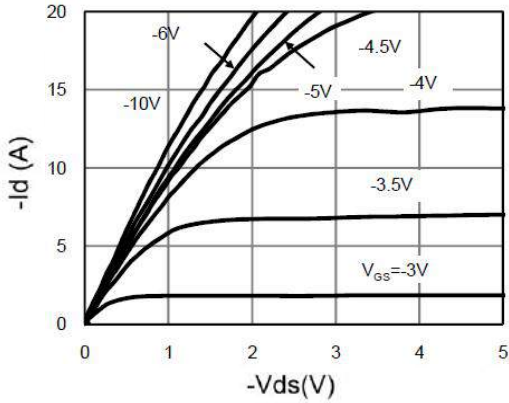


Figure 1. Output Characteristics

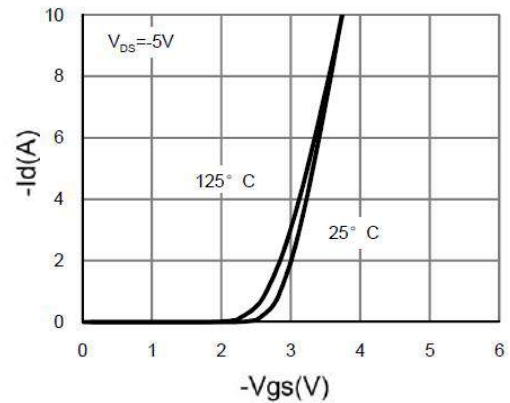


Figure 4. Transfer Characteristics

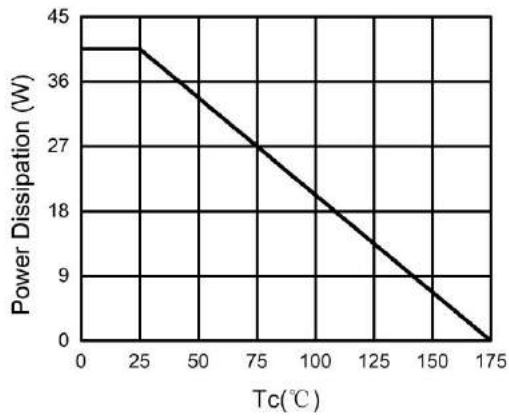


Figure 2. Power Dissipation

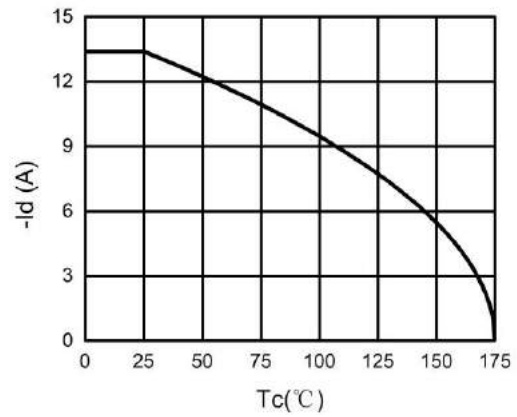


Figure 5. Drain Current

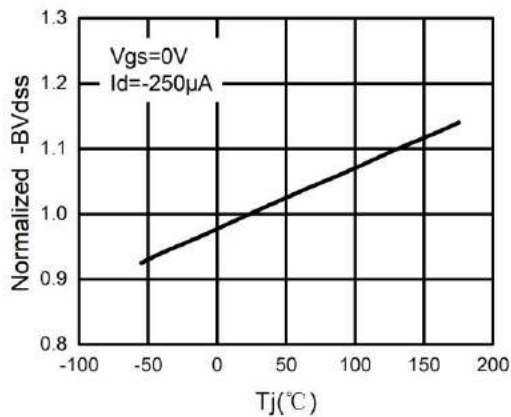


Figure 3.  $BV_{dss}$  vs Junction Temperature

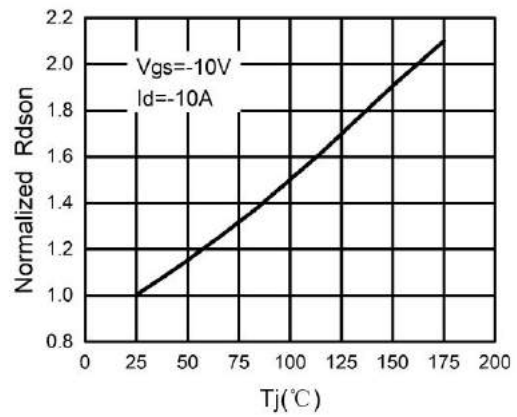


Figure 6.  $R_{ds(on)}$  vs Junction Temperature

### Typical Electrical And Thermal Characteristics (Curves)

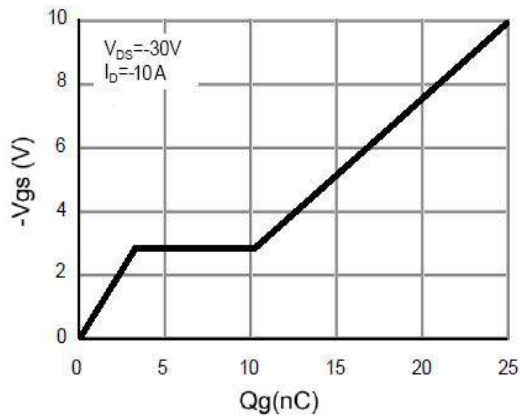


Figure 7. Gate Charge Waveforms

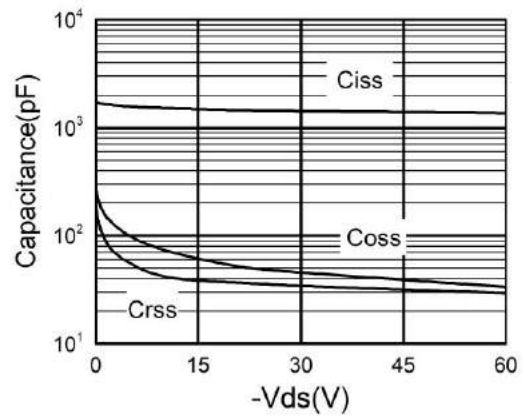


Figure 9. Capacitance

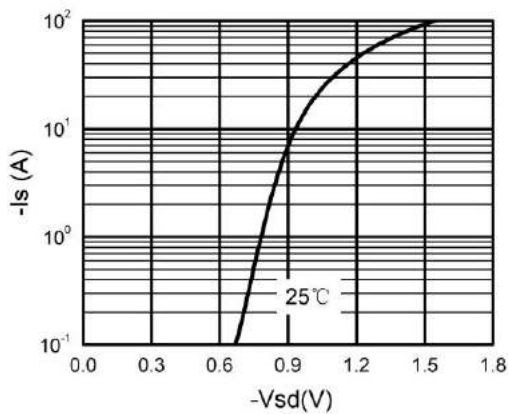


Figure 8. Body-Diode Characteristics

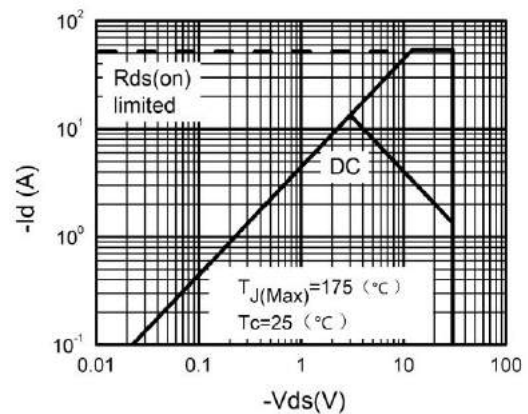


Figure 10. Maximum Safe Operating Area

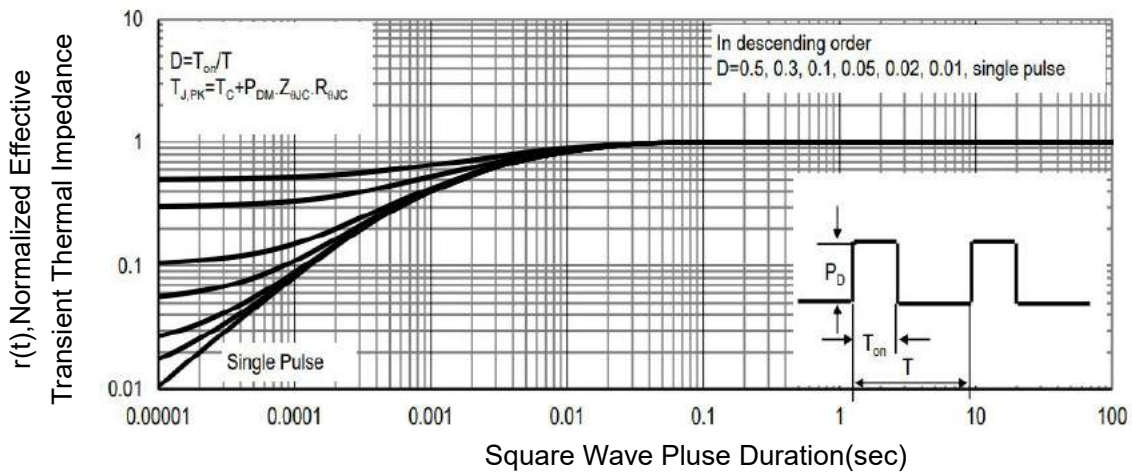
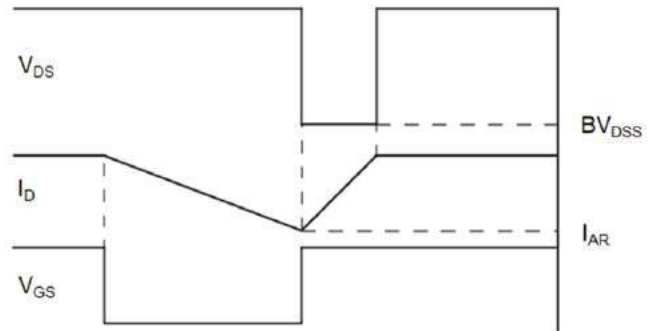
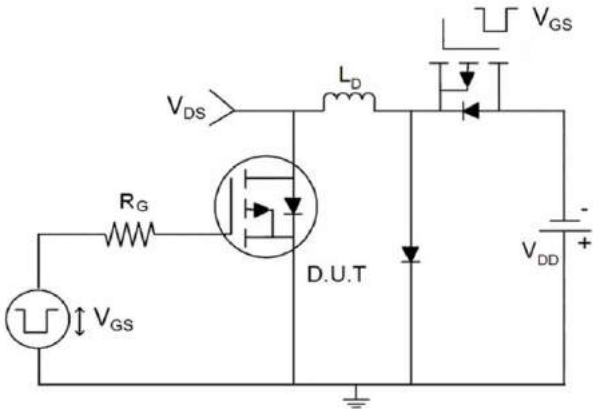


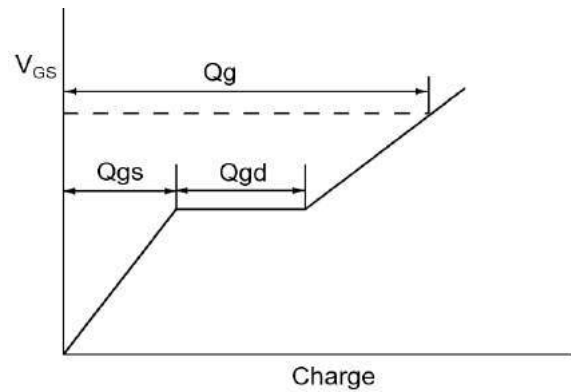
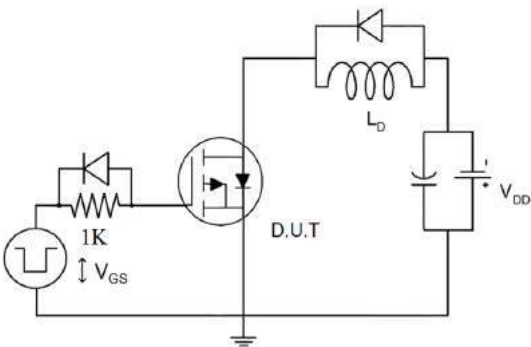
Figure 11. Normalized Maximum Transient Thermal Impedance

## Test Circuit

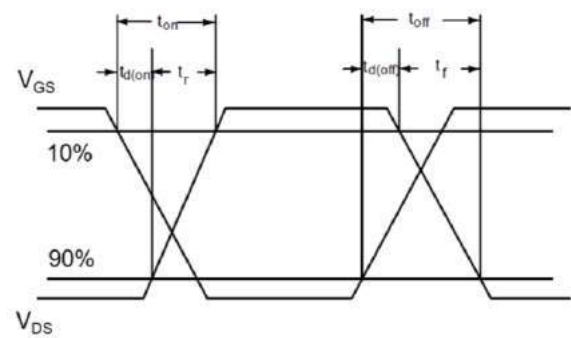
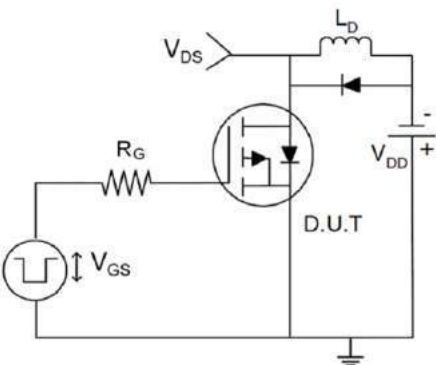
### 1) $E_{AS}$ Test Circuits



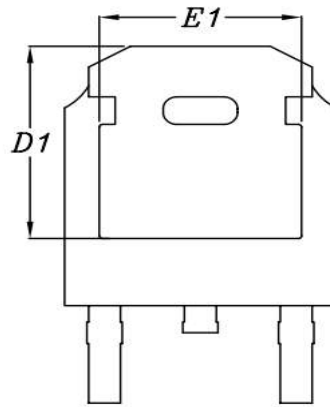
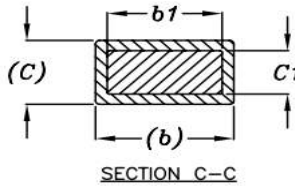
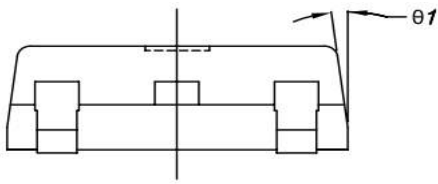
### 2) Gate Charge Test Circuit



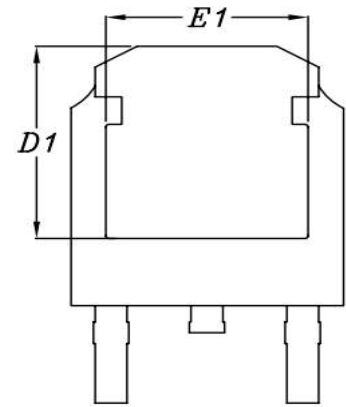
### 3) Switch Time Test Circuit



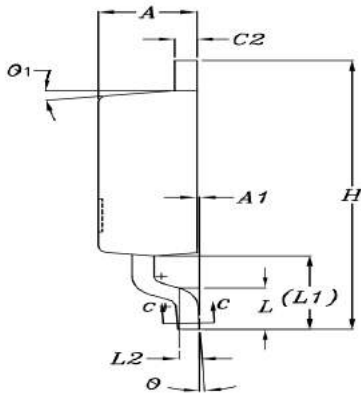
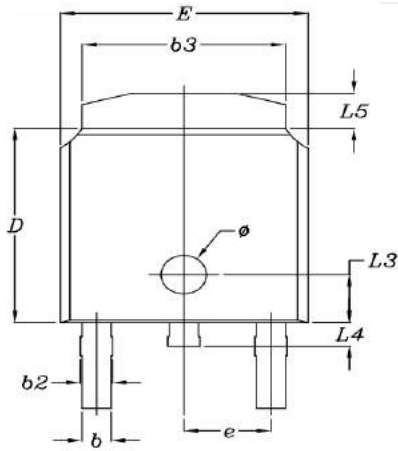
## TO-252 Package Information



Option(1)  
Standard PAD



Option(2)  
Large PAD



I T E M	DIMENSIONS			
	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.18	2.39	0.086	0.094
A1	—	0.13	—	0.005
b	0.70	0.89	0.028	0.035
b1	0.70	0.86	0.028	0.034
b2	0.76	1.14	0.030	0.045
b3	4.95	5.46	0.195	0.215
c	0.46	0.61	0.018	0.024
c1	0.41	0.56	0.016	0.022
c2	0.46	0.89	0.018	0.035
D	5.97	6.22	0.235	0.245
D1	5.21	—	0.205	—
E	6.35	6.73	0.250	0.265
E1	4.32	—	0.170	—
e	2.29 BSC		0.090 BSC	
H	9.40	10.41	0.370	0.410
L	1.40	1.78	0.055	0.070
L1	2.60	2.90	0.102	0.114
L2	0.51 BSC		0.020 BSC	
L3	1.65	1.95	0.065	0.077
L4	0.60	0.90	0.024	0.035
L5	0.89	1.27	0.035	0.050
φ	1°	5°	1°	5°
θ1	7° REF		7° REF	
φ	1.20 REF		1.20 REF	

## Customer Service

Sales and Service:

[zj@ztasemi.com](mailto:zj@ztasemi.com)