

● General Description

The AGM312ME combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

This device is ideal for load switch and battery protection applications.

● Features

- Advance high cell density Trench technology
- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching
- Low Thermal resistance

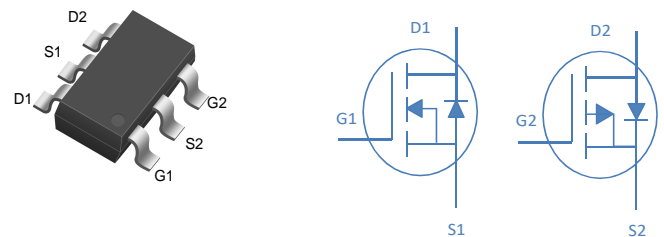
● Application

- MB/VGA Vcore
- SMPS 2nd Synchronous Rectifier
- POL application
- BLDC Motor driver

Product Summary

BVDSS	RDSON	ID
30V	24mΩ	5.5A
-30V	38mΩ	-4.4A

SOT23-6L Pin Configuration



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM312	AGM312ME	SOT23-6L	178mm	8mm	3000

Table 1. Absolute Maximum Ratings ($T_A=25^\circ\text{C}$)

Symbol	Parameter	Rating		Units
		N-Ch	P-Ch	
V_{DS}	Drain-Source Voltage ($V_{GS}=0V$)	30	-30	V
V_{GS}	Gate-Source Voltage ($V_{DS}=0V$)	± 12	± 12	V
I_D	Drain Current-Continuous($T_A=25^\circ\text{C}$) (Note 1)	5.5	-4.4	A
	Drain Current-Continuous($T_A=100^\circ\text{C}$)	3.3	-2.6	A
IDM (pluse)	Drain Current-Continuous@ Current-Pulsed (Note 2)	22	-17.6	A
P_D	Total Power Dissipation($T_A=25^\circ\text{C}$)	1.0	1.0	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	-55 To 150	$^\circ\text{C}$

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient (Steady State) ¹	125	125	$^\circ\text{C}/\text{W}$

Table 3. N- Channel Electrical Characteristics (TA=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=250μA	30	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=30V,VGS=0V	--	--	1	μA
IGSS	Gate-Body Leakage Current	VGS=±12V,VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS,ID=250μA	0.5	--	1.3	V
gFS	Forward Transconductance	VDS=5V,ID=5A	--	8	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=4.2A	--	24	30	mΩ
		VGS=4.5V, ID=4A	--	26	35	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=15V,VGS=0V, F=1MHZ	--	390	--	pF
Coss	Output Capacitance		--	54.5	--	pF
Crss	Reverse Transfer Capacitance		--	41	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	3	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=10V,VDS=15V, ID=4A,RGEN=6Ω	--	4	--	nS
tr	Turn-on Rise Time		--	2	--	nS
td(off)	Turn-Off Delay Time		--	22	--	nS
tf	Turn-Off Fall Time		--	3	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=15V, ID=4A	--	4.5	--	nC
Qgs	Gate-Source Charge		--	1.4	--	nC
Qgd	Gate-Drain Charge		--	0.6	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	5.5	A
VSD	Forward on Voltage	VGS=0V,IS=1A	--	0.7	0.95	V
trr	Reverse Recovery Time	IF=4A , di/dt=100A/μs ,	--	11	--	ns
Qrr	Reverse Recovery Charge	TJ=25°C	--	5.5	--	nc

Notes 1.The maximum current rating is package limited.

Notes 2.Repetitive Rating: Pulse width limited by maximum junction temperature

Notes 3.EAS condition: TJ=25°C

Table 3. P-Channel Electrical Characteristics (TA=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=-250μA	-30	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=-24V, VGS=0V	--	--	-1	μA
IGSS	Gate-Body Leakage Current	VGS=±12V, VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS, ID=-250μA	-0.5	--	-1.3	V
gFS	Forward Transconductance	VDS=-5V, ID=-4A	--	8	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=-10V, ID=-4.2A	--	38	50	mΩ
		VGS=-4.5V, ID=-4A	--	45	55	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=-15V, VGS=0V, F=1MHZ	--	409	--	pF
Coss	Output Capacitance		--	55	--	pF
Crss	Reverse Transfer Capacitance		--	42	--	pF
Rg	Gate resistance	VGS=0V, VDS=-0V, f=1.0MHz	--	12	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=-15V, VDS=-10V, ID=-4A, RGEN=3Ω	--	13	--	nS
tr	Turn-on Rise Time		--	10	--	nS
td(off)	Turn-Off Delay Time		--	28	--	nS
tf	Turn-Off Fall Time		--	13	--	nS
Qg	Total Gate Charge	VGS=-10V, VDS=-15V, ID=-4A	--	4.8	--	nC
Qgs	Gate-Source Charge		--	1.4	--	nC
Qgd	Gate-Drain Charge		--	0.72	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	-4.4	A
VSD	Forward on Voltage	VGS=0V, IS=-1A	--	-0.7	-1.0	V
trr	Reverse Recovery Time	IF=-4A , dI/dt=100A/μs , TJ=25°C	--	26	--	ns
Qrr	Reverse Recovery Charge		--	15.6	--	nc

Notes 1.The maximum current rating is package limited.

Notes 2.Repetitive Rating: Pulse width limited by maximum junction temperature

Notes 3.EAS condition: TJ=25°C

N Channel Typical Characteristics

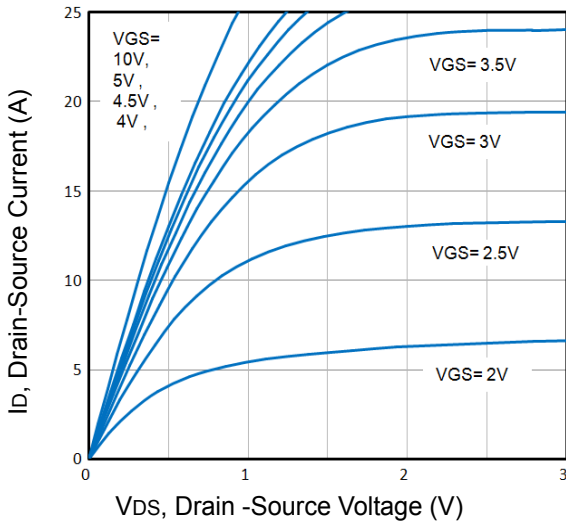


Fig1. Typical Output Characteristics

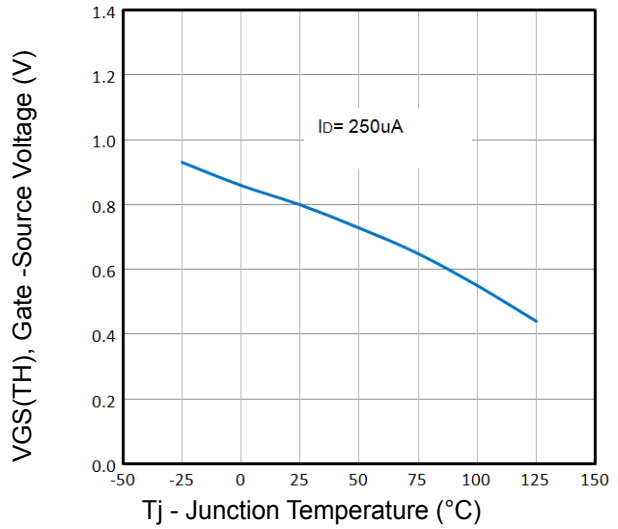


Fig2. Normalized Threshold Voltage Vs. Temperature

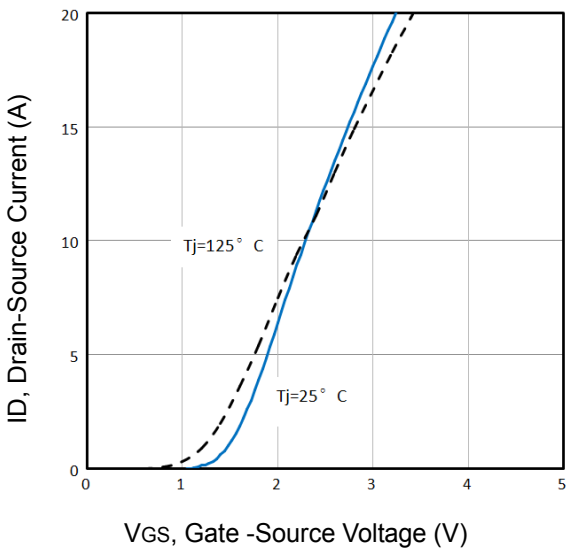


Fig3. Typical Transfer Characteristics

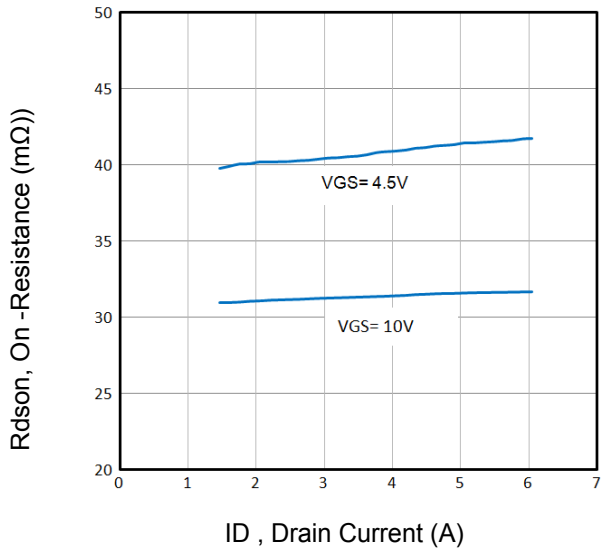


Fig4. On-Resistance vs. Drain Current and Gate

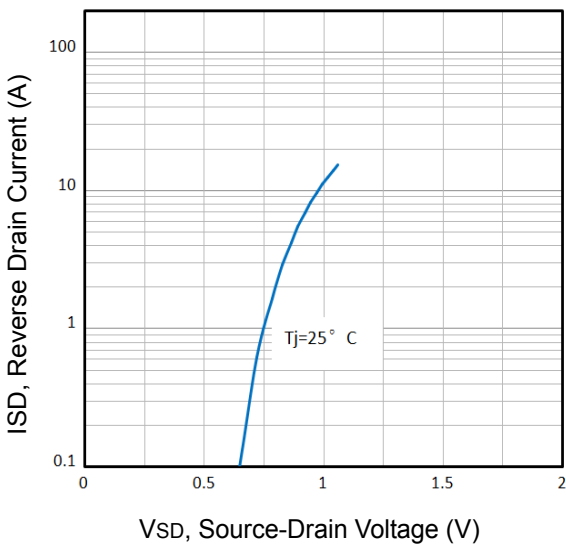


Fig5. Typical Source-Drain Diode Forward Voltage

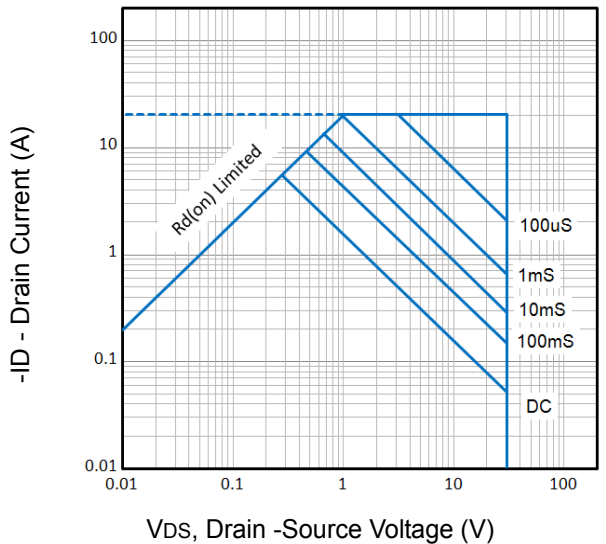


Fig6. Maximum Safe Operating Area

N Channel Typical Characteristics

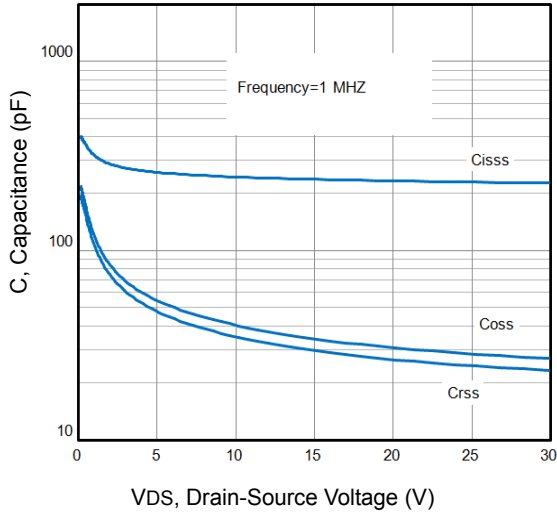


Fig7. Typical Capacitance Vs. Drain-Source Voltage

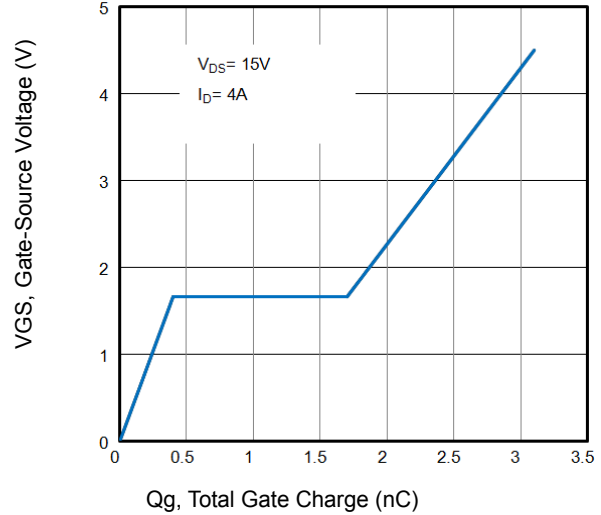


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

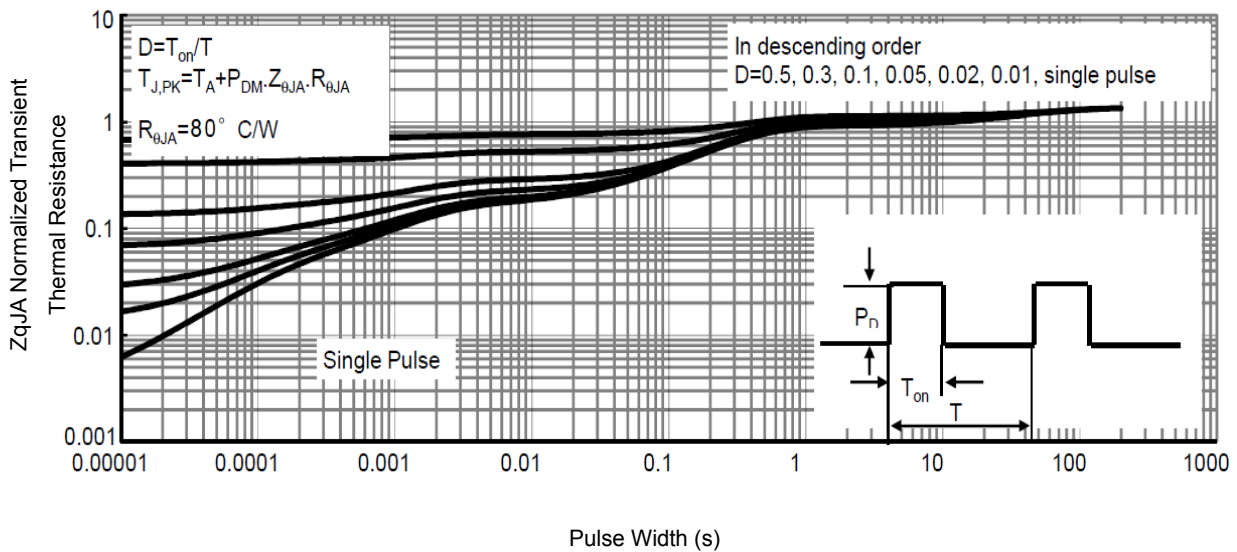


Fig9. Normalized Maximum Transient Thermal Impedance

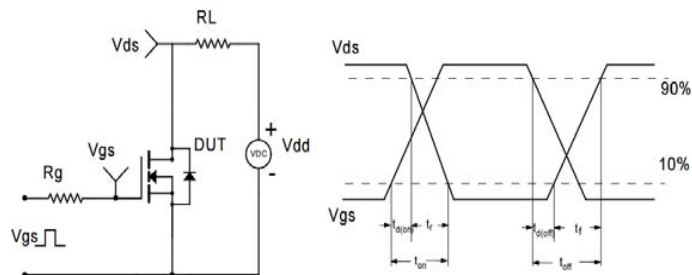


Fig10. Switching Time Test Circuit and waveforms

P Channel Typical Characteristics

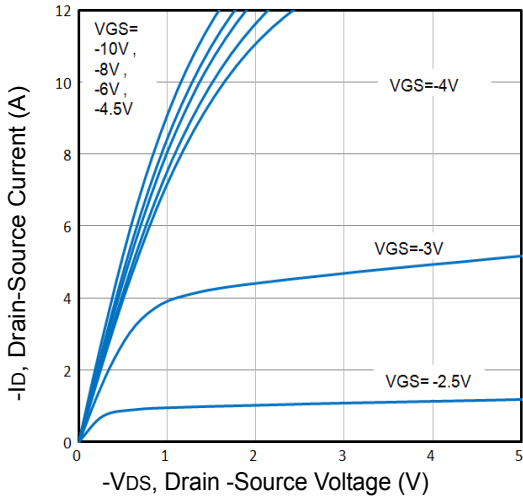


Fig11. Typical Output Characteristics

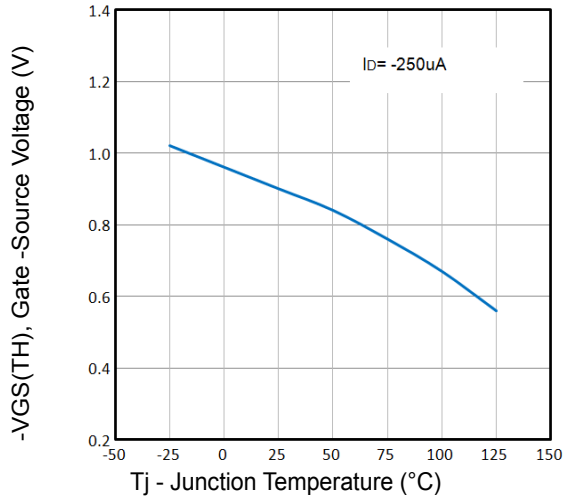


Fig12. Normalized Threshold Voltage Vs. Temperature

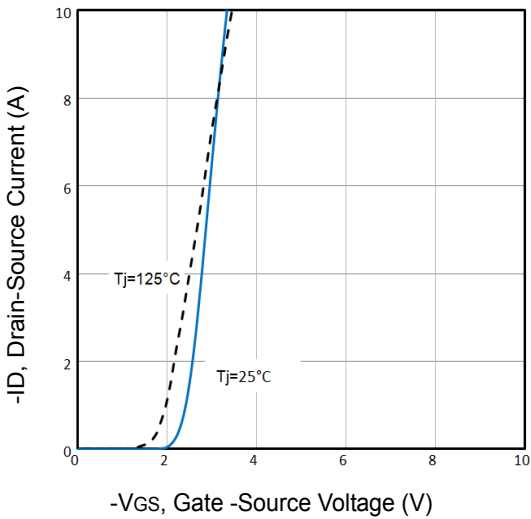


Fig13. Typical Transfer Characteristics

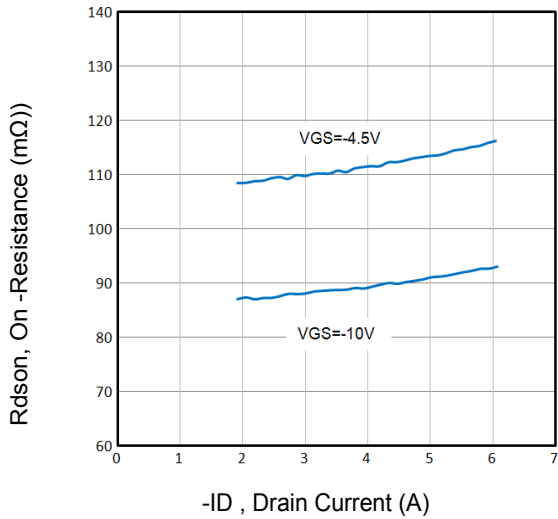


Fig14. On-Resistance vs. Drain Current and Gate

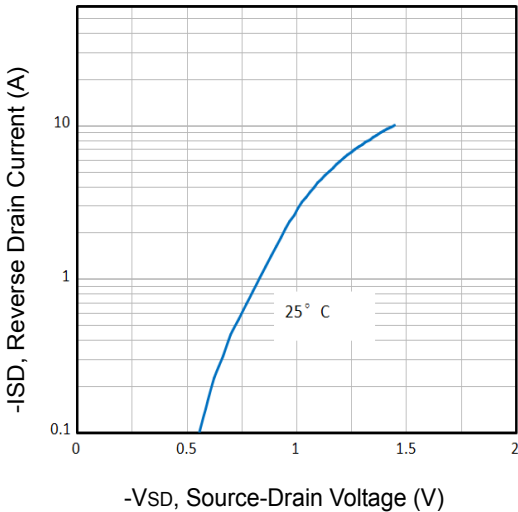


Fig15. Typical Source-Drain Diode Forward Voltage

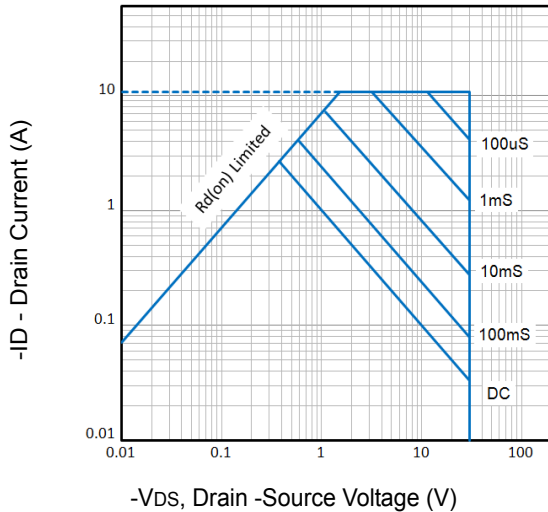


Fig16. Maximum Safe Operating Area

P Channel Typical Characteristics

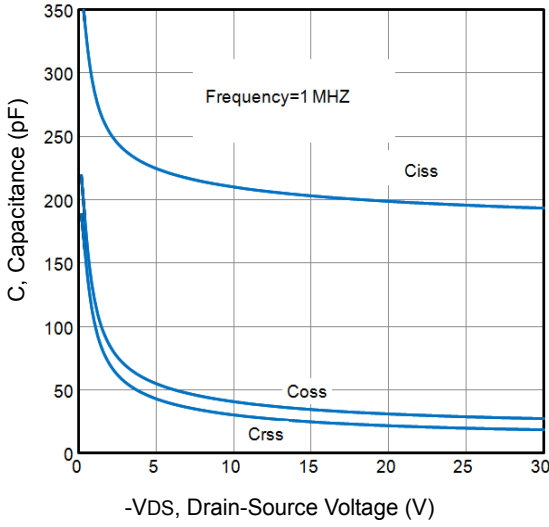


Fig17. Typical Capacitance Vs. Drain-Source Voltage

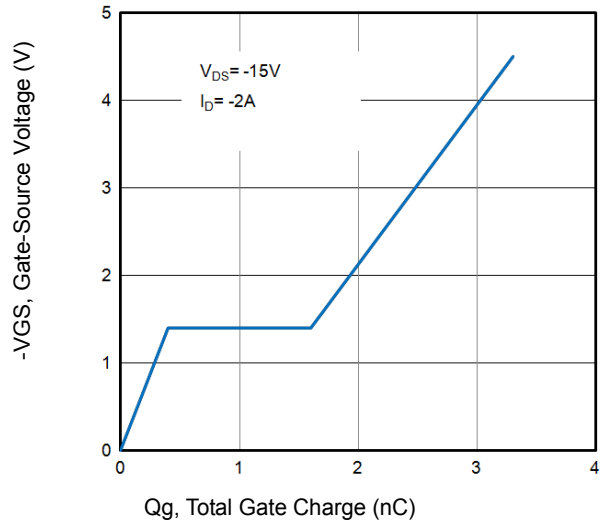


Fig18. Typical Gate Charge Vs. Gate-Source Voltage

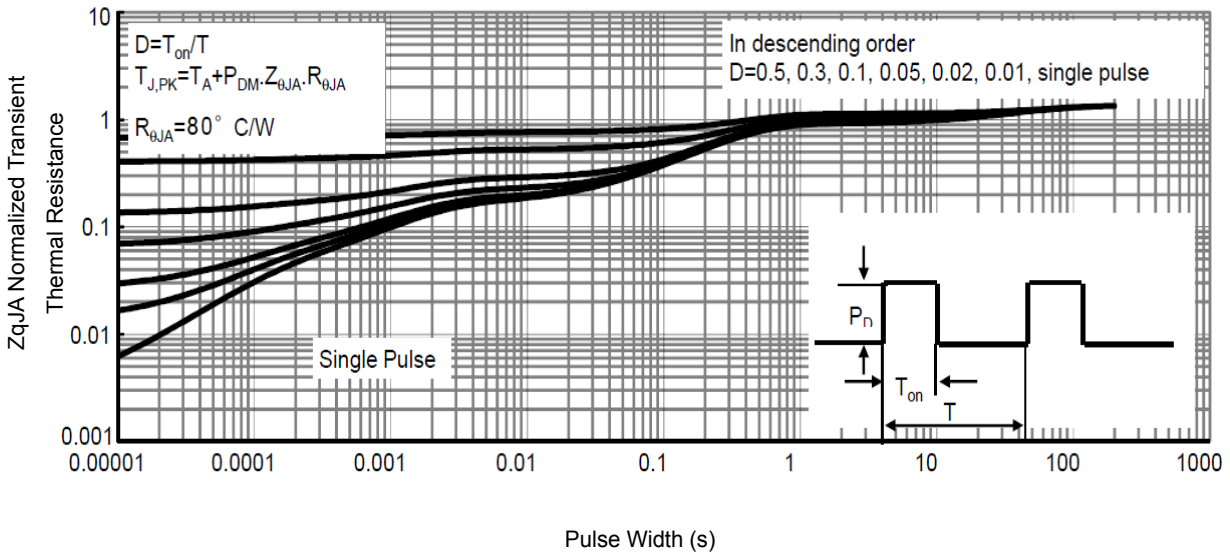


Fig19. Normalized Maximum Transient Thermal Impedance

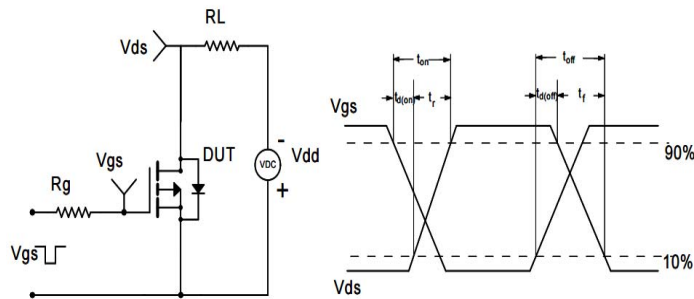
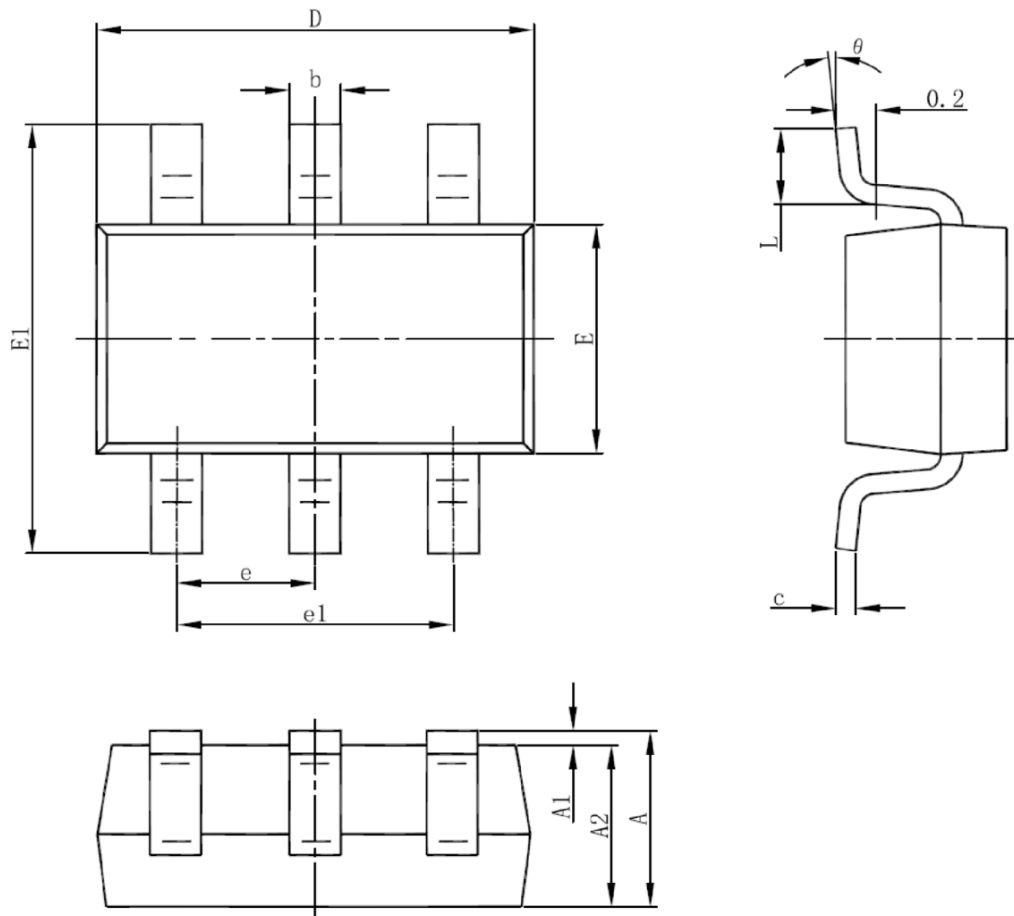


Fig20. Switching Time Test Circuit and waveforms

Package Mechanical Data-SOT23-6


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°


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