● General Description

The AGML315ME 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

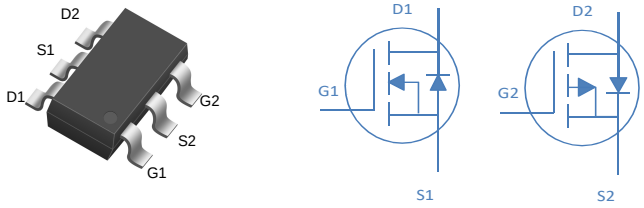
● Application

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

Product Summary

BVDSS	RDSON	ID
30V	25mΩ	5.6A
-30V	43mΩ	-4.2A

SOT23-6L Pin Configuration



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGML315ME	AGML315ME	SOT23-6L	178mm	8mm	3000

Table 1. Absolute Maximum Ratings (T_A=25°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(TA=25℃) (Note 1)	5.6	-4.2	A
	Drain Current-Continuous(TA=100℃)	3.5	-2.7	A
IDM (pluse)	Drain Current-Continuous@ Current-Pulsed (Note 2)	23	-17	A
P_D	Total Power Dissipation(TA=25℃)	1.28	1.28	W
TJ,TSTG	Operating Junction and Storage Temperature Range	-55 To 150	-55 To 150	℃

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient (Steady State)[1]	---	98	℃/W

Table 3. N- Channel Electrical Characteristics (TA=25℃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	0.9	1.3	V
gFS	Forward Transconductance	VDS=5V,ID=3A	--	2	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=4A	--	25	29	mΩ
		VGS=4.5V, ID=3A	--	27	32	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=15V,VGS=0V, F=1MHZ	--	630	--	pF
Coss	Output Capacitance		--	55	--	pF
Crss	Reverse Transfer Capacitance		--	71	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	--	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=10V,VDS=15V, RGEN=3Ω,ID=5.6A	--	4.4	--	nS
tr	Turn-on Rise Time		--	28	--	nS
td(off)	Turn-Off Delay Time		--	16	--	nS
tf	Turn-Off Fall Time		--	26	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=15V,ID=5.6A	--	17	--	nC
Qgs	Gate-Source Charge		--	2.1	--	nC
Qgd	Gate-Drain Charge		--	2.0	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	5.6	A
VSD	Forward on Voltage	VGS=0V,IS=4A	--	--	1.2	V
trr	Reverse Recovery Time	IF=4A , dI/dt=100A/μs , TJ=25℃	--	1.1	--	ns
Qrr	Reverse Recovery Charge		--	13.1	--	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℃

Table 3. P-Channel Electrical Characteristics (TA=25℃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	-0.6	--	-1.3	V
gFS	Forward Transconductance	VDS=-5V,ID=-3A	--	5	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=-10V, ID=-4A	--	43	46	mΩ
		VGS=-4.5V, ID=-3A	--	51	55	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=-15V,VGS=0V, F=1MHZ	--	750	--	pF
Coss	Output Capacitance		--	78	--	pF
Crss	Reverse Transfer Capacitance		--	65	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	--	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=-15V,VDS=-10V, ID=-4.2A,RGEN=6Ω	--	1.4	--	nS
tr	Turn-on Rise Time		--	31	--	nS
td(off)	Turn-Off Delay Time		--	43.6	--	nS
tf	Turn-Off Fall Time		--	8.5	--	nS
Qg	Total Gate Charge	VGS=-10V, VDS=-15V, ID=-4.2A	--	8.0	--	nC
Qgs	Gate-Source Charge		--	1.6	--	nC
Qgd	Gate-Drain Charge		--	2.4	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	-4.2	A
VSD	Forward on Voltage	VGS=0V,IS=-4A	--	-0.8	-1.2	V
trr	Reverse Recovery Time	IF=-4A , dI/dt=100A/μs , TJ=25℃	--	--	--	ns
Qrr	Reverse Recovery Charge		--	--	--	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℃

N-Channel Typical Performance Characteristics

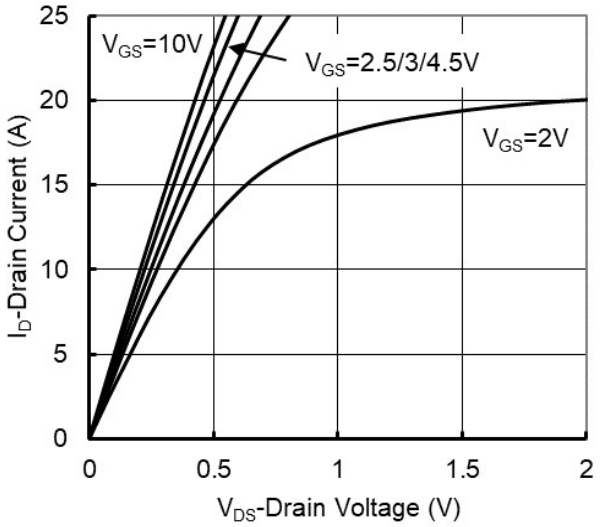


Figure1. Output Characteristics

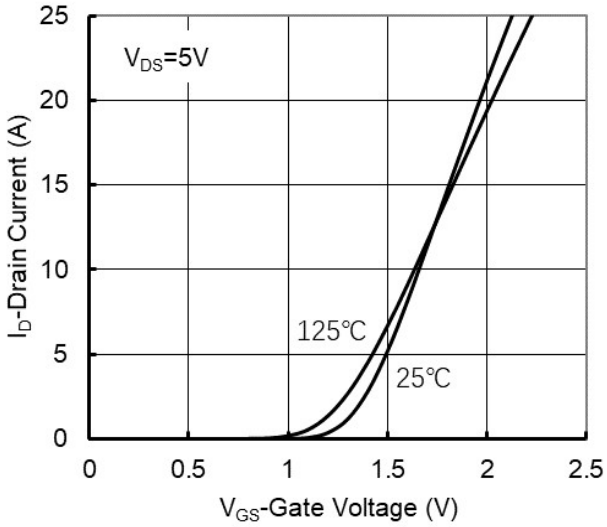


Figure2. Transfer Characteristics

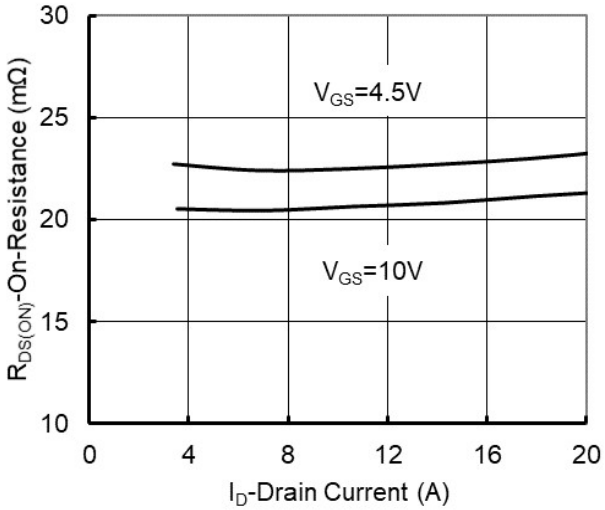


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

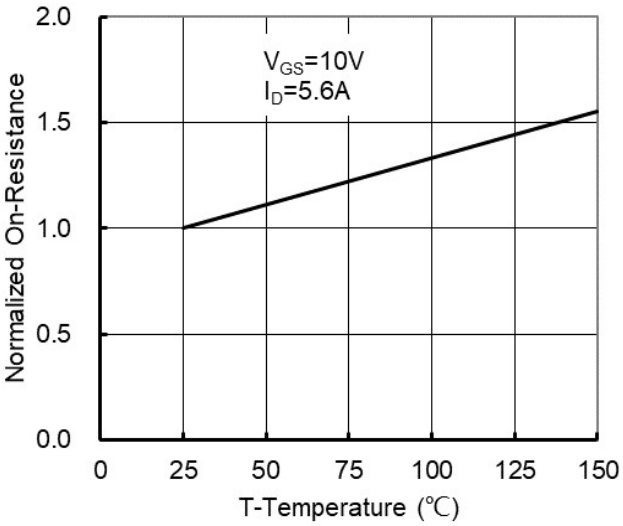


Figure 4: On-Resistance vs. Junction Temperature

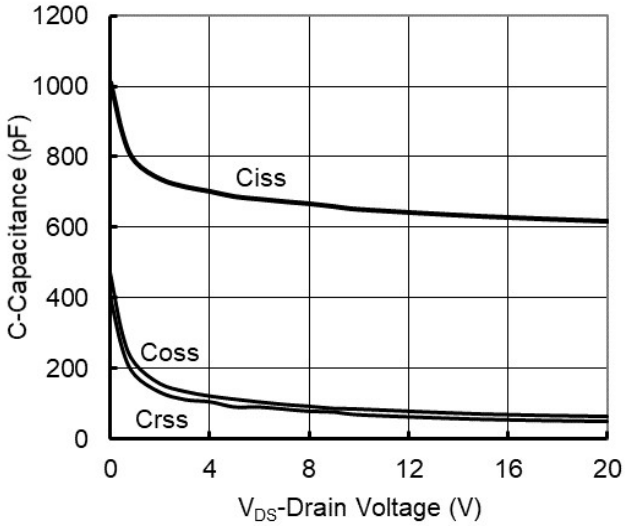


Figure5. Capacitance Characteristics

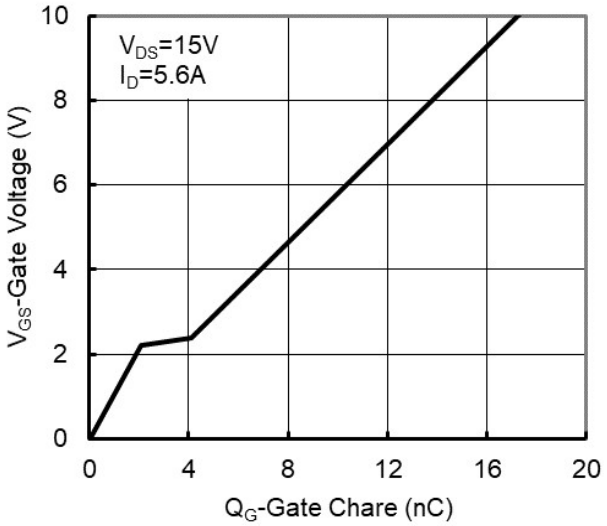


Figure6. Gate Charge

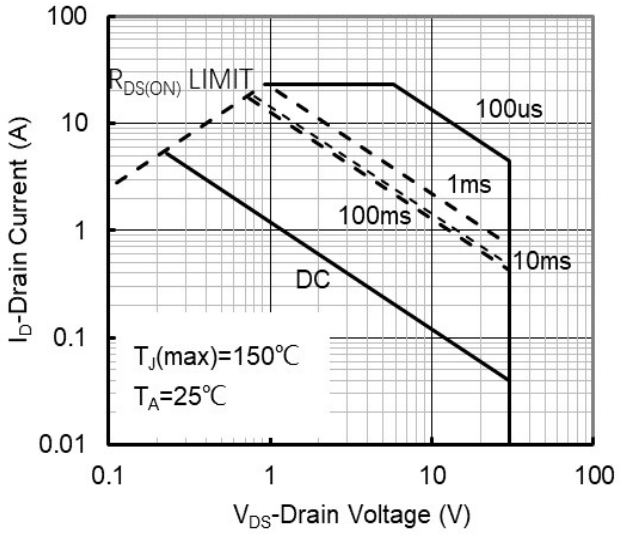


Figure7. Safe Operation Area

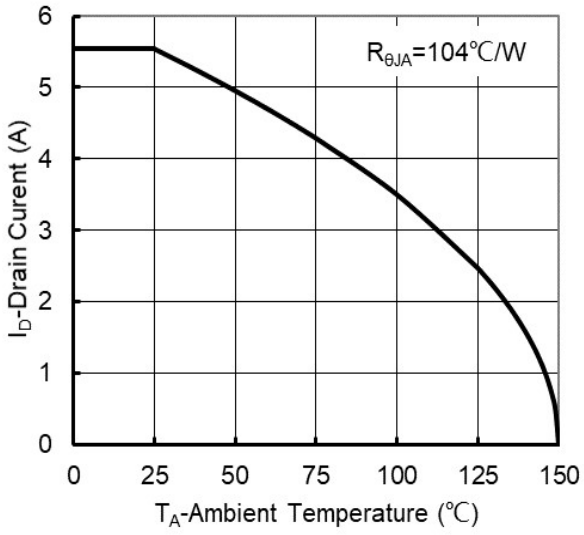


Figure8. Maximum Continuous Drain Current vs Ambient Temperature

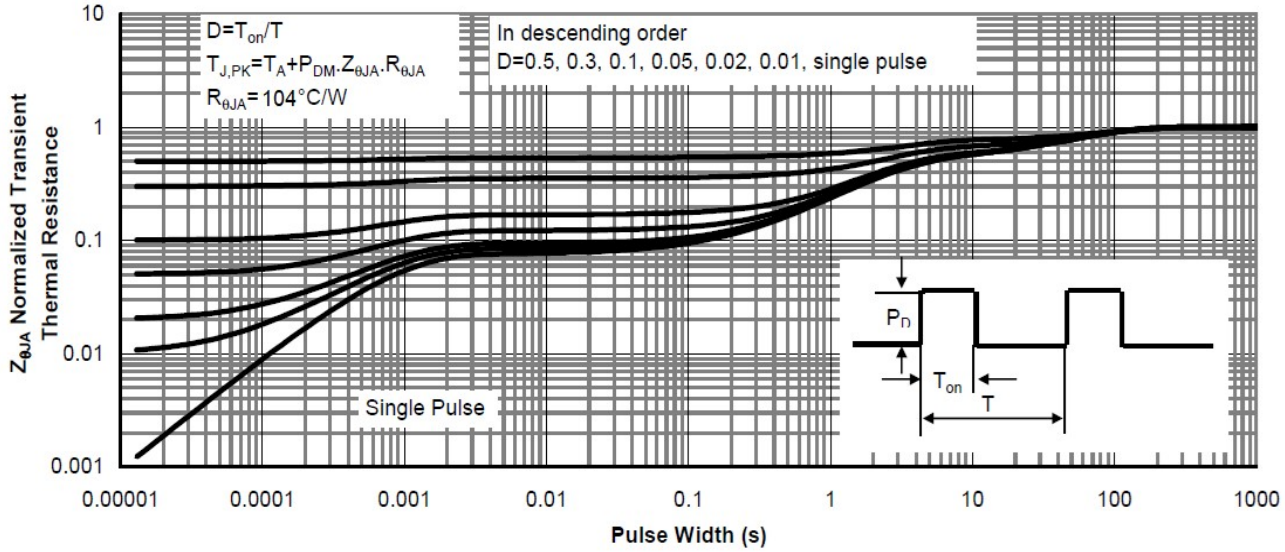
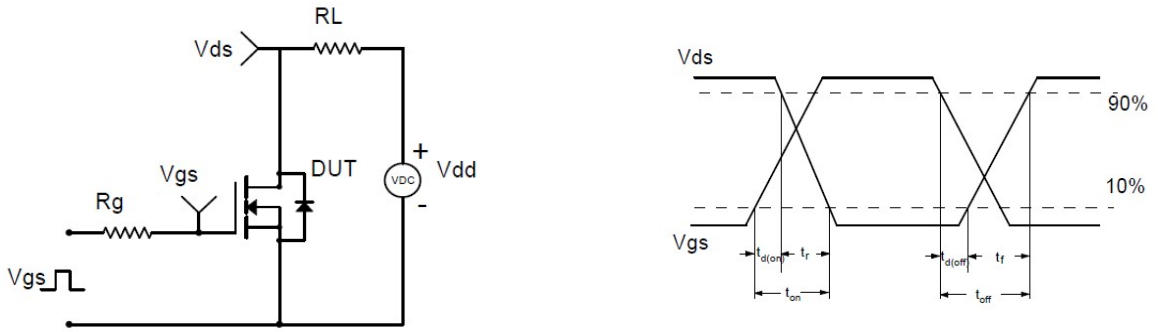
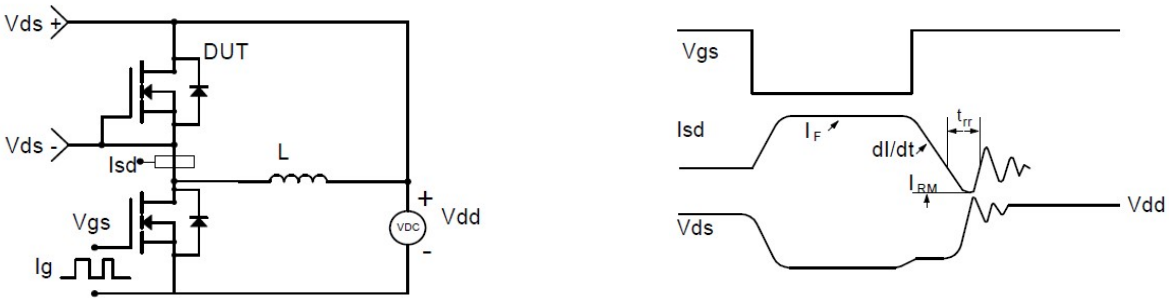


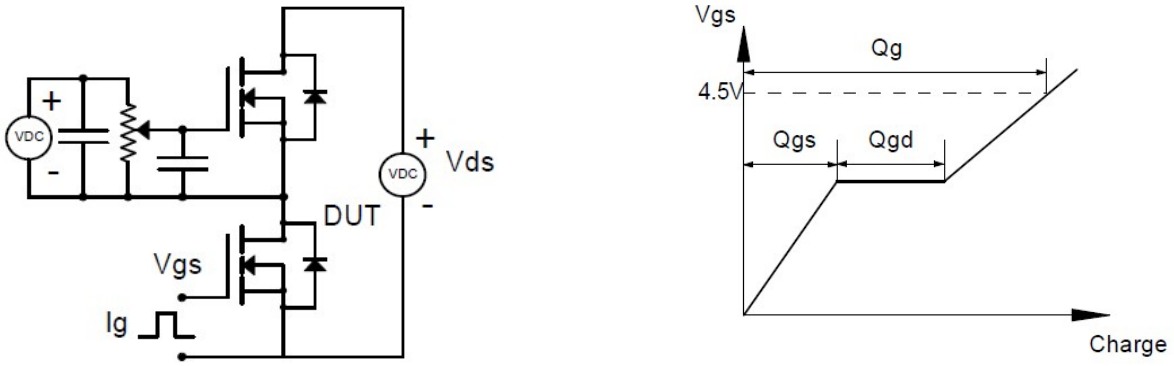
Figure9. Normalized Maximum Transient Thermal Impedance



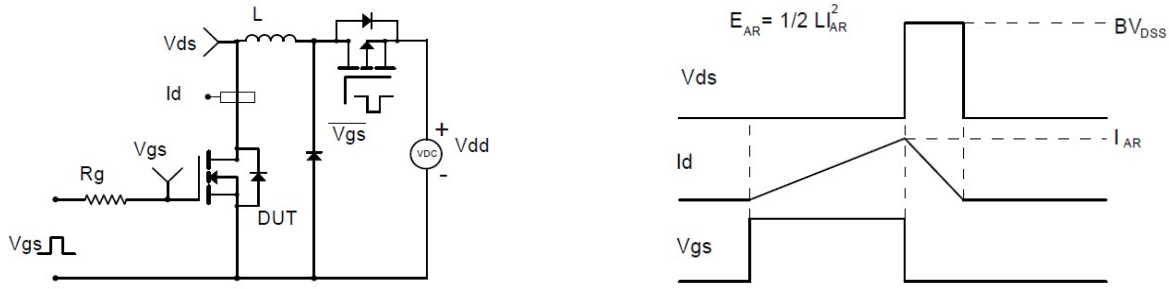
Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



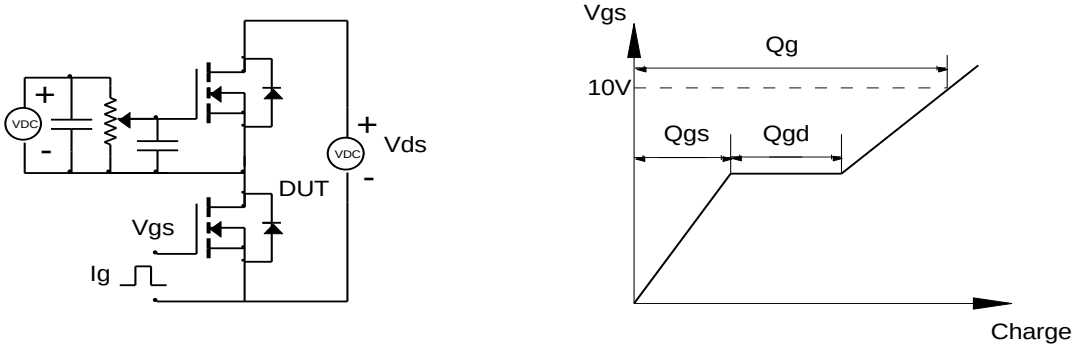
Gate Charge Test Circuit & Waveform



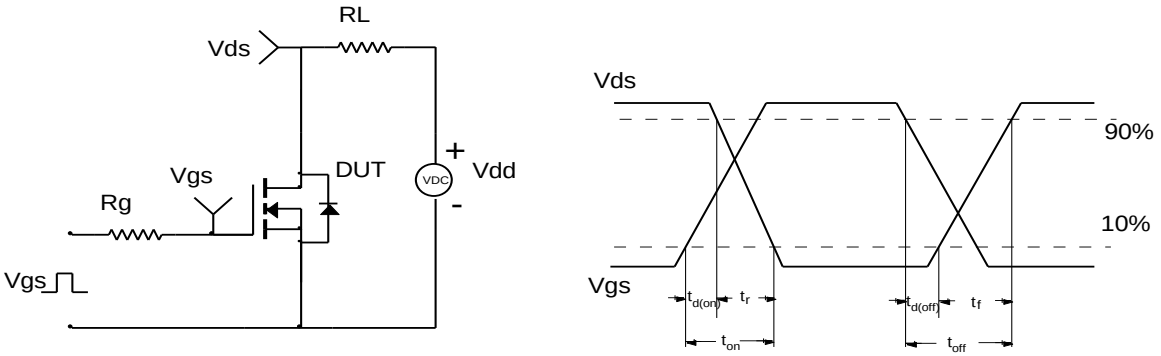
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

P-Channel Test Circuit and Waveform

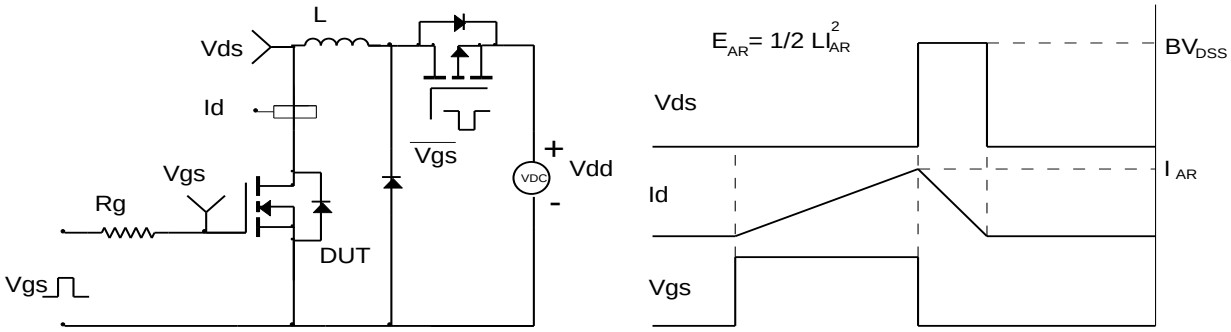
Gate Charge Test Circuit & Waveform



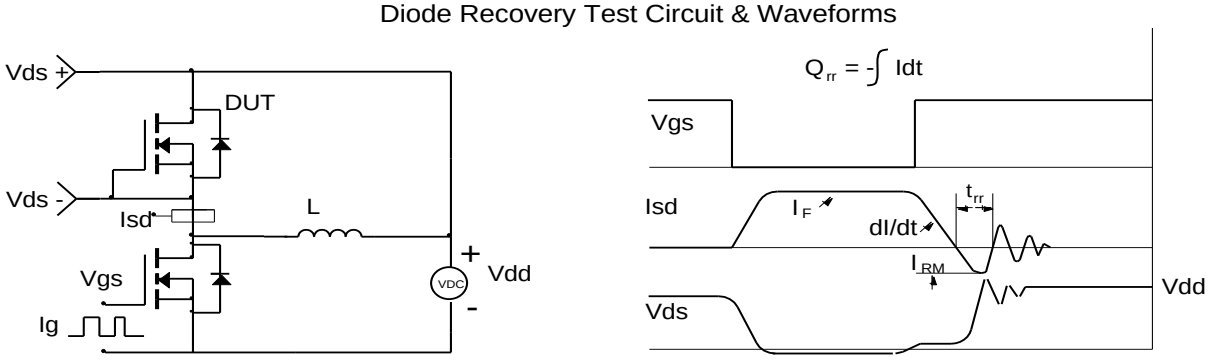
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Electrical Characteristics Diagrams

Fig.1 Power Dissipation Derating Curve

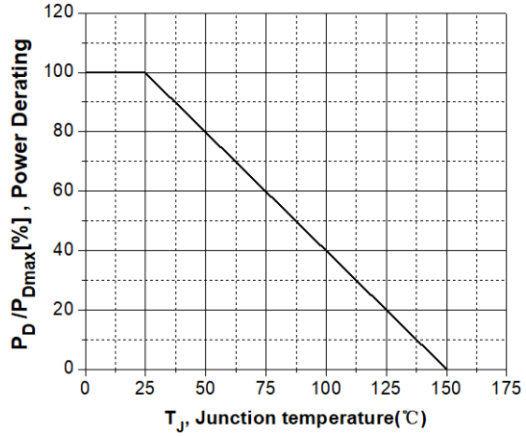


Fig.2 Avalanche Energy Derating Curve vs. Junction Temperature

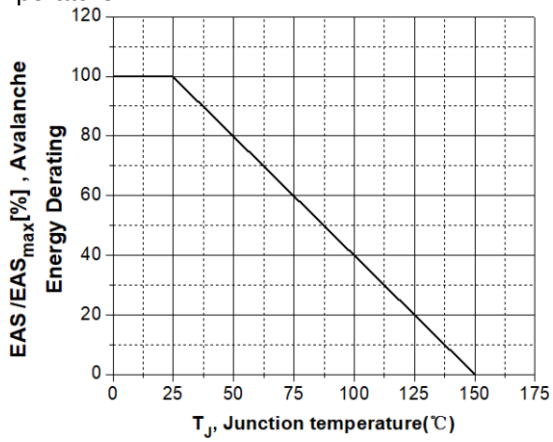


Fig.3 Typical Output Characteristics

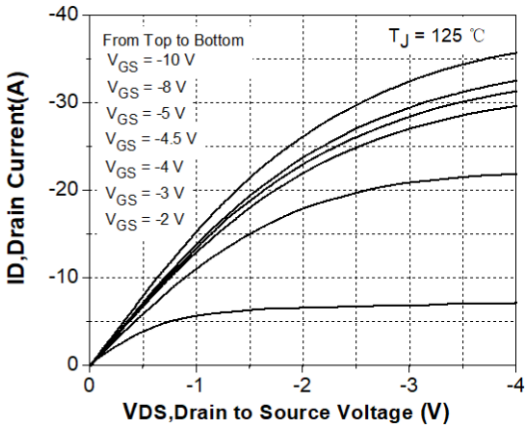


Fig. 4 Transconductance vs. Drain Current

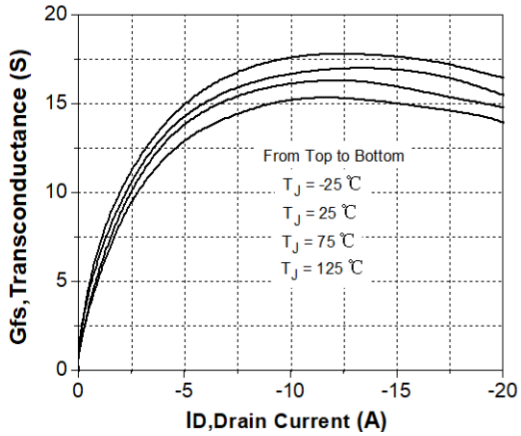


Fig.5 Typical Transfer Characteristics

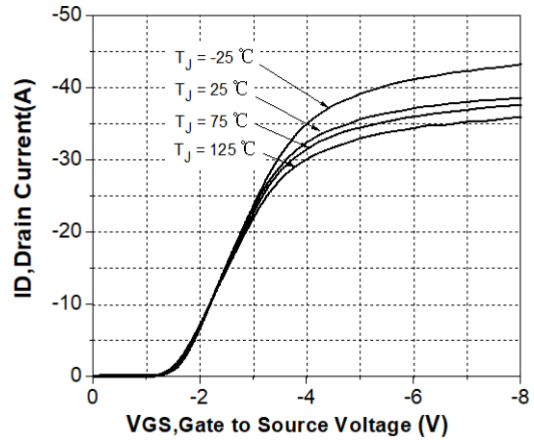


Fig. 6 Static Drain - Source On - State Resistance vs. Drain Current

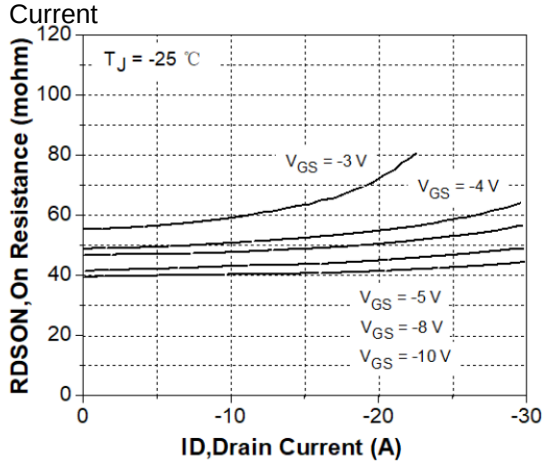


Fig.7 Static Drain - Source On - State Resistance vs. Drain Current

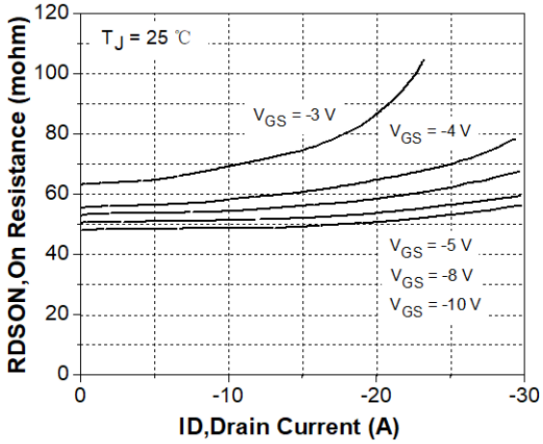


Fig.8 Static Drain - Source On - State Resistance vs. Drain Current

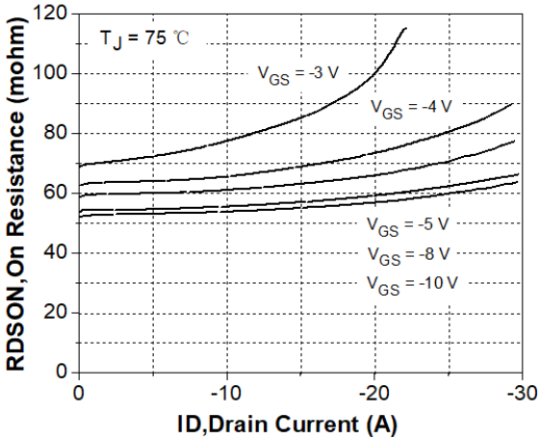


Fig.9 Static Drain - Source On - State Resistance vs. Drain Current

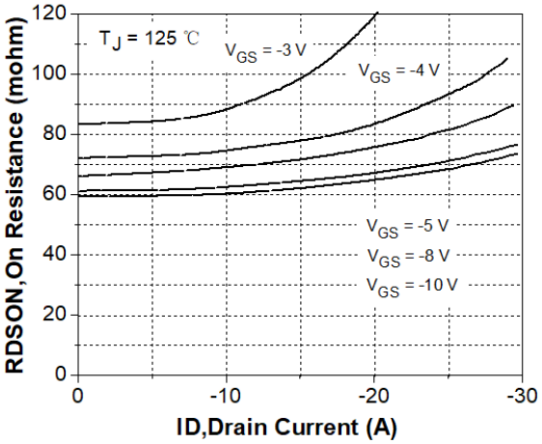


Figure.10 Gate Charge Characteristics

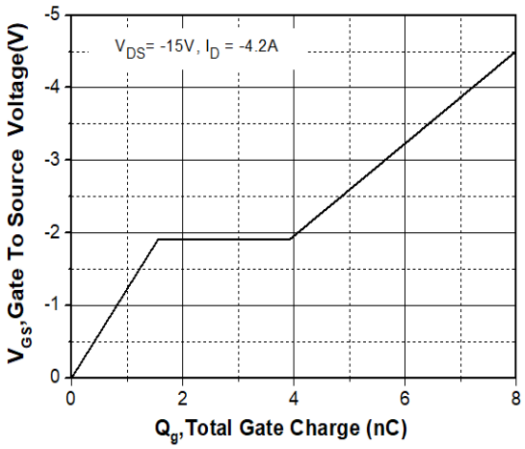


Figure.11 Breakdown Voltage vs. Junction Temperature

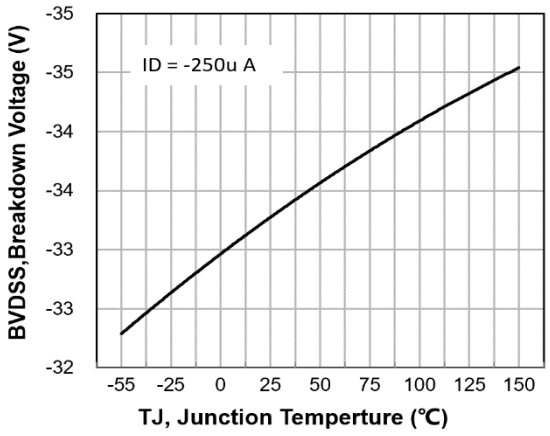


Figure.12 Gate Threshold Voltage vs. Junction Temperature

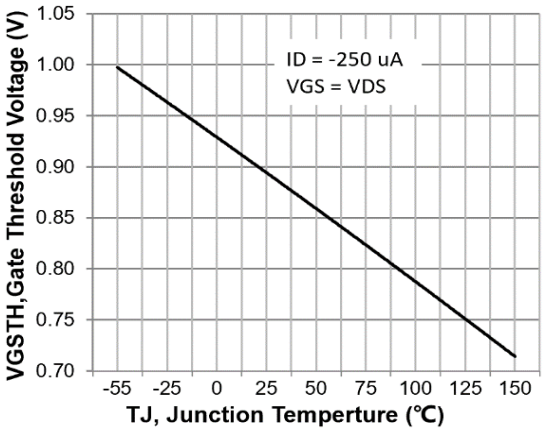


Fig.13 Safe Operating Area

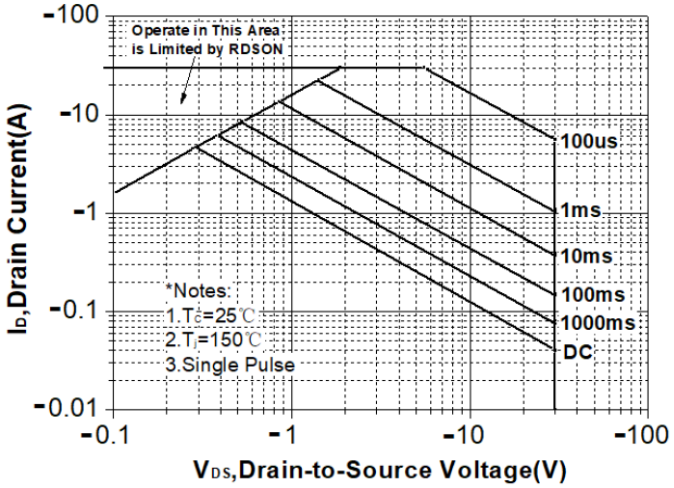
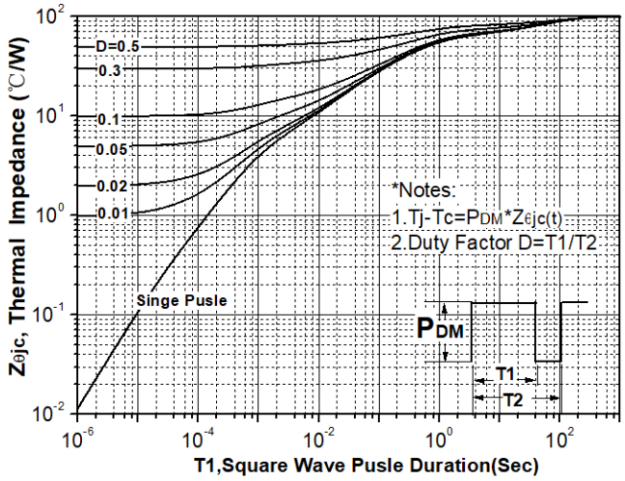
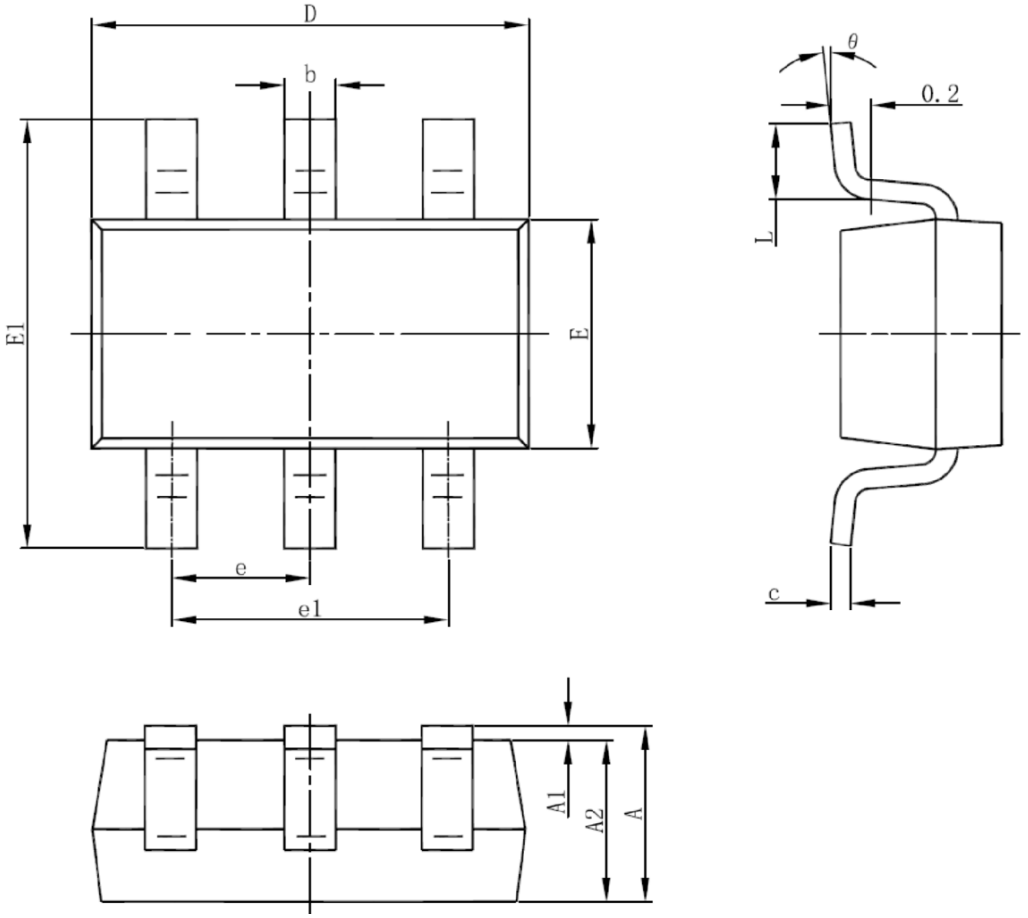


Fig. 14 Transient Thermal Response Curve



Package Mechanical Data-SOT23-6L



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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