

### • General Description

The AGM425ME 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
- 100% Avalanche tested
- 100% DVDS tested

### • Application

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

### Product Summary

BVDSS	RDSON	ID
40V	25mΩ	6.6A
-40V	65.5mΩ	-3.3A

### SOT23-6L Pin Configuration

### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM425ME	AGM425ME	SOT23-6L	178mm	8mm	3000

**Table 1. Absolute Maximum Ratings (TA=25°C)**

Symbol	Parameter	Rating		Units
		N-Ch	P-Ch	
$V_{DS}$	Drain-Source Voltage ( $V_{GS}=0V$ )	40	-40	V
$V_{GS}$	Gate-Source Voltage ( $V_{DS}=0V$ )	±20	±20	V
$I_D$	Drain Current-Continuous(TA=25°C) <b>(Note 1)</b>	6.6	-3.3	A
	Drain Current-Continuous(TA=100°C)	5.2	-2.2	A
IDM (pluse)	Drain Current-Pulsed <b>(Note 2)</b>	26.4	-13.2	A
$P_D$	Total Power Dissipation(TA=25°C)	1.25	1.25	W
	Total Power Dissipation(TA=100°C)	0.5	0.5	W
EAS	Avalanche energy <b>(Note 3)</b>	13	15	mJ
TJ,TSTG	Operating Junction and Storage Temperature Range	-55 To 150	-55 To 150	°C

**Table 2. Thermal Characteristic**

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient (Steady State) <sup>1</sup>	---	100	°C/W

**Table 3. N- Channel Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>On/Off States</b>						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=250μA	40	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=40V,VGS=0V	--	--	1	μA
IGSS	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS,ID=250μA	1.2	1.5	2.2	V
gFS	Forward Transconductance	VDS=5V,ID=3A	--	8	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=4A	--	25	33	mΩ
		VGS=4.5V, ID=3A	--	34.5	55	mΩ
<b>Dynamic Characteristics</b>						
Ciss	Input Capacitance	VDS=20V,VGS=0V, F=1MHZ	--	495	--	pF
Coss	Output Capacitance		--	42	--	pF
Crss	Reverse Transfer Capacitance		--	33	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	--	--	Ω
<b>Switching Times</b>						
td(on)	Turn-on Delay Time	VGS=10V,VDS=20V, ID=3.5A,RGEN=3Ω	--	15	--	nS
tr	Turn-on Rise Time		--	49.5	--	nS
td(off)	Turn-Off Delay Time		--	19.2	--	nS
tf	Turn-Off Fall Time		--	11	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=20V, ID=3.5A	--	10	--	nC
Qgs	Gate-Source Charge		--	1.4	--	nC
Qgd	Gate-Drain Charge		--	1.9	--	nC
<b>Source-Drain Diode Characteristics</b>						
ISD	Source-Drain Current(Body Diode)		--	--	6.6	A
VSD	Forward on Voltage	VGS=0V,IS=4A	--	--	1.2	V
trr	Reverse Recovery Time	IF=4A , dI/dt=100A/μs ,	--	2.6	--	ns
Qrr	Reverse Recovery Charge	TJ=25°C	--	19	--	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: T<sub>J</sub>=25°C ,VDD=25V,Vgs=10V,ID=7.2A, L=0.5mH,RG=25ohm

**Table 3. P-Channel Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>On/Off States</b>						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=-250μA	-40	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=-40V, VGS=0V	--	--	-1	μA
IGSS	Gate-Body Leakage Current	VGS=±20V, VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS, ID=-250μA	-1.2	-1.5	-2.2	V
gFS	Forward Transconductance	VDS=-5V, ID=-3A	--	4	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=-10V, ID=-4A	--	65.5	79	mΩ
		VGS=-4.5V, ID=-3A	--	78	94	mΩ
<b>Dynamic Characteristics</b>						
Ciss	Input Capacitance	VDS=-20V, VGS=0V, F=1MHZ	--	600	--	pF
Coss	Output Capacitance		--	90	--	pF
Crss	Reverse Transfer Capacitance		--	70	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V, f=1.0MHz	--	--	--	Ω
<b>Switching Times</b>						
td(on)	Turn-on Delay Time	VGS=-10V, VDS=-20V, ID=-3A, RGEN=3Ω	--	9	--	nS
tr	Turn-on Rise Time		--	8	--	nS
td(off)	Turn-Off Delay Time		--	28	--	nS
tf	Turn-Off Fall Time		--	10	--	nS
Qg	Total Gate Charge	VGS=-10V, VDS=-20V, ID=-3A	--	14	--	nC
Qgs	Gate-Source Charge		--	2.9	--	nC
Qgd	Gate-Drain Charge		--	3.8	--	nC
<b>Source-Drain Diode Characteristics</b>						
ISD	Source-Drain Current(Body Diode)		--	--	-3.3	A
VSD	Forward on Voltage	VGS=0V, IS=-4A	--	--	-1.2	V
trr	Reverse Recovery Time	IF=-4A , di/dt=100A/μs , TJ=25°C	--	--	--	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: T<sub>J</sub>=25°C, VDD=25V, Vgs=10V, ID=7.8A, L=0.5mH, RG=25ohm

## N-Channel Typical Characteristics

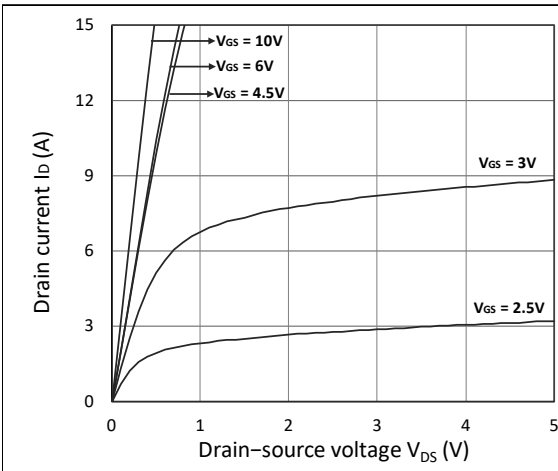


Figure 1. Output Characteristics

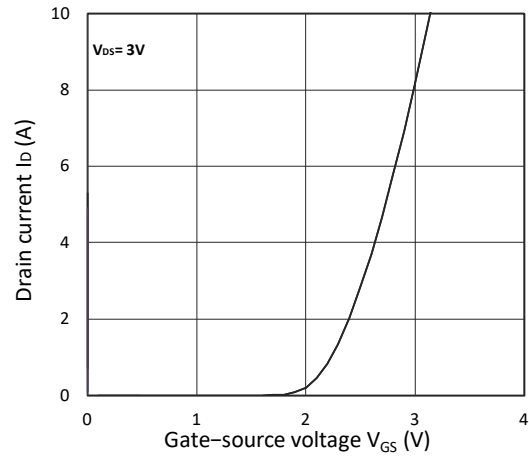


Figure 2. Transfer Characteristics

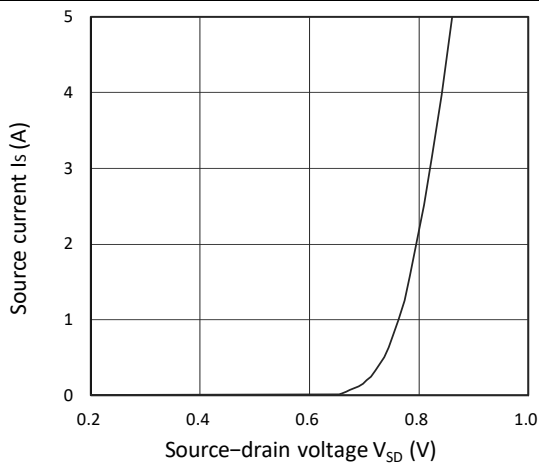
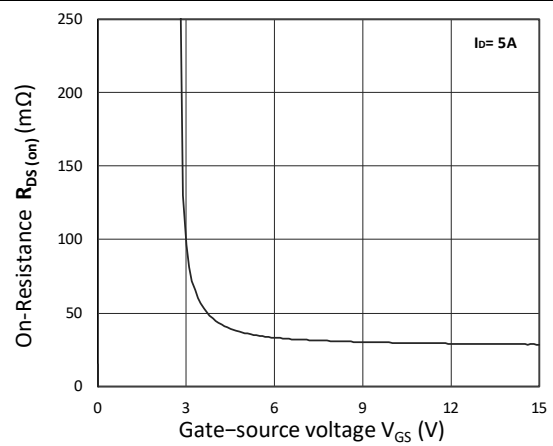
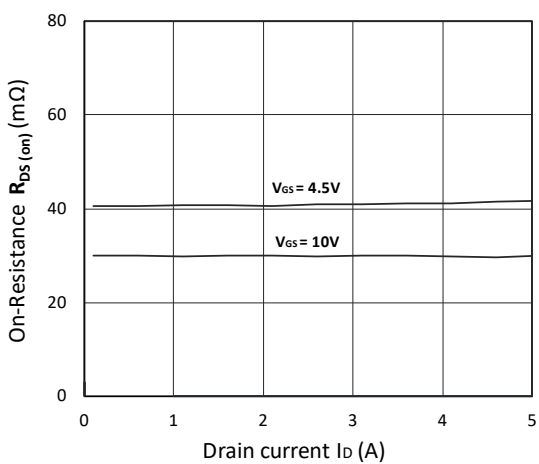
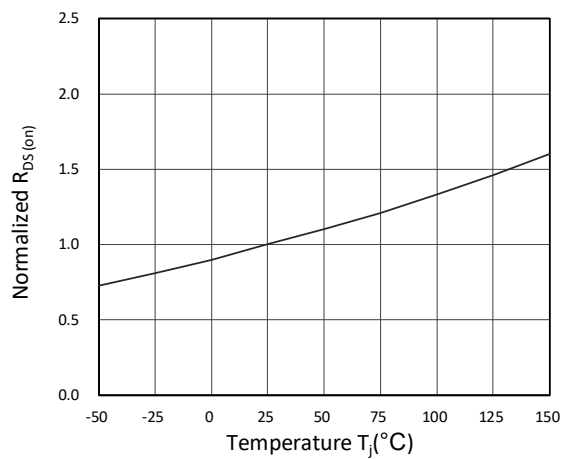
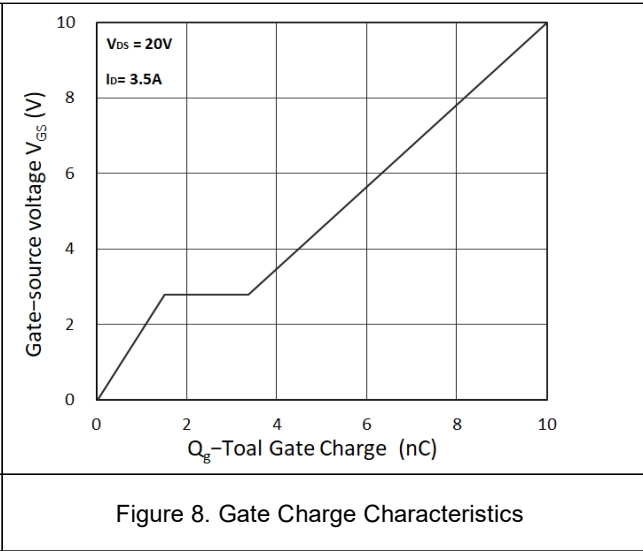
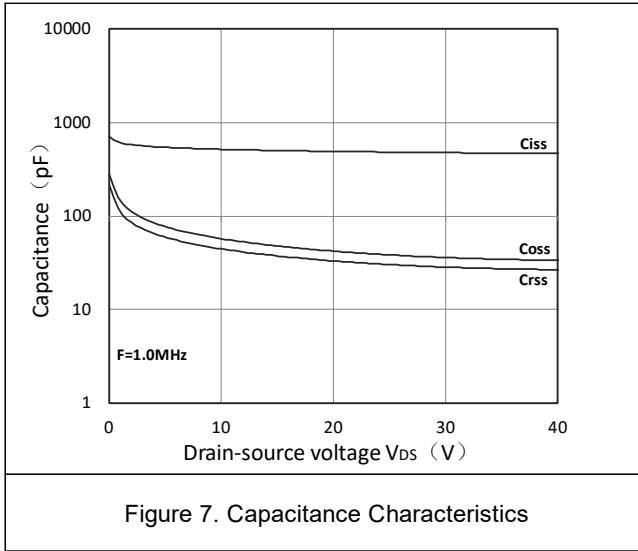


Figure 3. Forward Characteristics of Reverse


 Figure 4.  $R_{DS(ON)}$  vs.  $V_{GS}$ 

 Figure 5.  $R_{DS(ON)}$  vs.  $I_D$ 

 Figure 6. Normalized  $R_{DS(on)}$  vs. Temperature



## P-Channel Typical Characteristics

### Typical Electrical and Thermal Characteristics

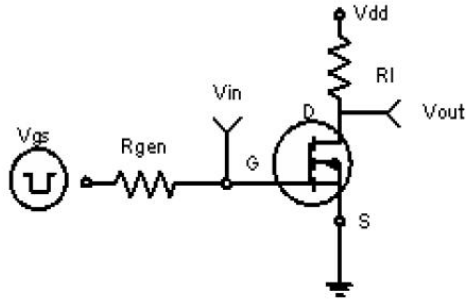


Figure 1: Switching Test Circuit

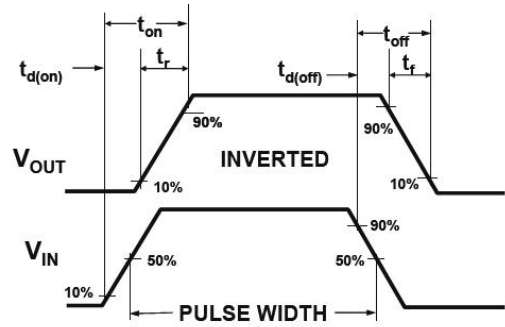


Figure 2: Switching Waveforms

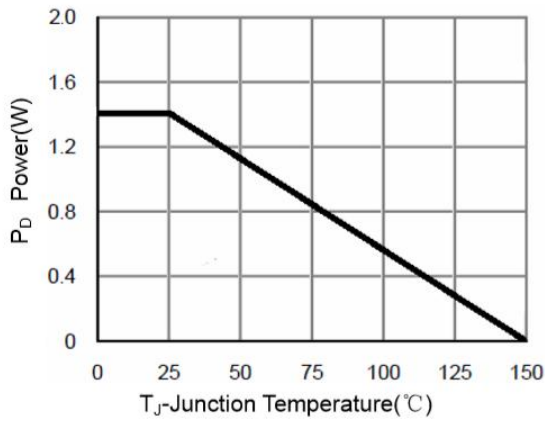


Figure 3 Power Dissipation

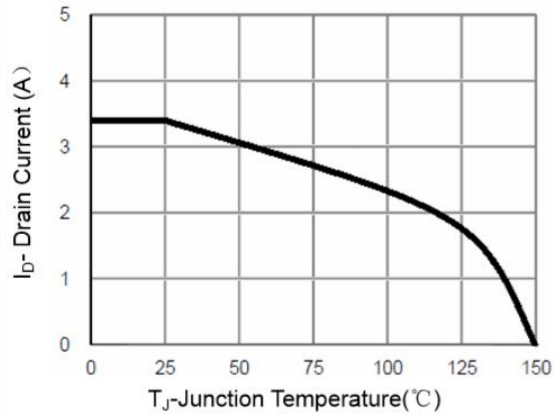


Figure 4 Drain Current

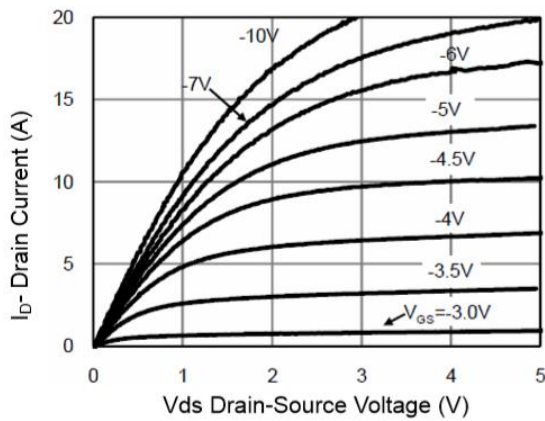


Figure 5 Output Characteristics

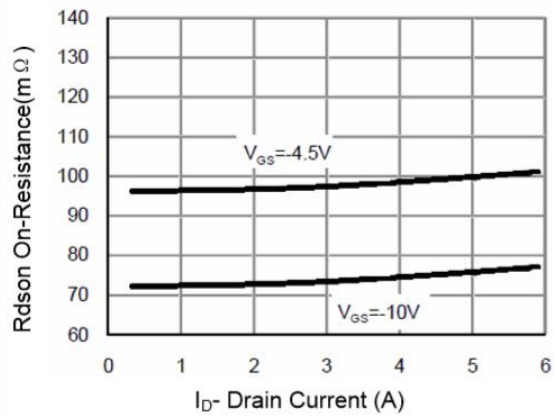


Figure 6 Drain-Source On-Resistance

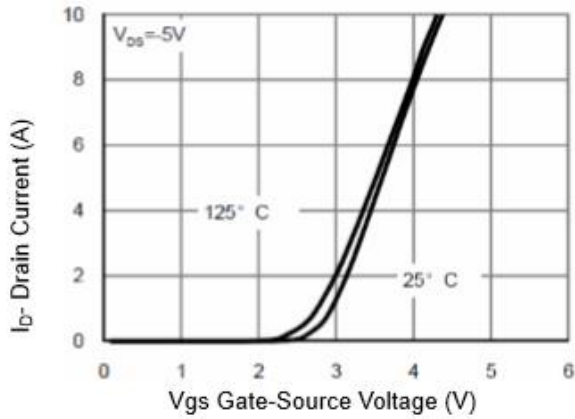


Figure 7 Transfer Characteristics

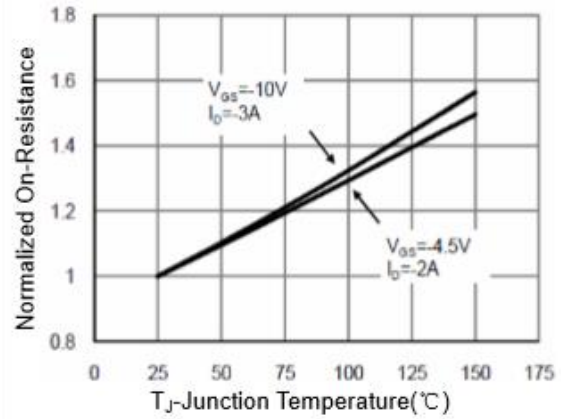


Figure 8 Drain-Source On-Resistance

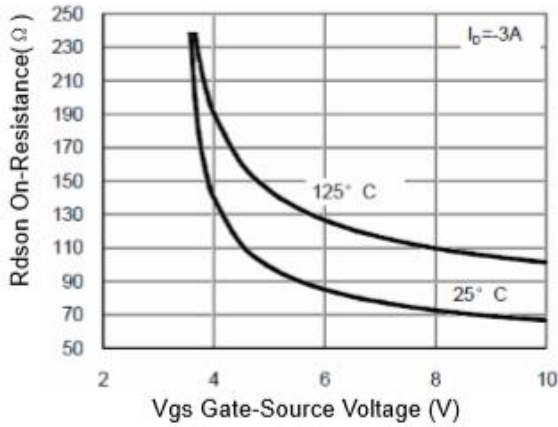


Figure 9 Rdson vs Vgs

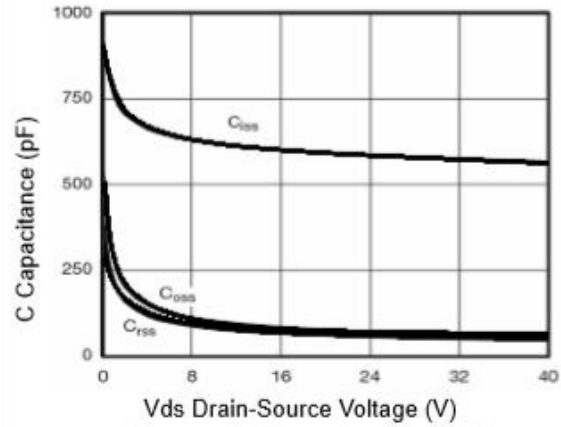


Figure 10 Capacitance vs Vds

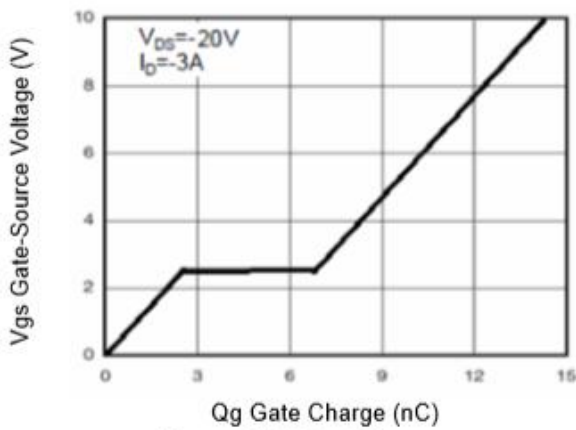


Figure 11 Gate Charge

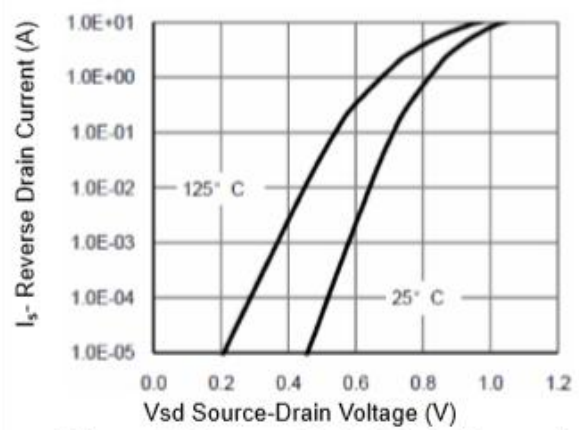


Figure 12 Source- Drain Diode Forward

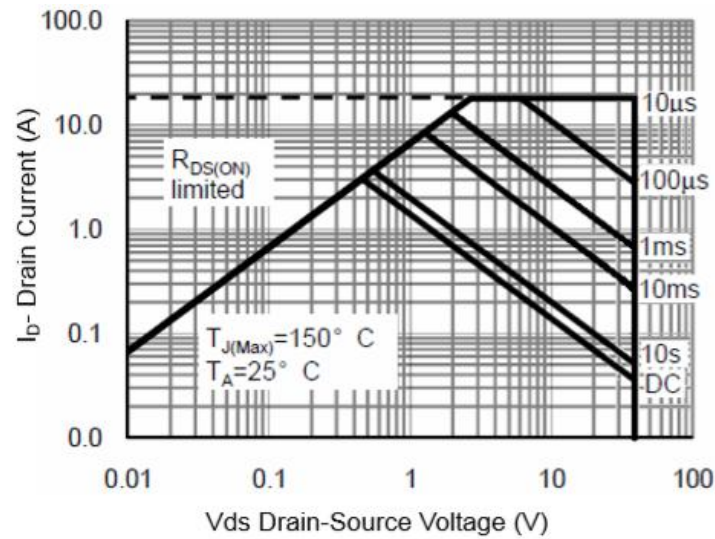


Figure 13 Safe Operation Area

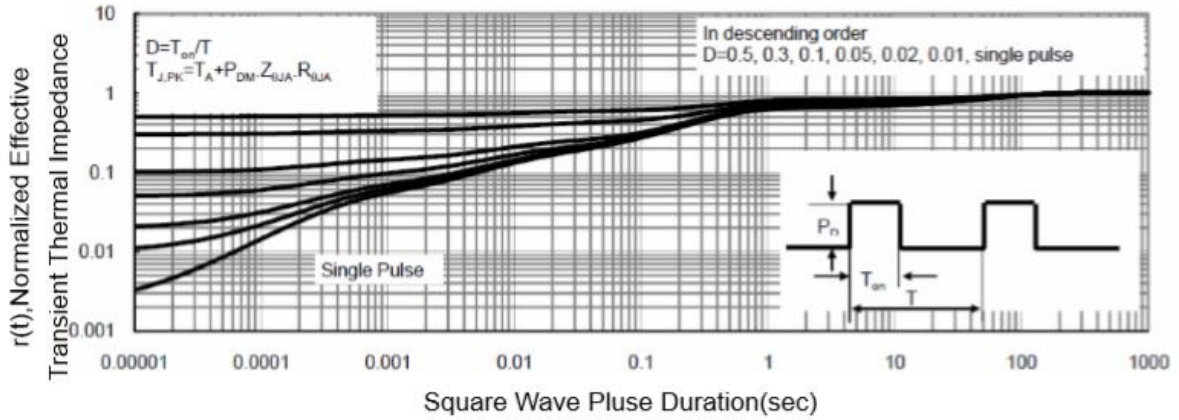
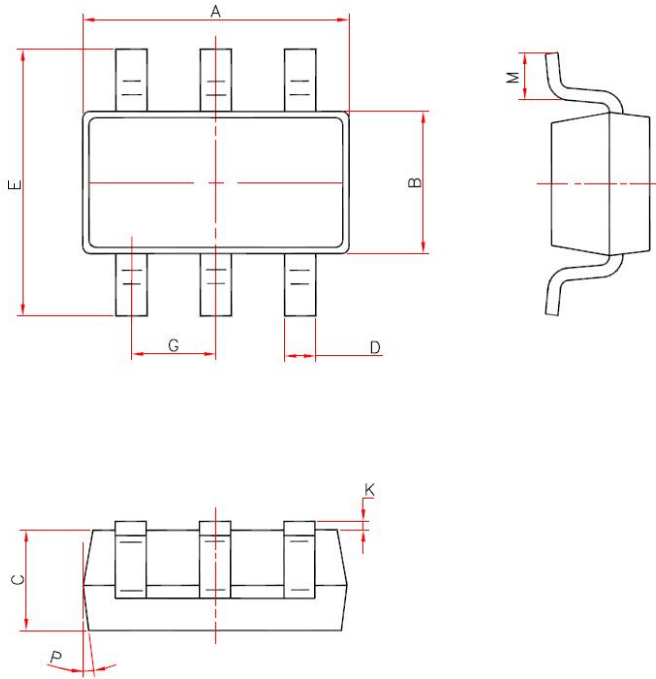


Figure 14 Normalized Maximum Transient Thermal Impedance



### Package Outline Data SOT-23-6



DIM	MILLIMETERS
A	2.82~3.02
B	1.60 ± 0.10
C	1.10 ± 0.05
D	0.40 ± 0.10
E	2.65~2.95
G	0.95typ
K	0.00~0.10
M	0.20MIN
P	9 ± 2°


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