AGMSEMi

● **General Description**

The AGM425MC 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

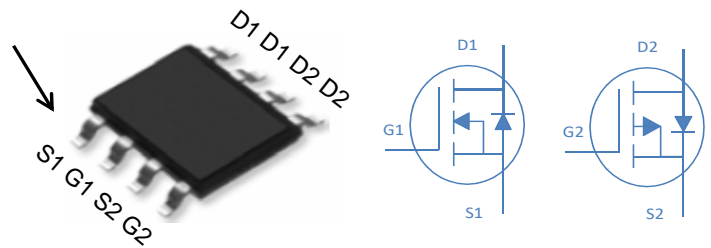■ Low Gate Charge for fast switching

■ Low Thermal resistance

● **Application**
■ MB/VGA Vcore

■ SMPS 2nd Synchronous Rectifier

■ POL application

■ BLDC Motor driver

Product Summary

BVDSS	RDSON	ID
40V	18mΩ	7.6A
-40V	34mΩ	-6.5A

SOP8 Pin Configuration

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM425MC	AGM425MC	SOP8	--mm	--mm	3000

Table 1. Absolute Maximum Ratings (T$_A$=25℃)

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=}$0V)	±20	±20	V
I_D	Drain Current-Continuous(T$_C$=25℃) (Note 1)	7.6	-6.5	A
	Drain Current-Continuous(Tc=100℃)	5.5	-4.2	A
IDM (pluse)	Drain Current-Continuous@ Current-Pulsed (Note 2)	24	-24	A
P_D	Total Power Dissipation(T$_C$=25℃)	2.4	3.0	W
	Total Power Dissipation(Tc=100℃)	1.0	1.2	W
EAS	Avalanche energy (Note 3)	24	18	mJ
TJ,TSTG	Operating Junction and Storage Temperature Range	-55 To 150	-55 To 150	℃

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
R$_{θJA}$	Thermal Resistance Junction-ambient (Steady State)[1]	---	62	℃/W
R$_{θJC}$	Thermal Resistance Junction-Case[1]	---	5	℃/W

Table 3. N- Channel Electrical Characteristics (TA=25℃unless otherwisenoted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV$_{DSS}$	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	1.0	1.8	2.5	V
gFS	Forward Transconductance	VDS=5V,ID=10A	--	15	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=6A	--	18	24	mΩ
		VGS=4.5V, ID=5A	--	24	38	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=20V,VGS=0V, F=1MHZ	--	516	--	pF
Coss	Output Capacitance		--	82	--	pF
Crss	Reverse Transfer Capacitance		--	43	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	--	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=10V,VDS=15V, RL=2.5Ω,RGEN=3Ω	--	4.5	--	nS
tr	Turn-on Rise Time		--	2.5	--	nS
td(off)	Turn-Off Delay Time		--	14.5	--	nS
tf	Turn-Off Fall Time		--	3.5	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=20V, ID=6A	--	8.9	--	nC
Qgs	Gate-Source Charge		--	2.4	--	nC
Qgd	Gate-Drain Charge		--	1.4	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	7.6	A
VSD	Forward on Voltage	VGS=0V,IS=6A	--	--	1.2	V
trr	Reverse Recovery Time	IF=6A , 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℃

Table 3. P-Channel Electrical Characteristics (TA=25℃unless otherwisenoted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
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	-1.0	-1.5	-2.5	V
gFS	Forward Transconductance	VDS=-5V,ID=-10A	--	16	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=-10V, ID=-5A	--	34	45	mΩ
		VGS=-4.5V, ID=-3A	--	44	58	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=-20V,VGS=0V, F=1MHZ	--	1080	--	pF
Coss	Output Capacitance		--	87	--	pF
Crss	Reverse Transfer Capacitance		--	77	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	10.3	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=-10V,VDS=-20V, ID=-5A,RGEN=3Ω	--	5.9	--	nS
tr	Turn-on Rise Time		--	7.1	--	nS
td(off)	Turn-Off Delay Time		--	25	--	nS
tf	Turn-Off Fall Time		--	8.2	--	nS
Qg	Total Gate Charge	VGS=-10V, VDS=-20V, ID=-6A	--	17	--	nC
Qgs	Gate-Source Charge		--	4.2	--	nC
Qgd	Gate-Drain Charge		--	3.7	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	-6	A
VSD	Forward on Voltage	VGS=0V,IS=-5A	--	--	-1.2	V
trr	Reverse Recovery Time	IF=-5A , 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 Electrical and Thermal Characteristics (Curves)
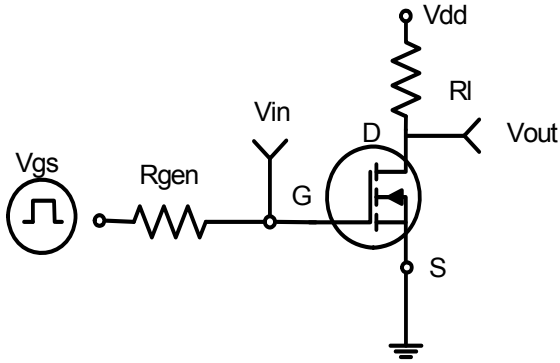
Figure 1:Switching Test Circuit
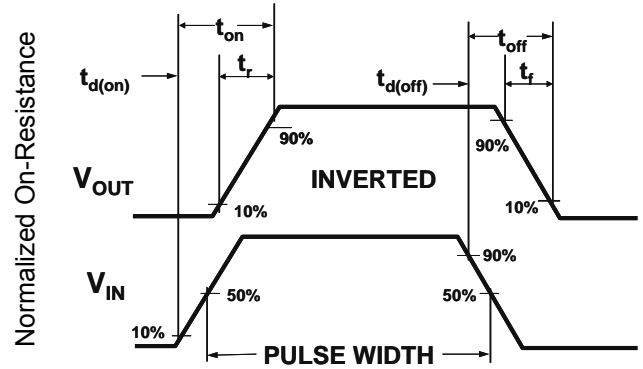
Figure 2:Switching Waveforms
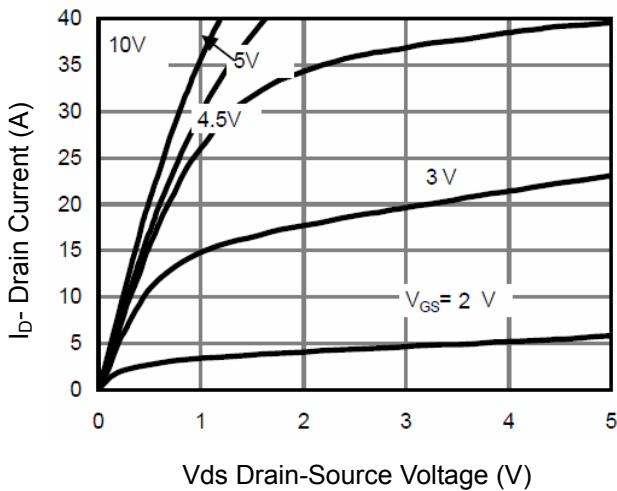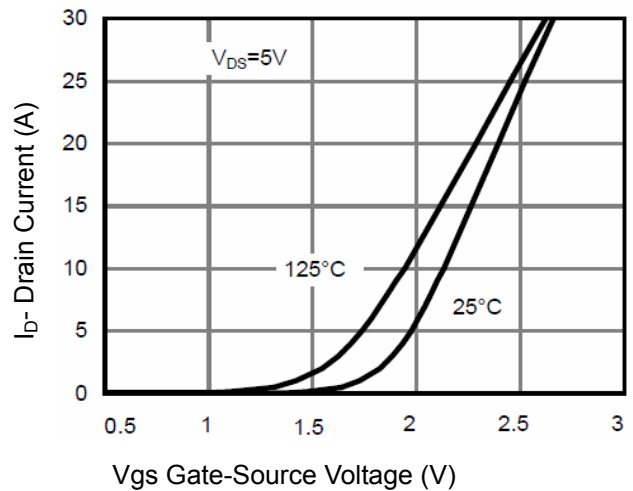
Figure 3 Output Characteristics

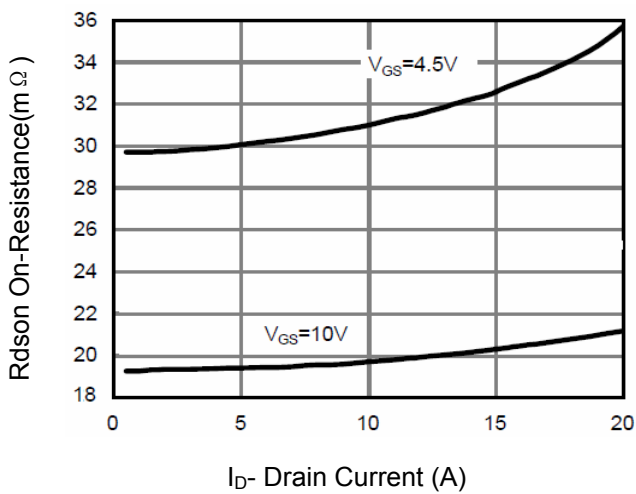**Figure 4 Transfer Characteristics**
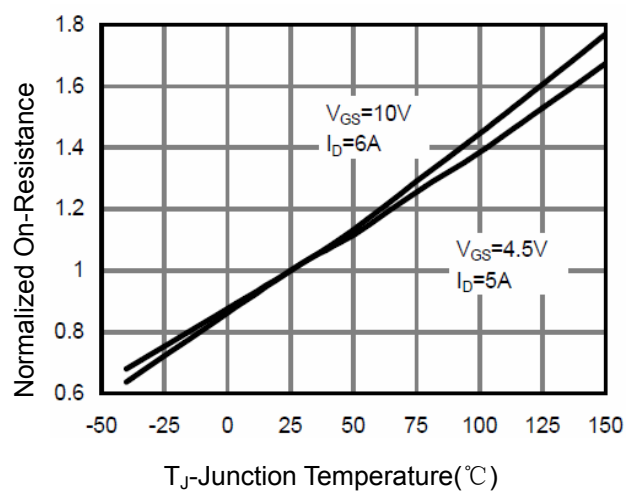
Figure 5 Drain-Source On-Resistance

Figure 6 Drain-Source On-Resistance
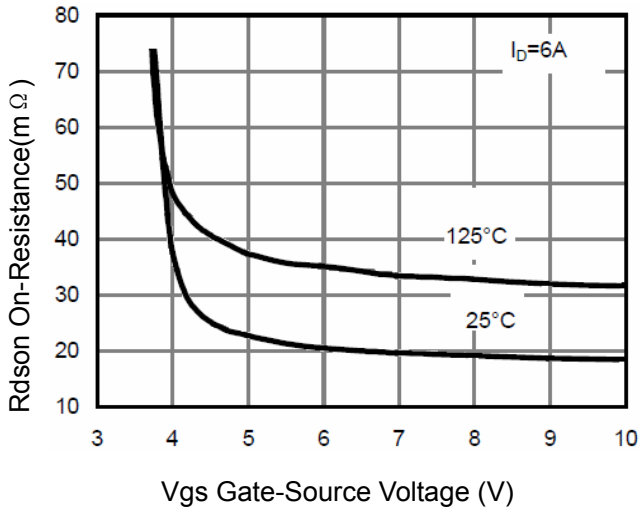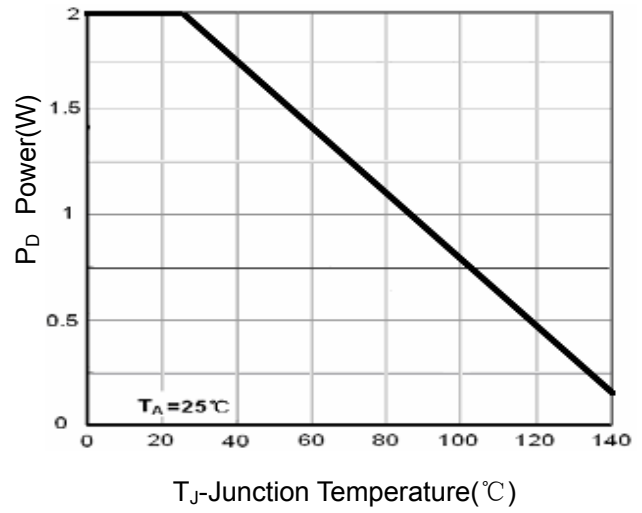
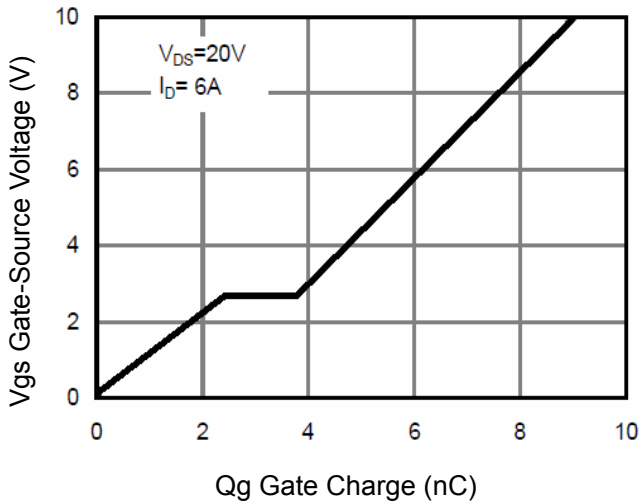Figure7 Rdson vs Vgs
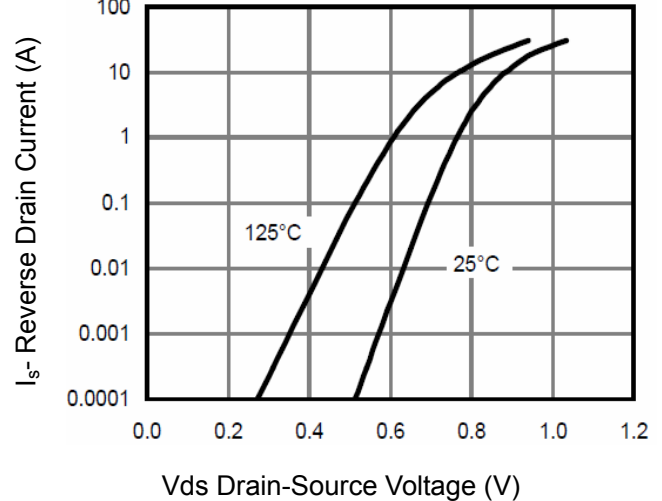

Figure 8 Power Dissipation

Figure 9 Gate Charge

Figure 10 Source- Drain Diode Forward
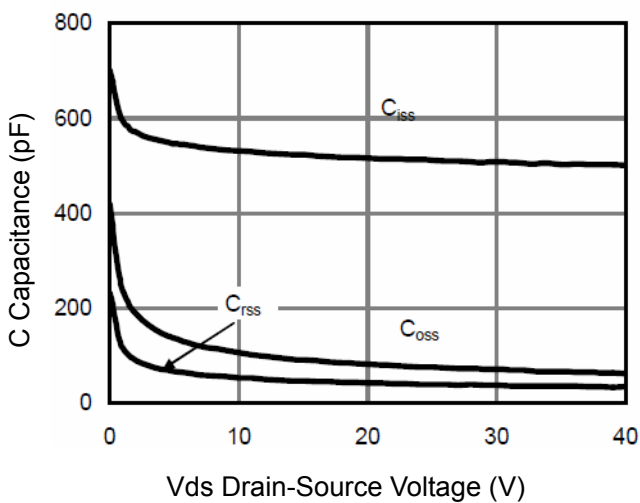
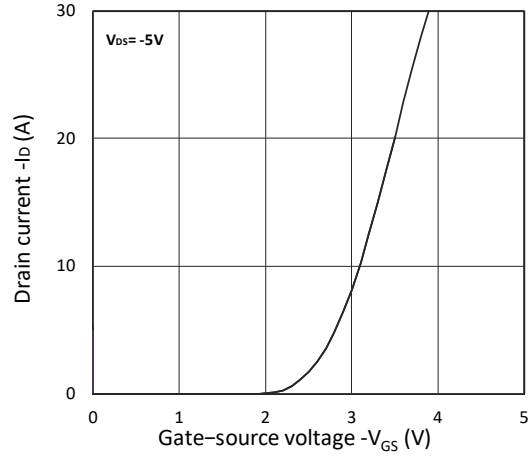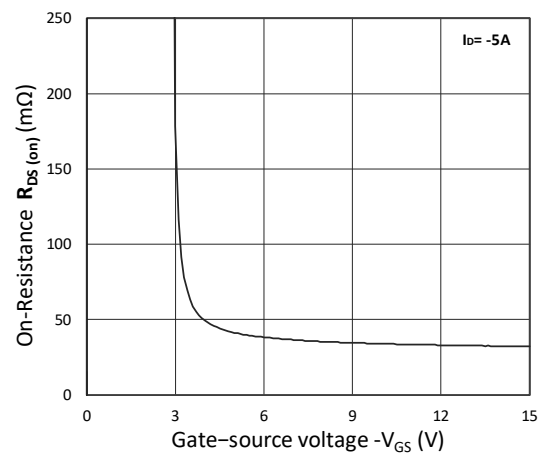Figure 11 Capacitance vs Vds
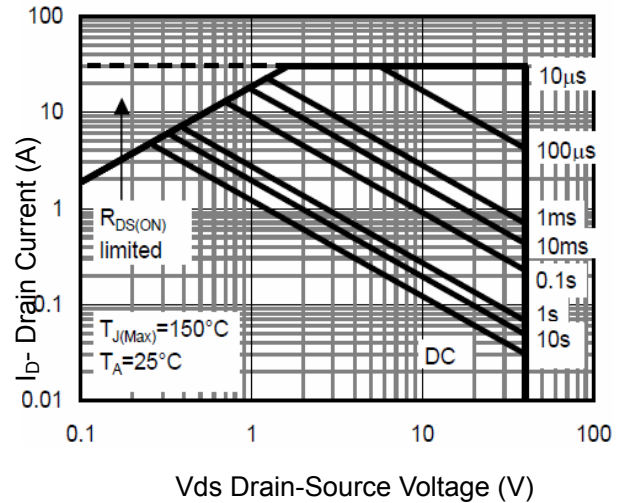
Figure 12 Safe Operation Area
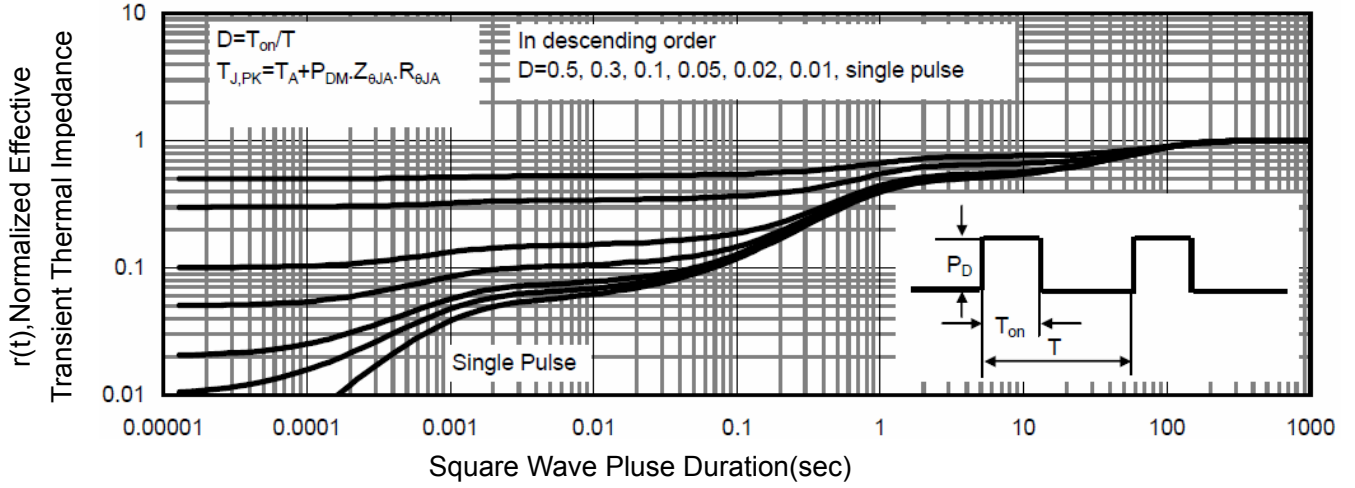
Figure 13 Normalized Maximum Transient Thermal Impedance

P-Channel Typical Characteristics
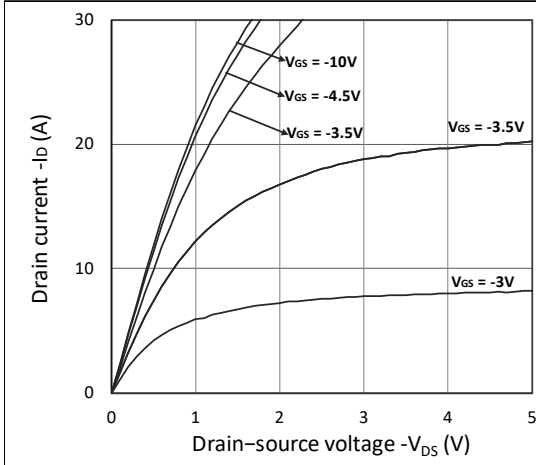
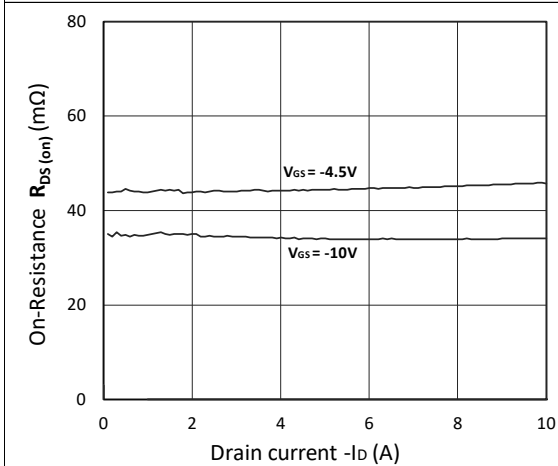Figure 1. Output Characteristics

Figure 2. Transfer Characteristics
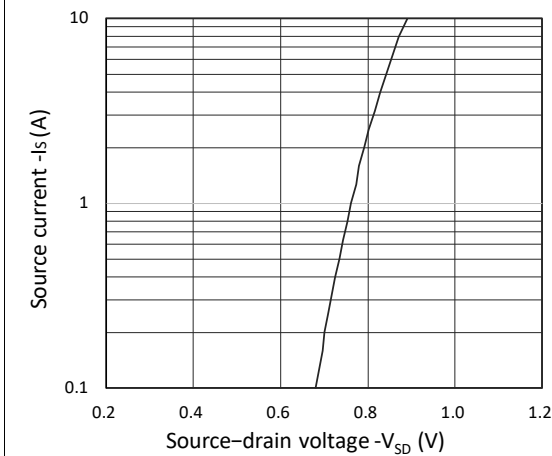
Figure 3. Forward Characteristics of Reverse

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

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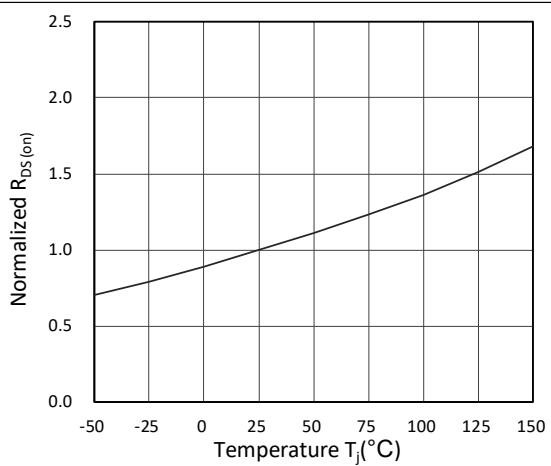
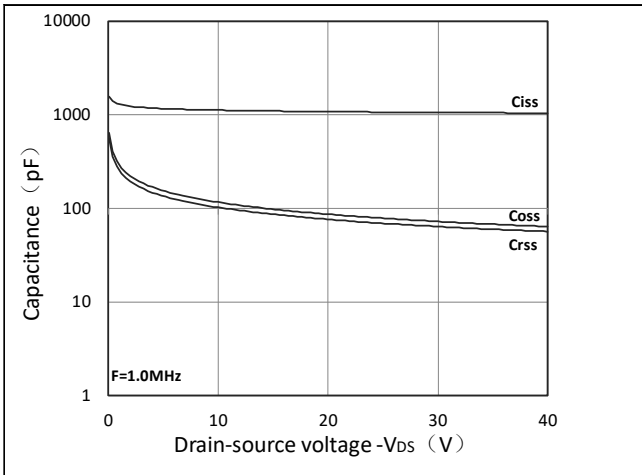

Figure 6. Normalized $R_{DS(on)}$ vs. Temperature
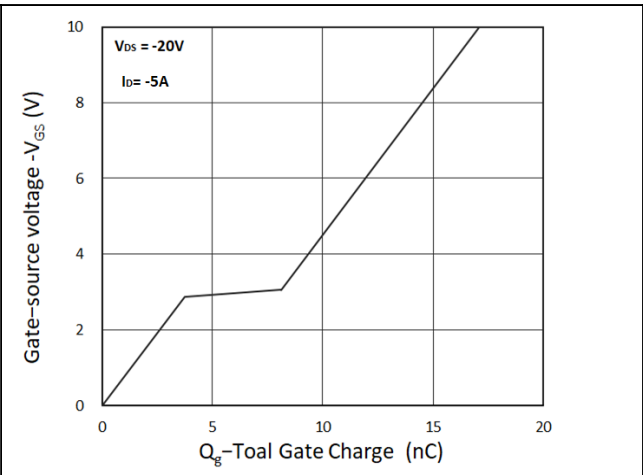
Figure 7. Capacitance Characteristics
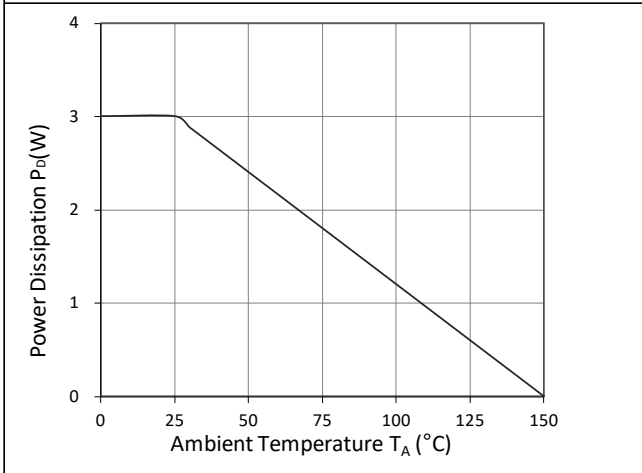

Figure 8. Gate Charge Characteristics

Figure 9. Power Dissipation

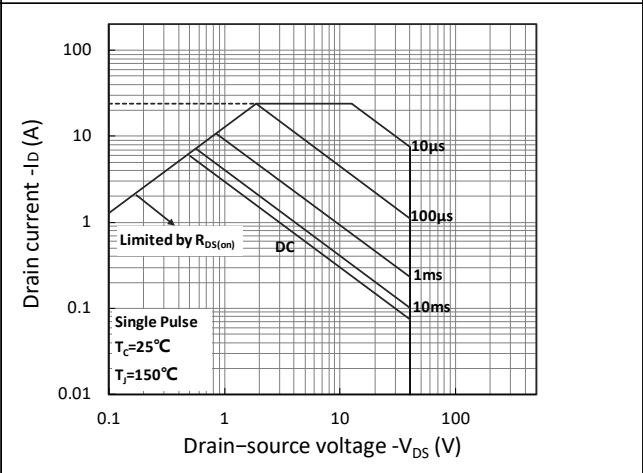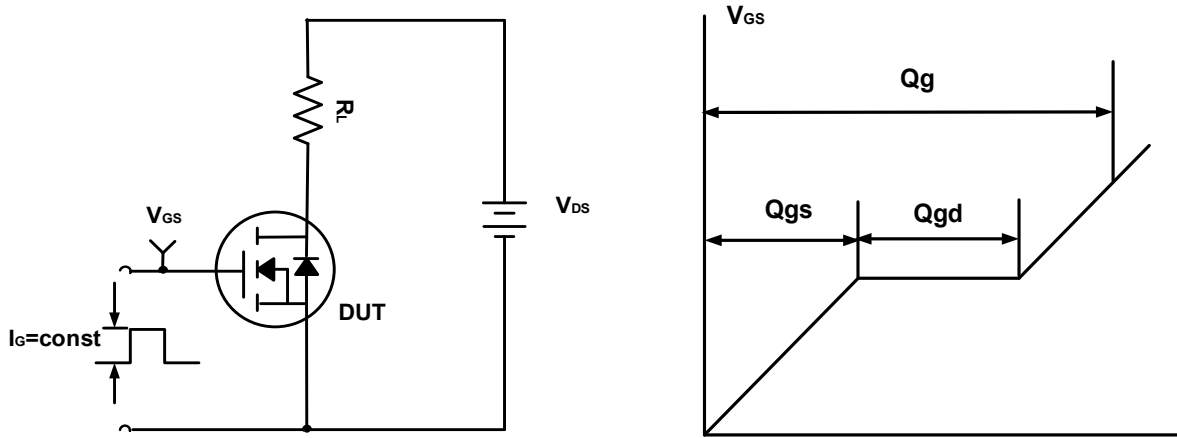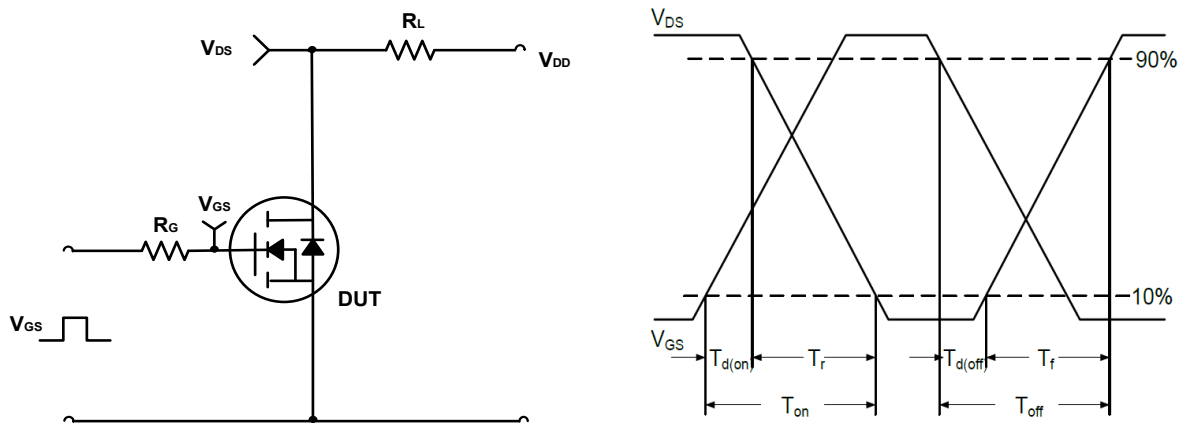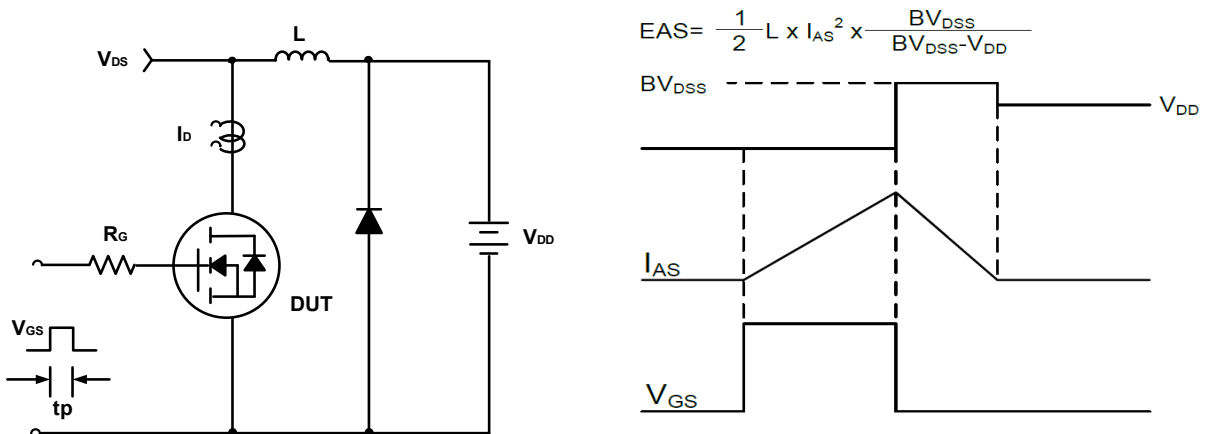

Figure10. Safe Operating Area
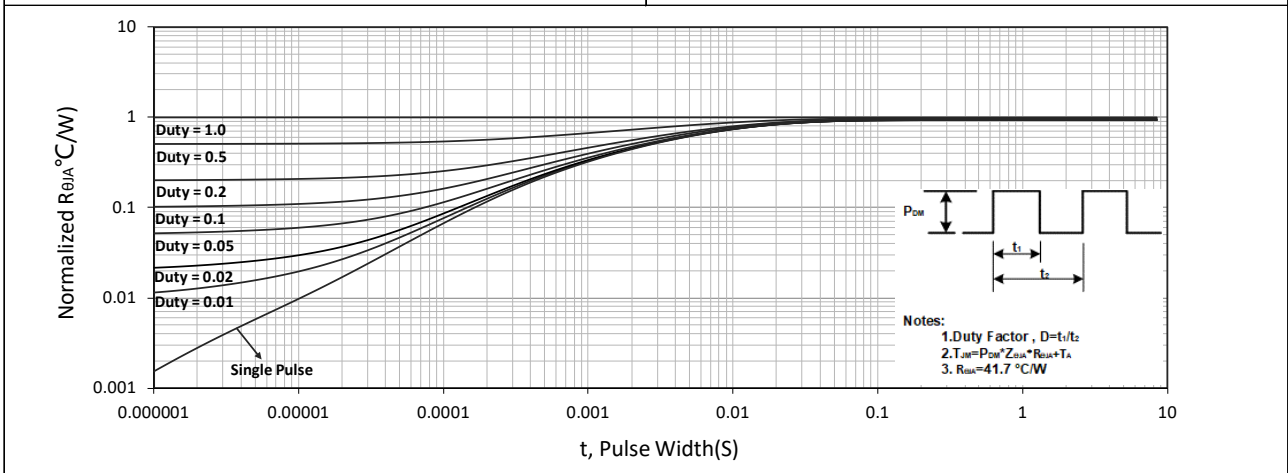
Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

Figure A. Gate Charge Test Circuit & Waveforms

Figure B. Switching Test Circuit & Waveforms

$$EAS= \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$

Figure C. Unclamped Inductive Switching Circuit & Waveforms

●Dimensions(SOP8)

SYMBOL	min	TYP	max	SYMBOL	min		max
A	4.80		5.00	C	1.30		1.50
A1	0.37		0.47	C1	0.55		0.75
A2		1.27		C2	0.55		0.65
A3		0.41		C3	0.05		0.20
B	5.80		6.20	C4	0.19	0.20	0.23
B1	3.80		4.00	D		1.05	
B2		5.00		D1	0.40		0.62
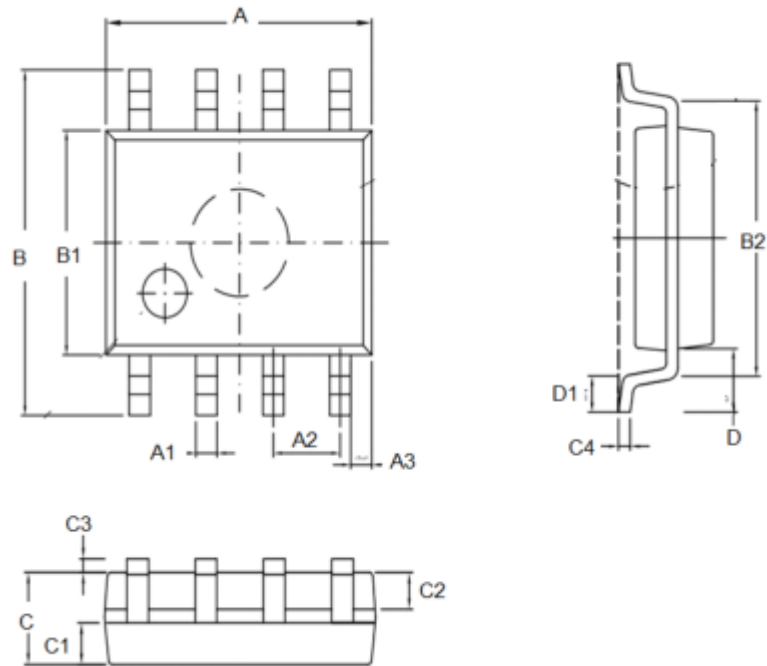
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