

General Description

The AGM420MC 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

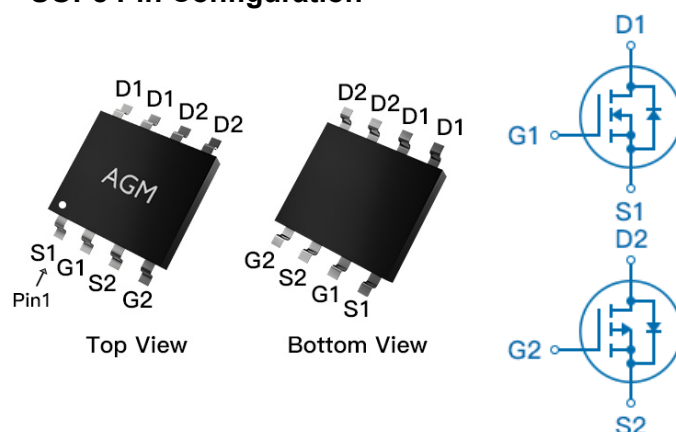
Application

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

Product Summary

BVDSS	RDSON	ID
40V	18mΩ	7.6A
-40V	26mΩ	-7.5A

SOP8 Pin Configuration



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM420MC	AGM420MC	SOP8	330mm	12mm	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 ($V_{GS}=0V$)	40	-40	V
V_{GS}	Gate-Source Voltage ($V_{DS}=0V$)	± 20	± 20	V
I_D	Drain Current-Continuous($T_A=25^{\circ}\text{C}$) (Note 1)	7.6	-7.5	A
	Drain Current-Continuous($T_A=100^{\circ}\text{C}$)	5.5	-5.3	A
IDM (pluse)	Drain Current-Pulsed (Note 2)	30.4	-30	A
P_D	Total Power Dissipation($T_A=25^{\circ}\text{C}$)	2.5	2.5	W
	Total Power Dissipation($T_A=100^{\circ}\text{C}$)	1.0	1.0	W
EAS	Avalanche energy (Note 3)	64	81	mJ
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	---	50	$^{\circ}\text{C/W}$

Table 3. N- Channel Electrical Characteristics (TJ=25℃unless otherwise noted)

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	1.2	1.6	2.2	V
gFS	Forward Transconductance	VDS=5V,ID=5A	--	8	--	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	--	0.8	1.2	V
trr	Reverse Recovery Time	IF=6A , dl/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℃,VDD=25V,Vgs=10V,ID=16A,L=0.5mH,RG=25ohm

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

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	-1.2	-1.5	-2.2	V
gFS	Forward Transconductance	VDS=-5V,ID=-3A	--	10	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=-10V, ID=-6A	--	26	34	mΩ
		VGS=-4.5V, ID=-5A	--	38	49	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=-20V VGS=0V, F=1MHZ	--	931	--	pF
Coss	Output Capacitance		--	96	--	pF
Crss	Reverse Transfer Capacitance		--	72	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	--	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=-10V,VDS=-20V, ID=-5A,RGEN=2.5Ω	--	7.2	--	nS
tr	Turn-on Rise Time		--	14	--	nS
td(off)	Turn-Off Delay Time		--	21	--	nS
tf	Turn-Off Fall Time		--	8.1	--	nS
Qg	Total Gate Charge	VGS=-10V, VDS=-20V, ID=-5A	--	18	--	nC
Qgs	Gate-Source Charge		--	3.2	--	nC
Qgd	Gate-Drain Charge		--	3.8	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	-7.5	A
VSD	Forward on Voltage	VGS=0V,IS=-6A	--	--	-1.2	V
trr	Reverse Recovery Time	IF=-6A , dl/dt=100A/μs ,	--	26	--	ns
Qrr	Reverse Recovery Charge	TJ=25℃	--	18	--	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 , VDD=-25V, Vgs=-10V, ID=-18A, L=0.5mH, RG=25ohm

N- Channel Typical Electrical and Thermal Characteristics (Curves)

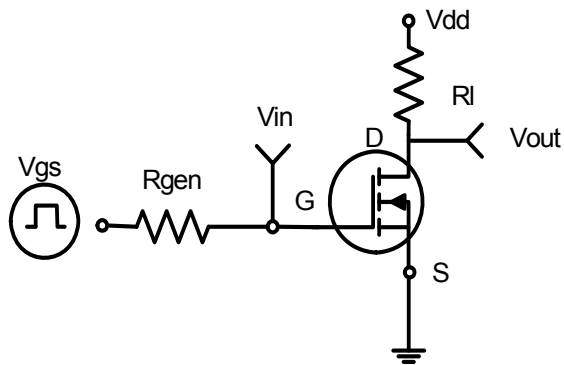


Figure 1: Switching Test Circuit

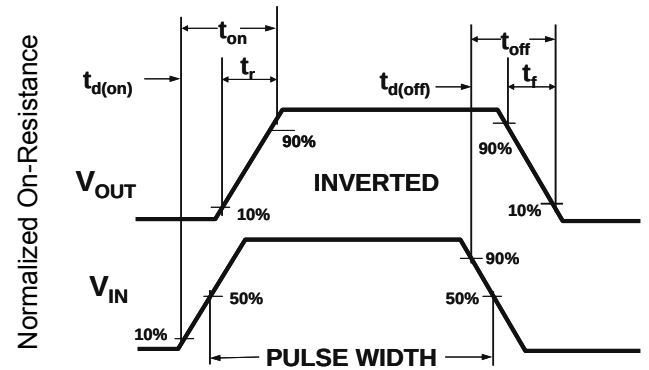


Figure 2: Switching Waveforms

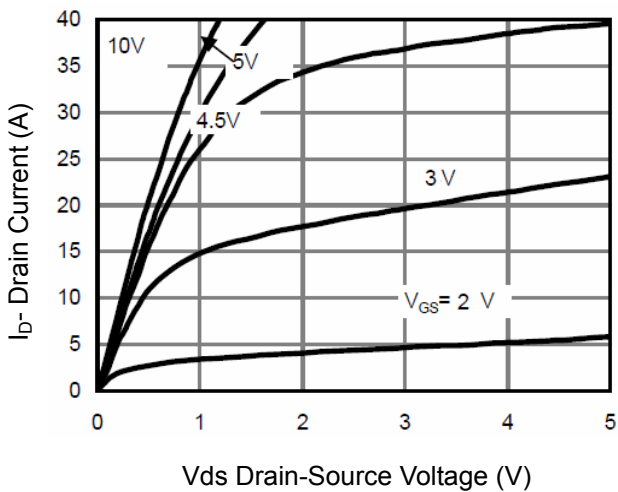


Figure 3 Output Characteristics

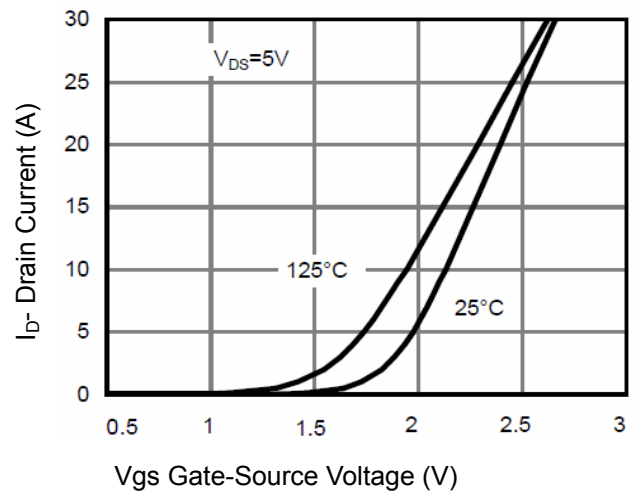


Figure 4 Transfer Characteristics

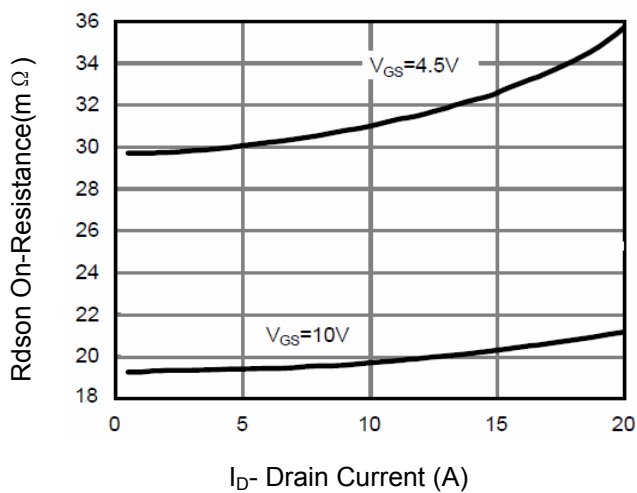


Figure 5 Drain-Source On-Resistance

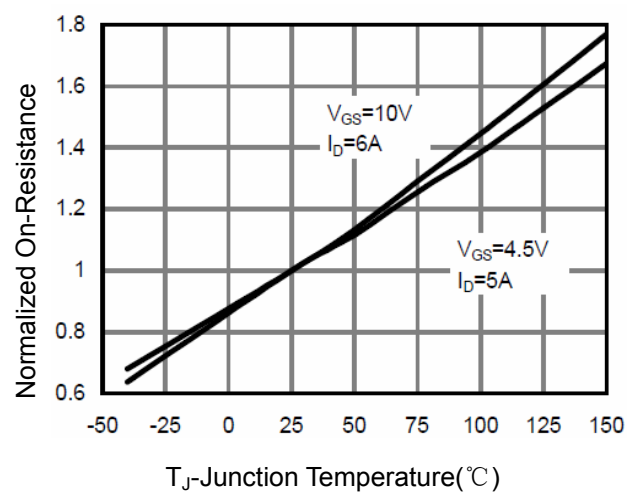


Figure 6 Drain-Source On-Resistance

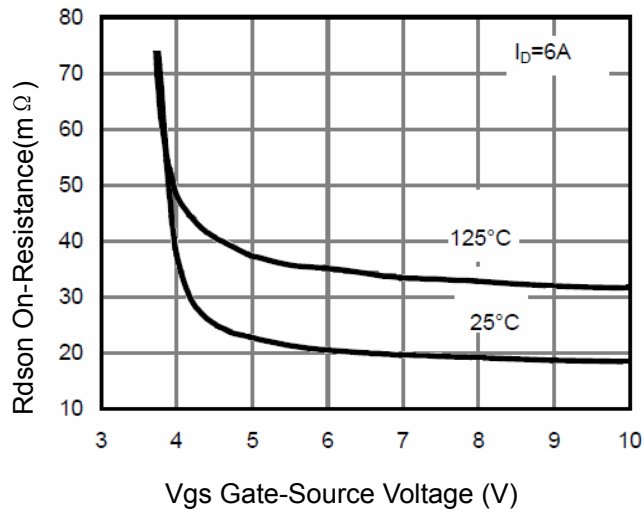


Figure7 Rdson vs Vgs

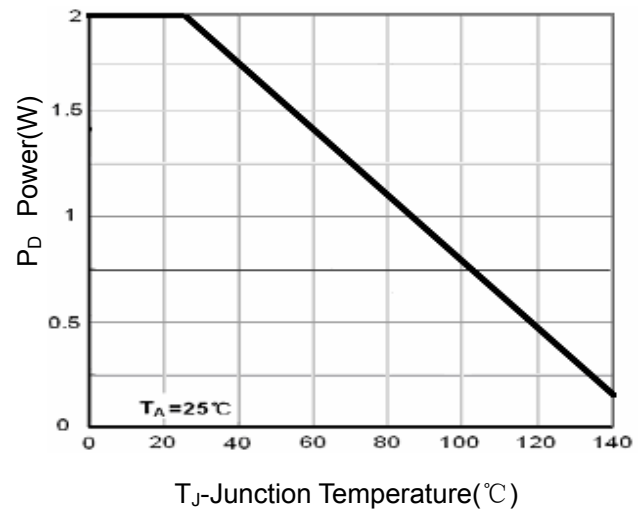


Figure 8 Power Dissipation

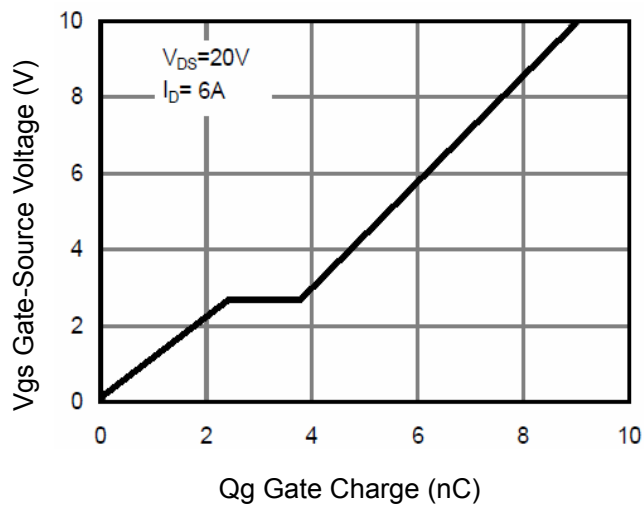


Figure 9 Gate Charge

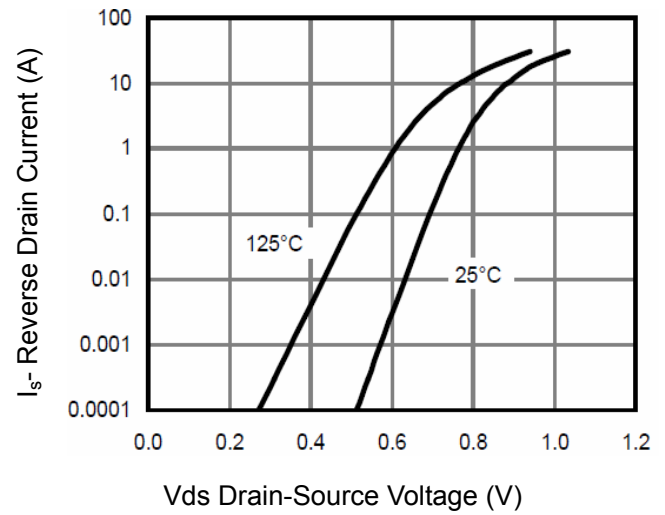


Figure 10 Source- Drain Diode Forward

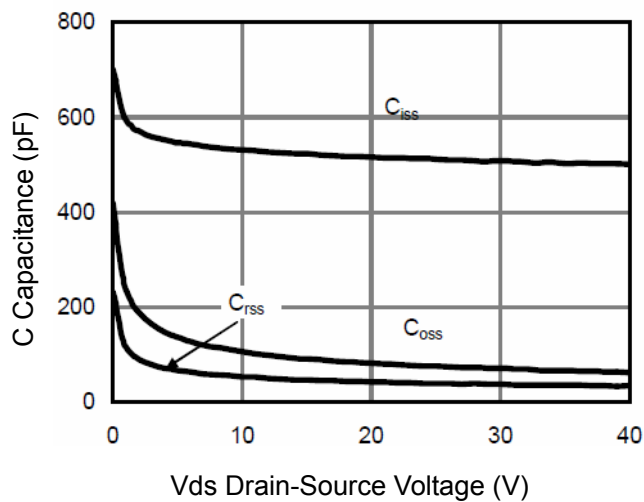


Figure 11 Capacitance vs Vds

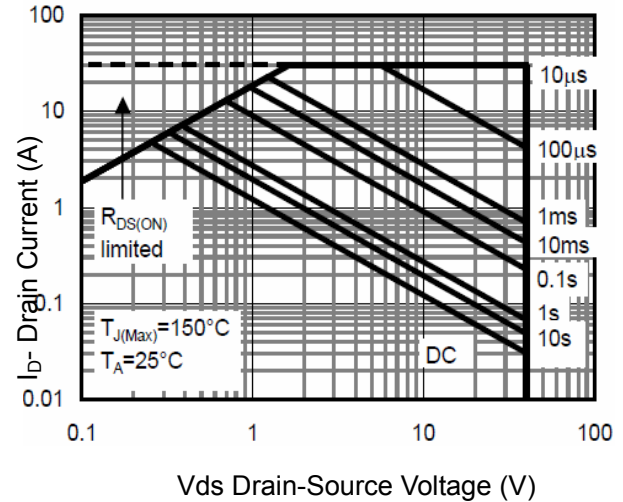


Figure 12 Safe Operation Area

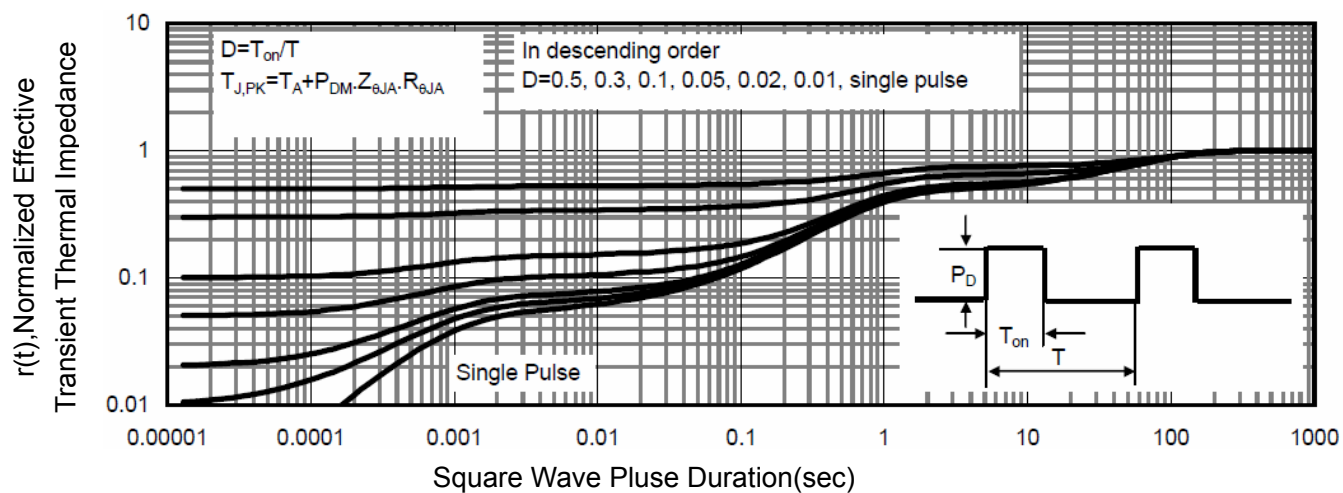
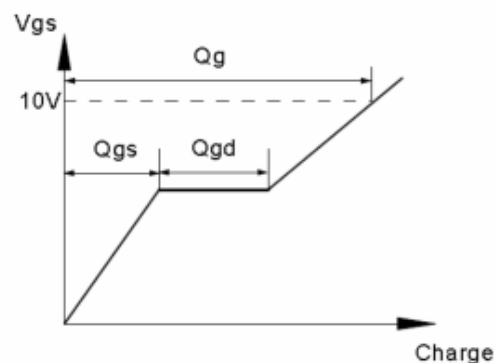
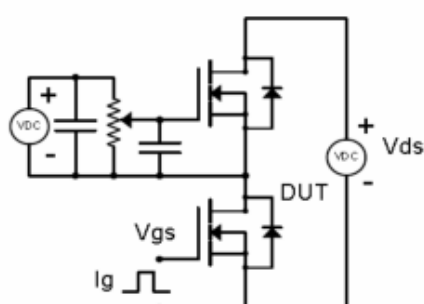


Figure 13 Normalized Maximum Transient Thermal Impedance

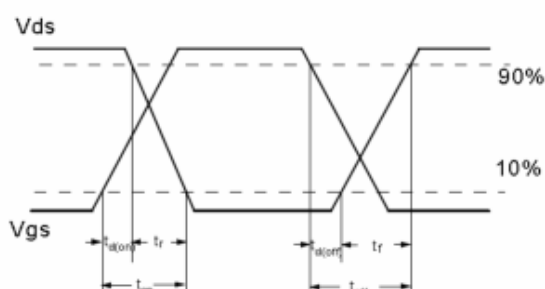
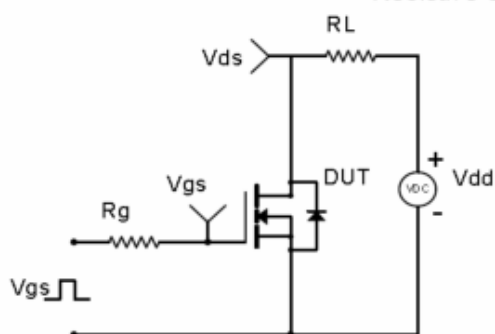
P- Channel Typical Electrical and Thermal Characteristics (Curves)

Test Circuit & Waveform

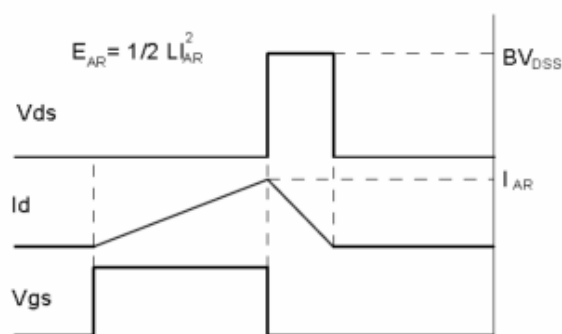
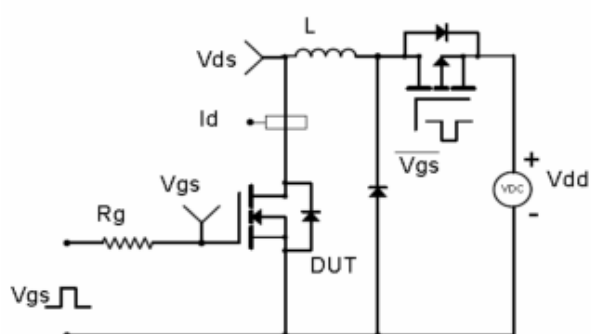
Gate Charge Test Circuit & Waveform



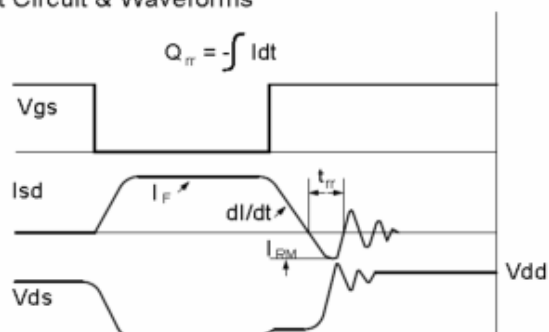
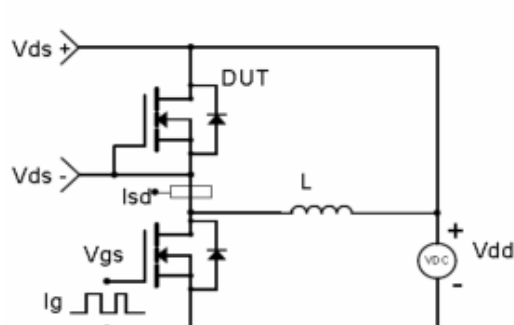
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Typical Performance Characteristics

Fig.1 Output Characteristics

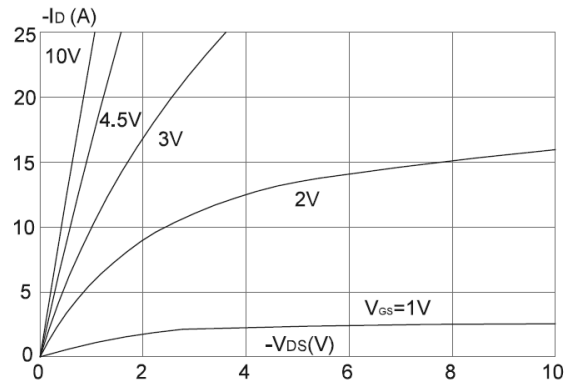


Fig.2 Typical Transfer Characteristics

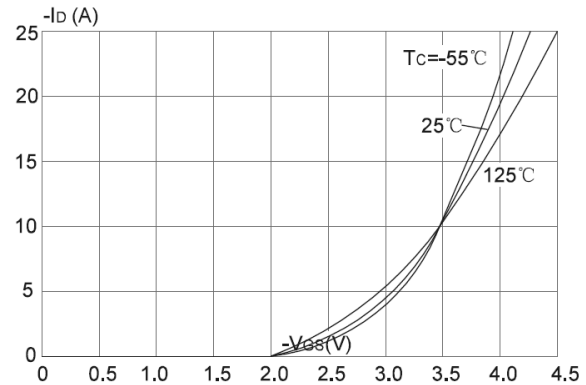


Fig.3 On-resistance vs. Drain Current

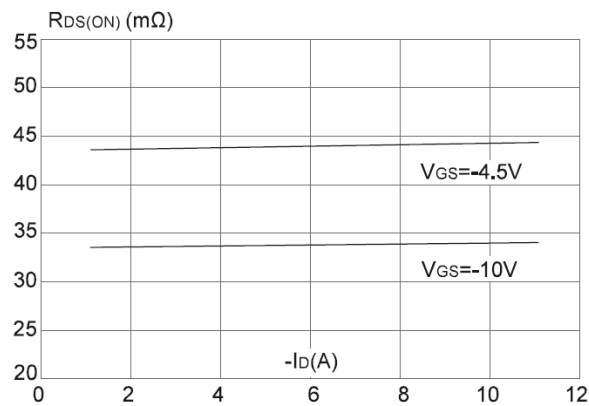


Fig. 4 Body Diode Characteristics

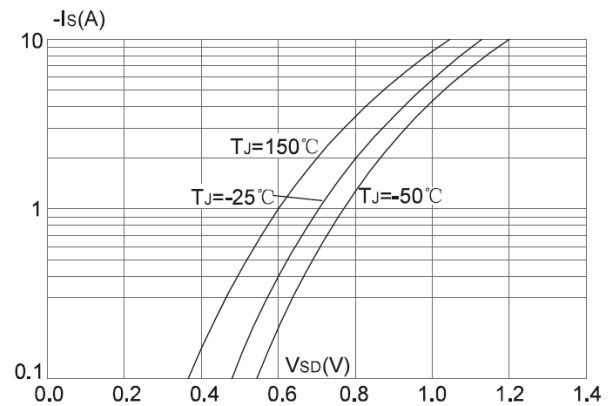


Fig.5 Gate Charge Characteristics

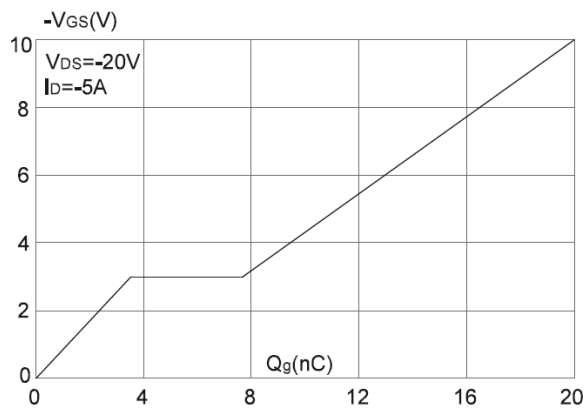


Fig. 6 Capacitance Characteristics

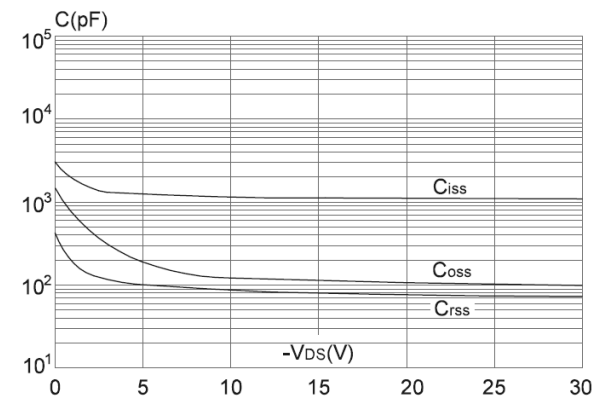


Fig.7 Normalized Breakdown Voltage vs. Junction Temperature

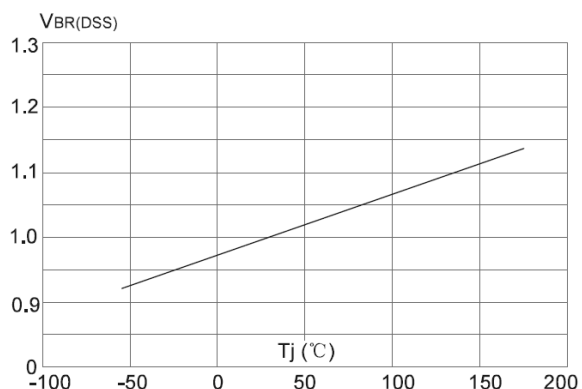


Fig. 8 Normalized on Resistance vs. Junction Temperature

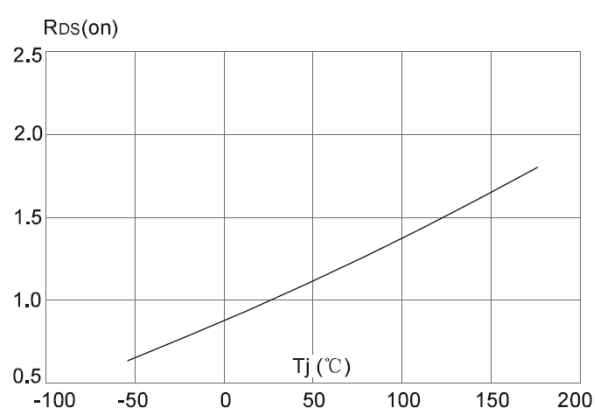


Fig.9 Maximum Continuous Drain Current vs. Case Temperature

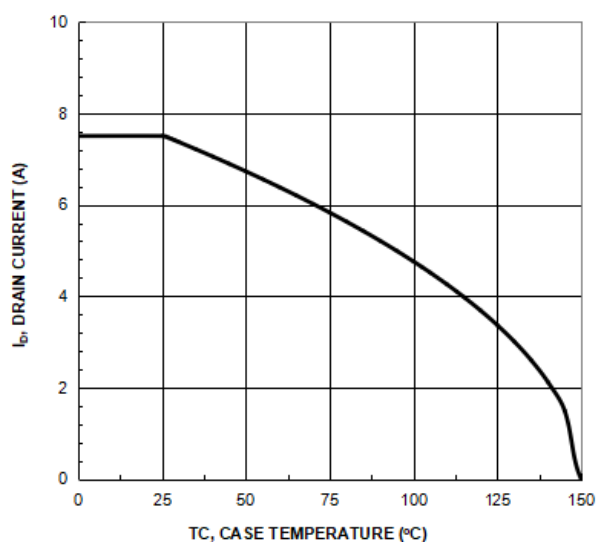


Fig.10 Safe Operating Area

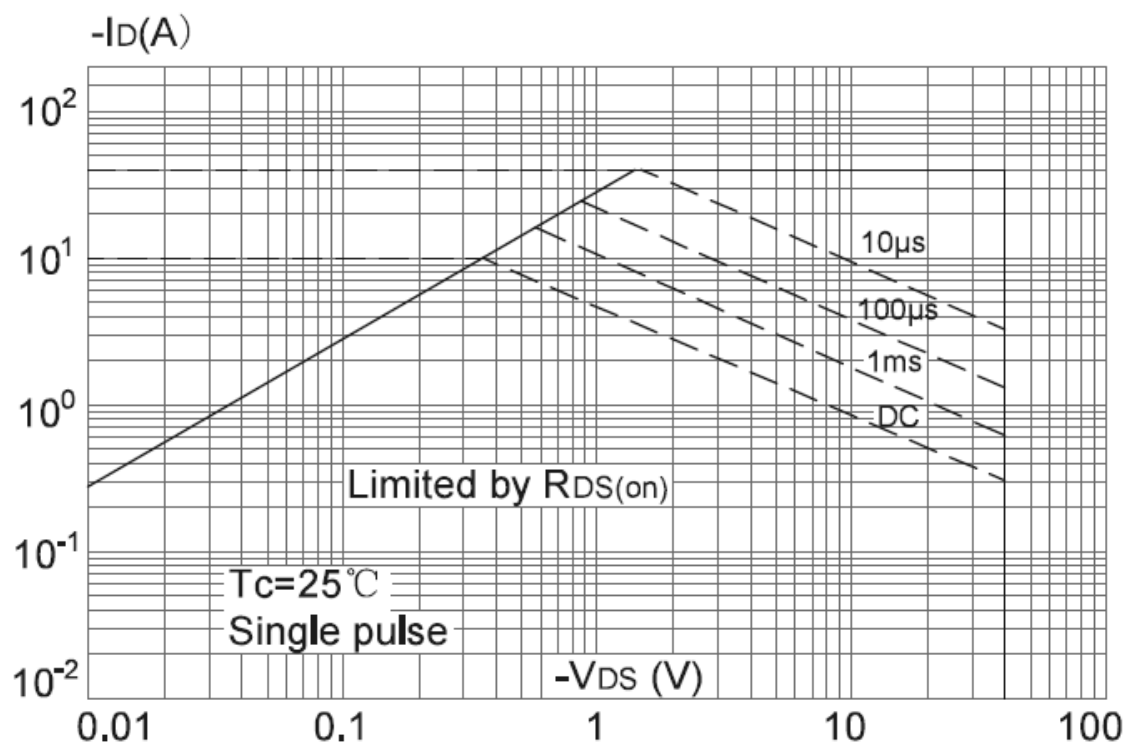
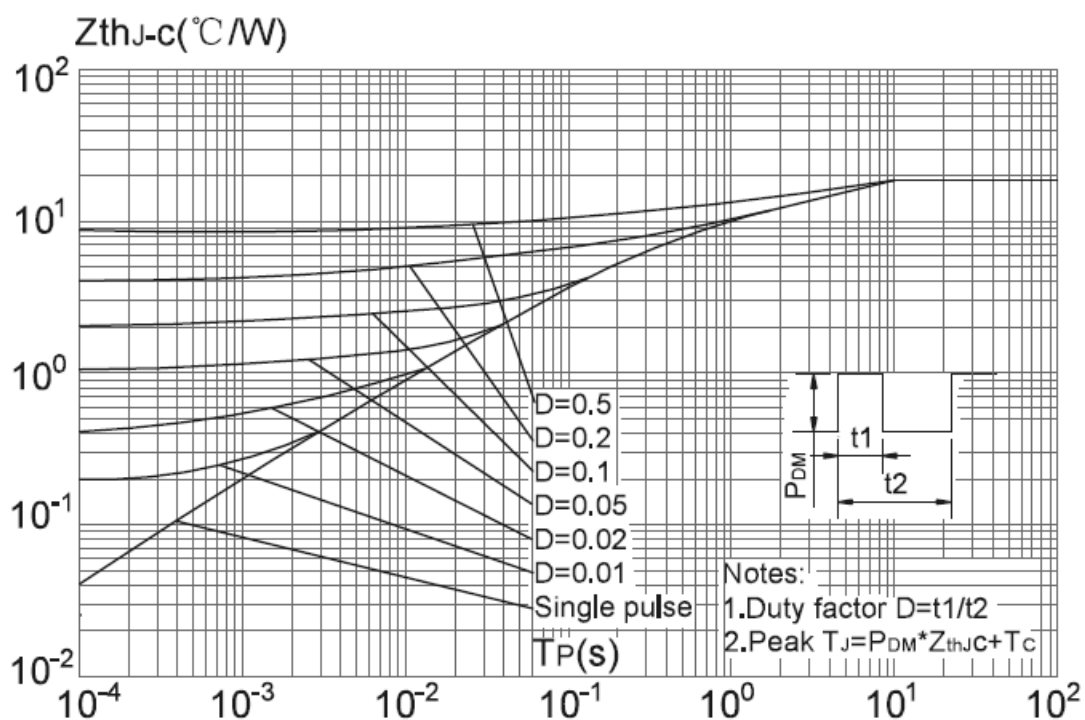
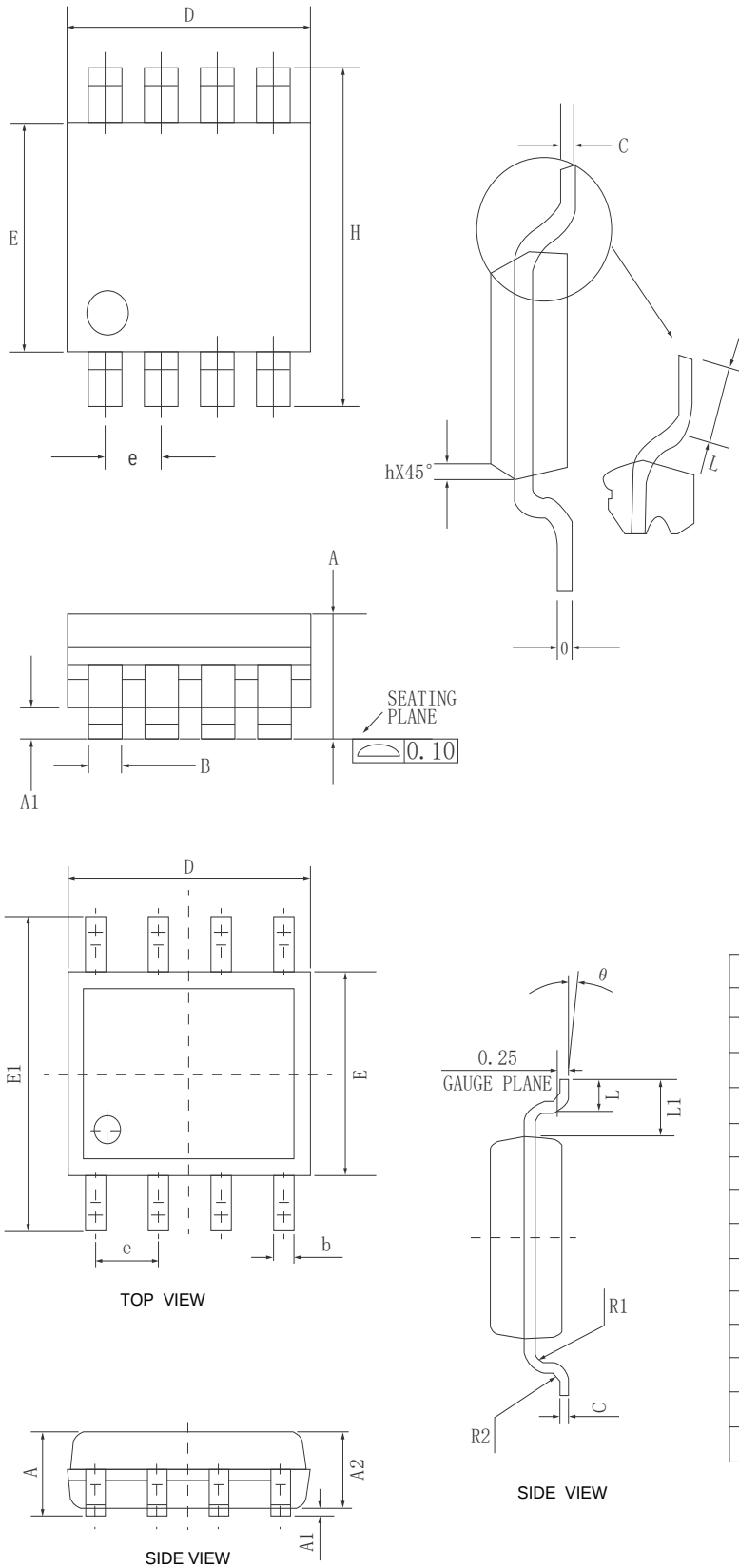


Fig. 11 Transient Thermal Response Curve



Dimensions (SOP8)

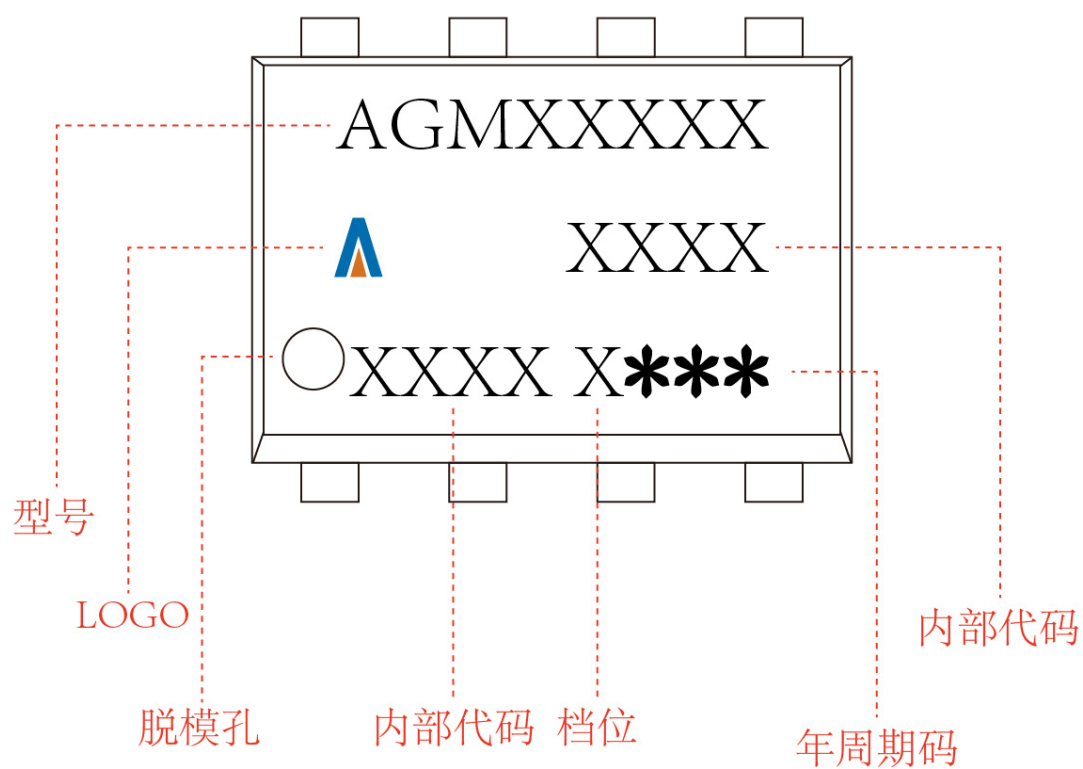


DIM	MILLIMETERS	
	MIN	MAX
A	1.35	1.75
A1	0.02	0.15
B	0.33	0.5
C	0.1	0.25
D	4.8	5
E	3.8	4
e	1.27 (BSC)	
H	5.8	6.2
h	0.25	0.5
I	0.4	1.25
θ	0°	7°

SYMBOL	MIN	NOM	MAX
A	1.40	1.60	1.80
A1	0.05	0.15	0.25
A2	1.35	1.45	1.55
b	0.30	0.40	0.50
c	0.153	0.203	0.253
D	4.80	4.90	5.00
E	3.80	3.90	4.00
E1	5.80	6.00	6.20
L	0.45	0.70	1.00
θ	2°	4°	6°
L1	1.04 REF		
e	1.27 BSC		
R1	0.07 TYP		
R2	0.07 TYP		

SOP8

Marking Instructions:



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