AG5P9SP060MQSP-Q1

P-Channel Enhancement Mode MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
-60V	47mΩ@-10V	-5.9A
	60mΩ@-4.5V	

Feature

- Split gate trench MOSFET technology
- High density cell design for low $R_{DS(ON)}$
- Low C_{rss}
- Suffix “-Q1” for AEC-Q101

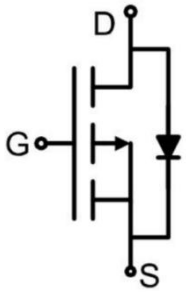
Application

- Battery protection
- Load switch

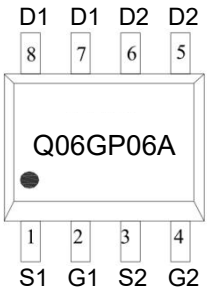
Package

SOP-8

Circuit diagram



Marking



Absolute maximum ratings (T_A=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-60	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D	-5.9	A
Continuous Drain Current (T_A=100℃)	I_D(100℃)	-3.7	A
Pulsed Drain Current[1]	I_{DM}	-30	A
Single Pulse Avalanche Energy[2]	E_{AS}	81	mJ
Power Dissipation[3]	P_D	3.1	W
Thermal Resistance Junction to Ambient[4] (t ≤10s)	$R_{\theta JA}$	40.3	℃/W
Operating Junction Temperature	T_J	-55 ~ +150	℃
Storage Temperature	T_{STG}	-55 ~ +150	℃

Electrical characteristics (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} =0V, I_D =-250μA	-60			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =-60V, V_{GS} =0V			-1	μA
Gate-body leakage current	I_{GSS}	V_{DS} =0V, V_{GS} =±20V			±100	nA
SGate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =-250μA	-1.3	-1.8	-2.5	V
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =-10V, I_D =-6A		35	47	mΩ
		V_{GS} =-4.5V, I_D =-3A		45	60	
Dynamic characteristics[5]						
Input Capacitance	C_{iss}	V_{DS} =-30V, V_{GS} =0V, f =1MHz		1100		pF
Output Capacitance	C_{oss}			350		
Reverse Transfer Capacitance	C_{rss}			28		
Total Gate Charge	Q_g	V_{DS} =-30V, V_{GS} =-10V, I_D =-3A		18.7		nC
Gate-Source Charge	Q_{gs}			4.7		
Gate-Drain Charge	Q_{gd}			3		
Turn-on delay time	$t_{d(on)}$	V_{DS} =-30V, V_{GS} =-10V, I_D =-3A R_G =6Ω		7.5		nS
Turn-on rise time	t_r			39.5		
Turn-off delay time	$t_{d(off)}$			43.6		
Turn-off fall time	t_f			55.1		
Source-Drain Diode characteristics						
Diode Forward Current	I_S				-5.9	A
Diode Forward voltage	V_{SD}	V_{GS} =0V, I_S =-6A			-1.3	V
Reverse Recovery Time	T_{rr}	I_F =-3A, di/dt =-100A/us		20.2		nS
Reverse Recovery Charge	Q_{rr}			8.2		nC

Notes:

1) Repetitive rating; pulse width limited by max. junction temperature.
2) V_{DD} =50V, R_G =25Ω, L =0.5mH, I_{AS} =18A.
3) Pd is based on max. junction temperature, using ≤10s junction-ambient thermal resistance.
4) The value of $R_{\theta JA}$ is measured with the device mounted on the 1in² FR-4 PCB board with 2oz . Copper, in the still air environment with T_A =25℃.The value in any given application Depends on the user's specific board design.
5) Guaranteed by design, not subject to production.

Typical Characteristics

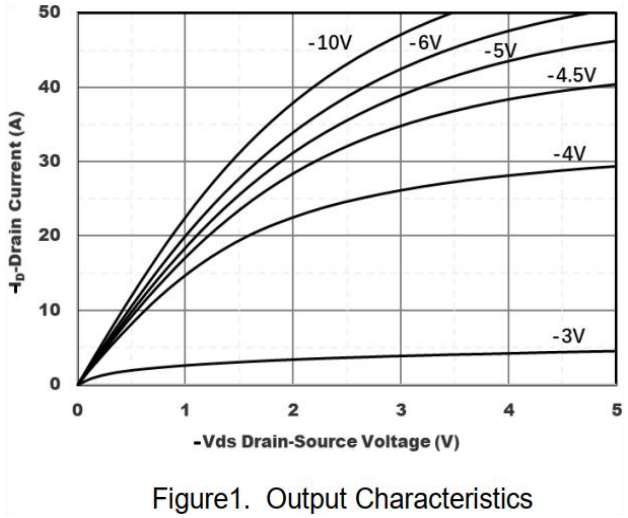


Figure1. Output Characteristics

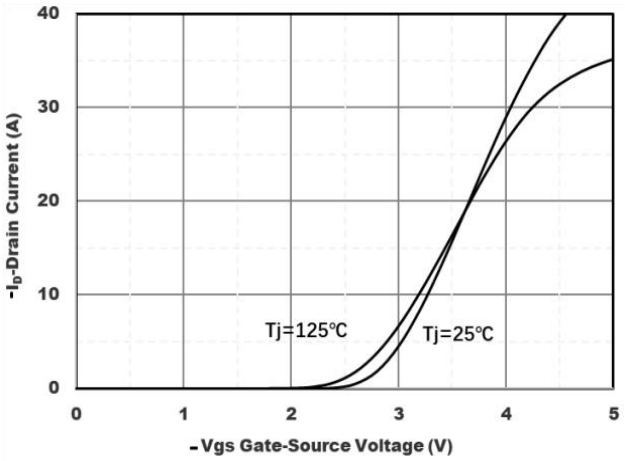


Figure2. Transfer Characteristics

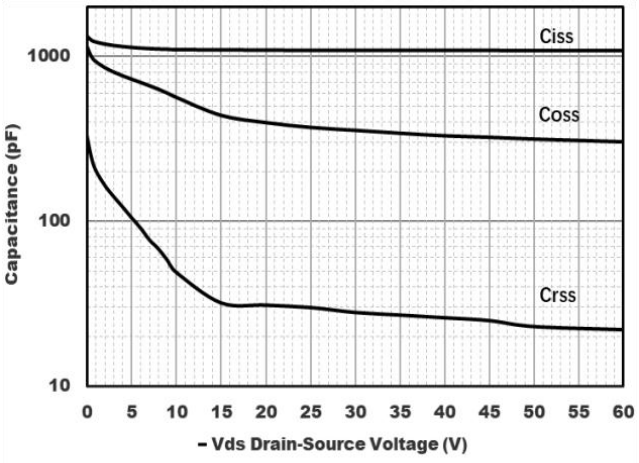


Figure3. Capacitance Characteristics

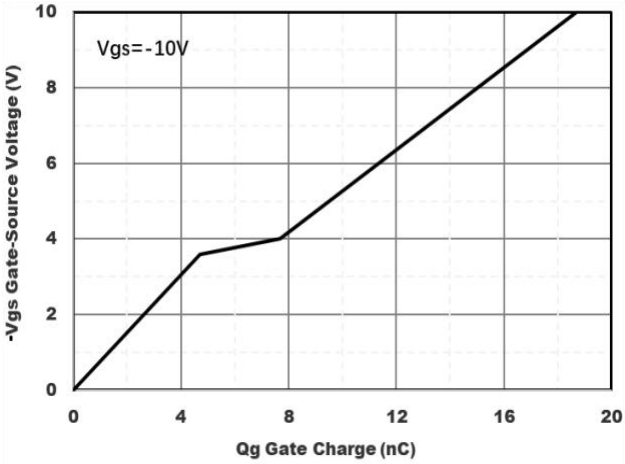


Figure4. Gate Charge

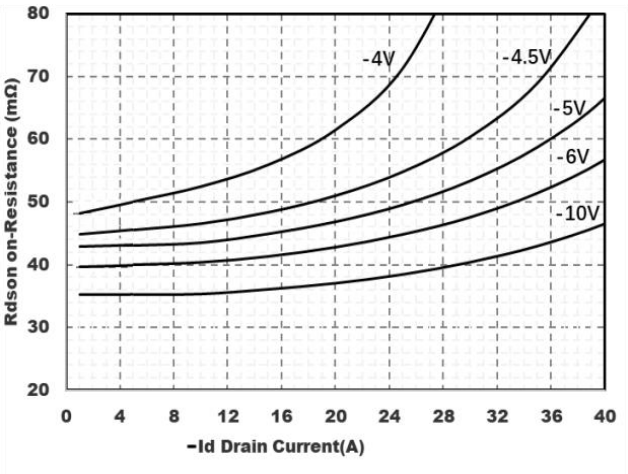


Figure5. : On-Resistance vs. Gate to Source Voltage

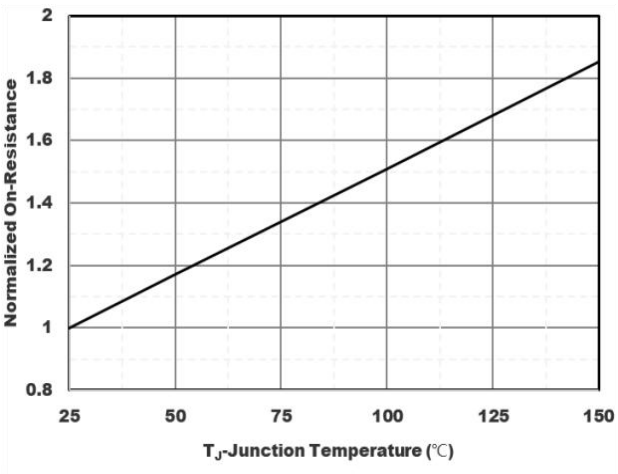


Figure6.Normalized On-Resistance

Typical Characteristics

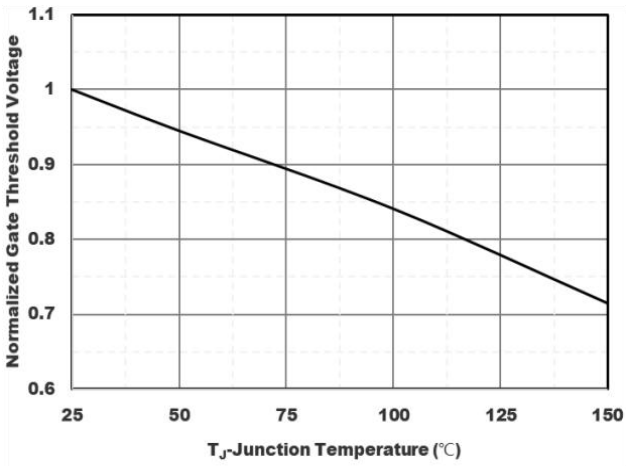


Figure7. Normalized Gate Threshold Voltage

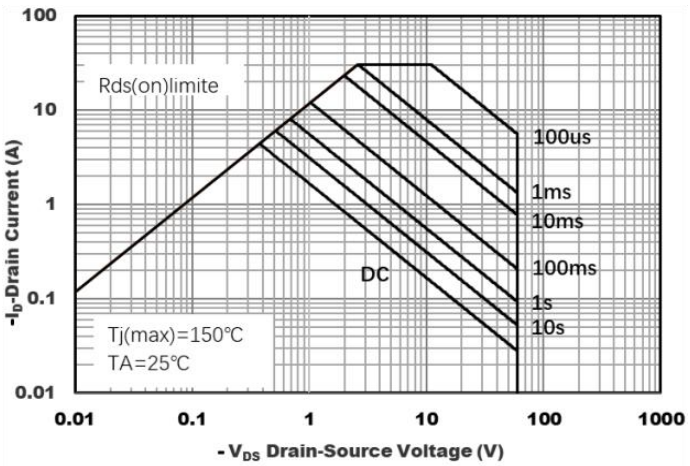


Figure8.Safe Operation Area

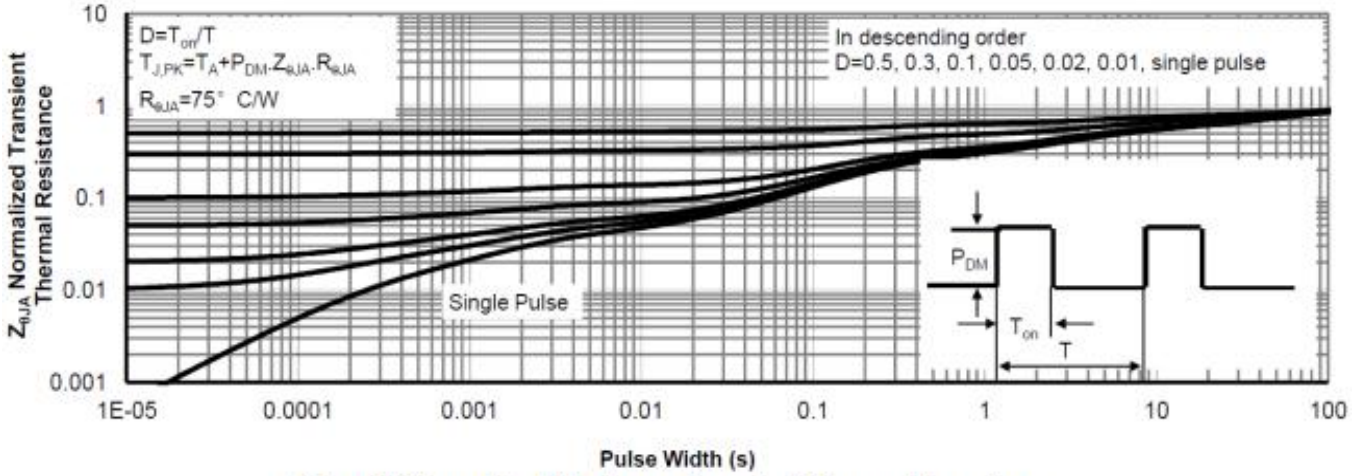


Figure9. Normalized Maximum Transient Thermal Impedance

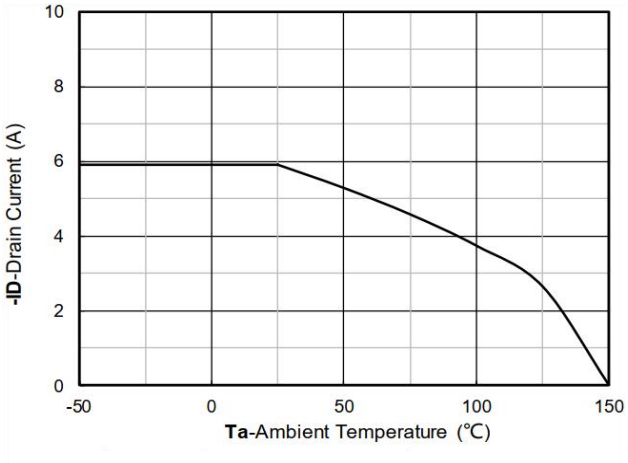
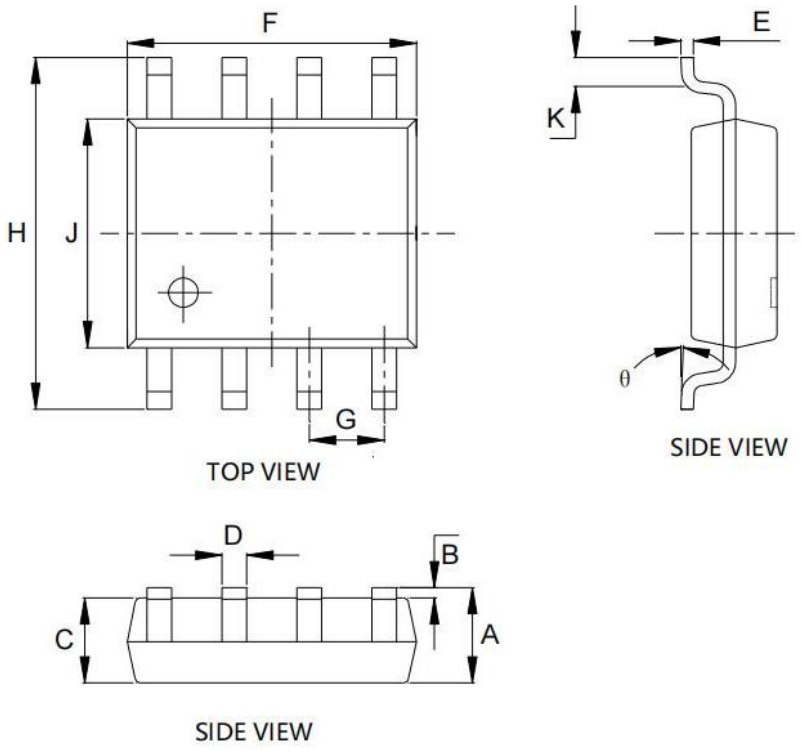


Figure 10. Current dissipation

SOP-8 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
B	0.100	0.250	0.004	0.010
C	1.350	1.550	0.053	0.061
D	0.330	0.510	0.013	0.020
E	0.170	0.250	0.007	0.010
F	4.800	5.000	0.189	0.197
G	1.270 BSC.		0.050 BSC.	
H	5.800	6.200	0.228	0.244
J	3.800	4.000	0.150	0.157
K	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°