AT004SN060MQSA-Q1

N-Channel Enhancement Mode MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
60V	50mΩ@10V	4A
	80mΩ@4.5V	

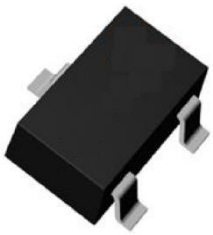
Feature

- High power and current handing capability
- Surface mount package
- Suffix “-Q1” for AEC-Q101

Application

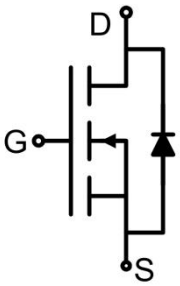
- Battery switch
- DC/DC converter

Package

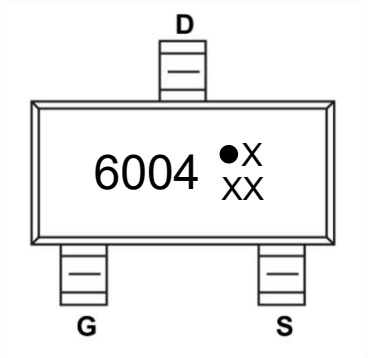


SOT-23

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	4	A
Pulsed Drain Current[1]	I_{DM}	16	A
Single Pulse Avalanche Energy[2]	E_{AS}	36	mJ
Power Dissipation	P_D	1.7	W
Thermal Resistance Junction to Ambient[3]	$R_{\theta JA}$	73.5	℃/W
Operating Junction Temperature	T_J	-55 ~ +150	℃
Storage Temperature	T_{STG}	-55 ~ +150	℃

Electrical characteristics (T_A=25 °C, 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
Gate threshold voltage[4]	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	1.2	1.8	2.5	V
Drain-source on-resistance[4]	$R_{DS(on)}$	V_{GS} =10V, I_D =4A		38	50	mΩ
		V_{GS} =4.5V, I_D =4A		58	80	
Dynamic characteristics[5]						
Input Capacitance	C_{iss}	V_{DS} =30V, V_{GS} =0V, f =1MHz		553		pF
Output Capacitance	C_{oss}			43		
Reverse Transfer Capacitance	C_{rss}			37		
Gate Charge	Q_g	V_{DS} =30V, V_{GS} =10V, I_D =4A		11.4		nC
Gate-Source Charge	Q_{gs}			1.7		
Gate-Drain Charge	Q_{gd}			2.6		
Turn-on delay time	$t_{d(on)}$	V_{DS} =30V, V_{GS} =10V, I_D =4A R_G =1Ω		6		nS
Turn-on rise time	t_r			11		
Turn-off delay time	$t_{d(off)}$			18		
Turn-off fall time	t_f			10		
Source-Drain Diode characteristics						
Diode Forward current	I_S				4	A
Diode Forward voltage[4]	V_{SD}	V_{GS} =0V, I_S =4A			1.2	V

Notes:

1) Repetitive Rating: Pulse width limited by maximum junction temperature.

2) EAS condition : Tj=25℃,V_{DD}=30V,V_G=10V,L=0.5mH,Rg=25Ω.

3) The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design.

4) Pulse Test: Pulse Width ≤300μs, Duty Cycle ≤2%.

5) Guaranteed by design, not subject to production.

Typical Characteristics

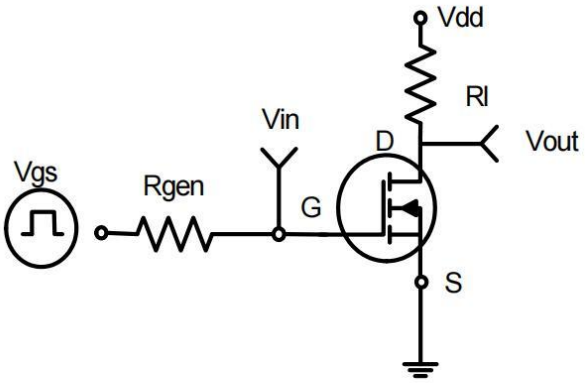


Figure 1:Switching Test Circuit

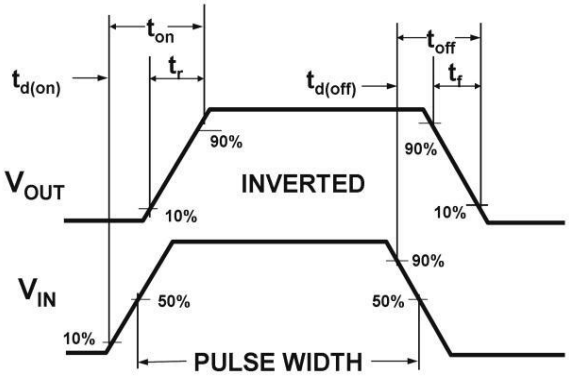


Figure 2:Switching Waveforms

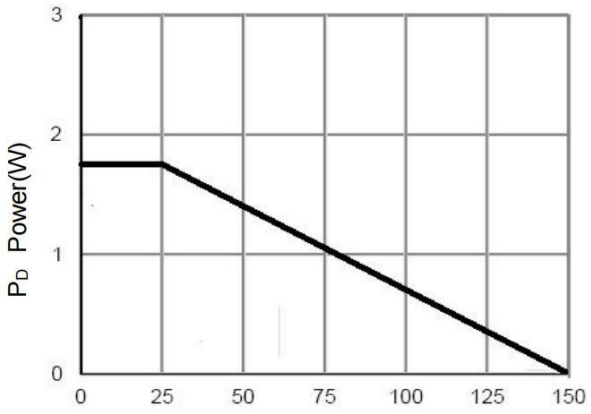


Figure 3 Power Dissipation

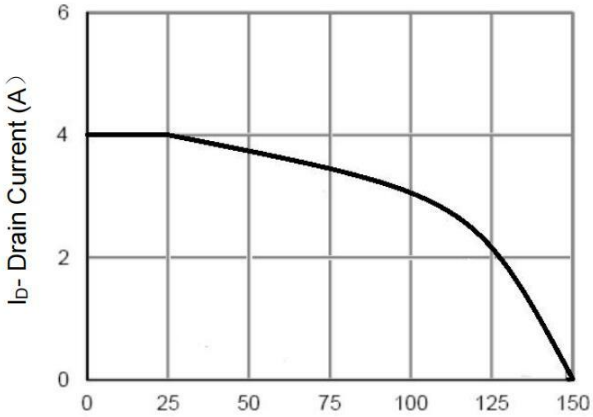


Figure 4 Drain Current

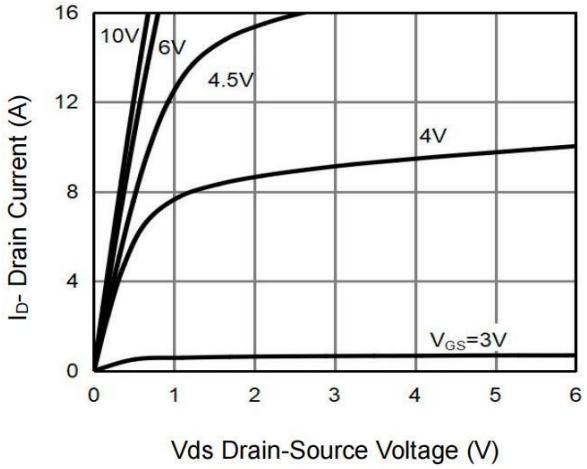


Figure 5 Output Characteristics

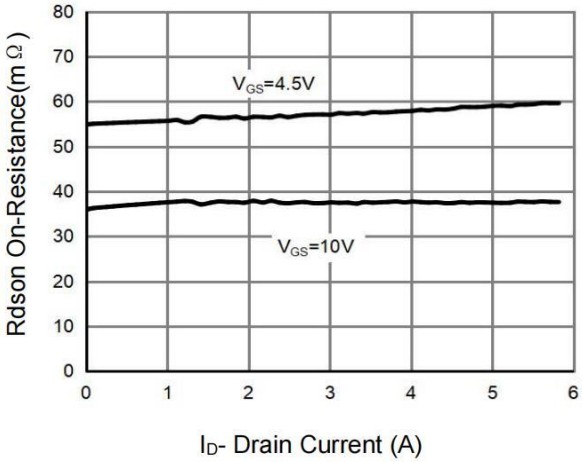


Figure 6 Drain-Source On-Resistance

Typical Characteristics

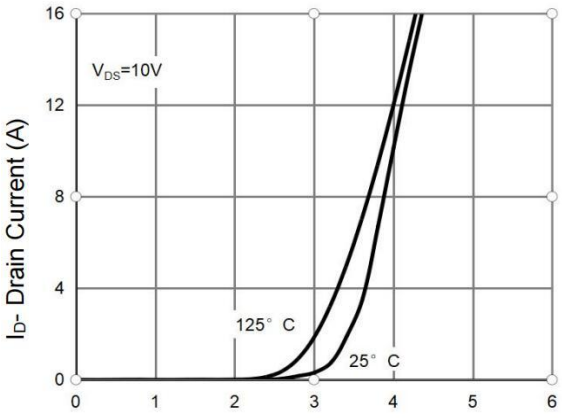


Figure 7 Transfer Characteristics

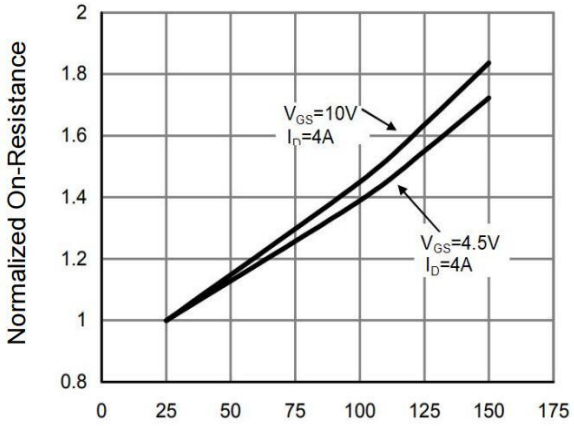


Figure 8 Drain-Source On-Resistance

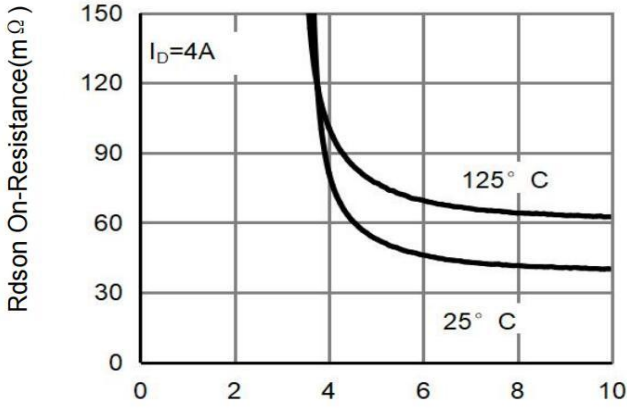


Figure 9 Rdson vs Vgs

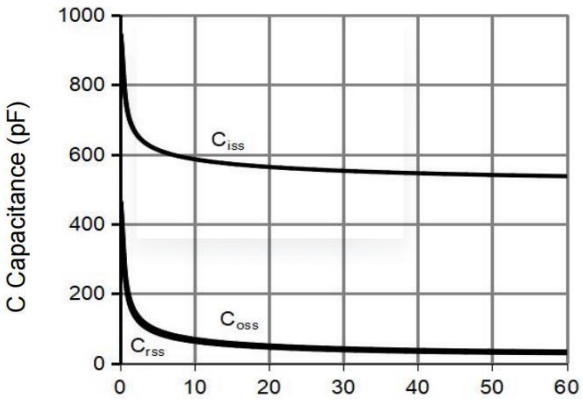


Figure 10 Capacitance vs Vds

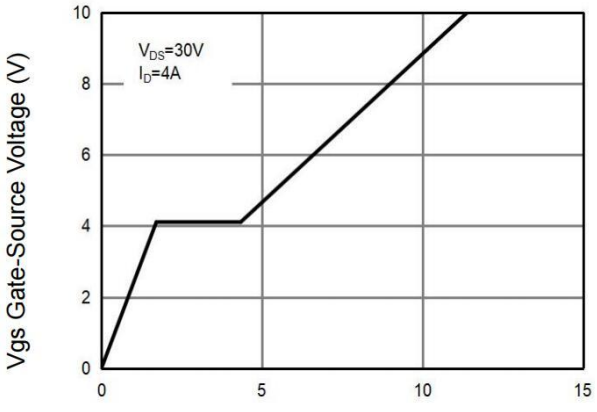


Figure 11 Gate Charge

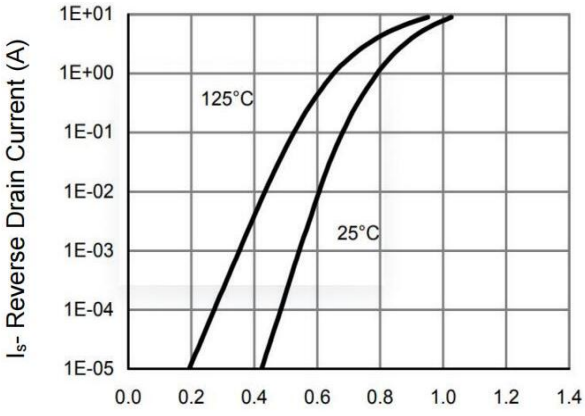


Figure 12 Source- Drain Diode Forward

Typical Characteristics

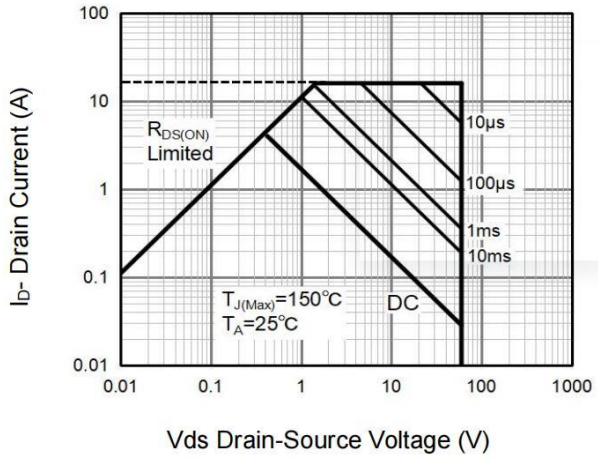


Figure 13 Safe Operation Area

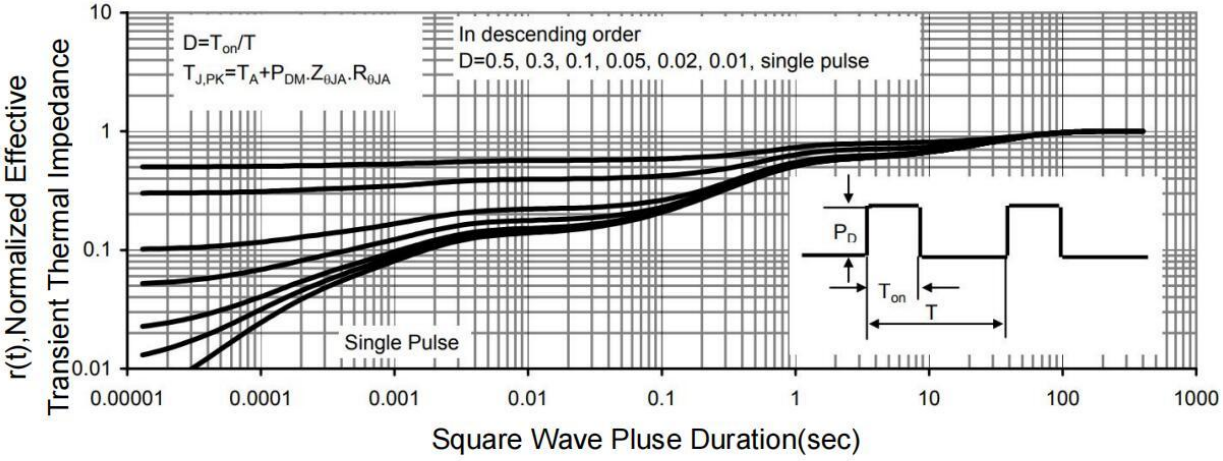
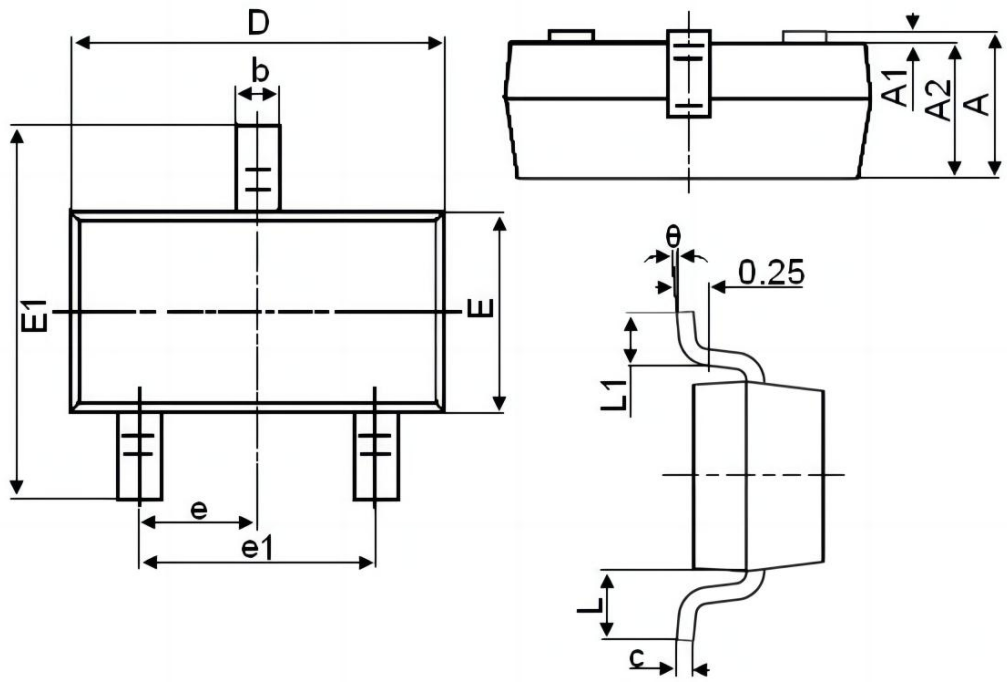


Figure 14 Normalized Maximum Transient Thermal Impedance

SOT-23 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°