

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
20V	32mΩ@4.5V	4.2A
	38mΩ@2.5V	

Feature

- Advanced trench technology
- Excellent $R_{DS(on)}$
- Low gate charge

Application

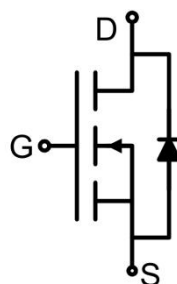
- Battery protection
- Load Switch
- Uninterruptible power supply

Package

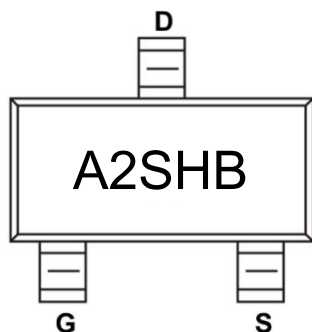


SOT-23

Circuit diagram



Marking



Absolute maximum ratings ($T_c=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current ¹⁾ ($V_{GS}=4.5\text{V}$, $T_A=25^{\circ}\text{C}$)	I_D	4.2	A
Continuous Drain Current ¹⁾ ($V_{GS}=4.5\text{V}$, $T_A=70^{\circ}\text{C}$)	$I_D (70^{\circ}\text{C})$	2.7	A
Pulsed Drain Current ²⁾	I_{DM}	14.4	A
Power Dissipation ³⁾ ($T_A=25^{\circ}\text{C}$)	P_D	1	W
Thermal Resistance Junction to Ambient ¹⁾	$R_{\theta JA}$	125	$^{\circ}\text{C/W}$
Operating Junction Temperature	T_J	$-55 \sim +150$	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	$-55 \sim +150$	$^{\circ}\text{C}$

Electrical characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	20			V
Zero gate voltage drain current	I_{DSS}	$V_{DS}=16V, V_{GS}=0V$			1	μA
Gate-body leakage current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 12V$			± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5	0.75	1.2	V
Drain-source on-resistance ²⁾	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=3A$		24	32	m Ω
		$V_{GS}=2.5V, I_D=2A$		29	38	
Dynamic characteristics ⁵⁾						
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V, f=1MHz$		310		pF
Output Capacitance	C_{oss}			49		
Reverse Transfer Capacitance	C_{rss}			35		
Total Gate Charge	Q_g	$V_{DS}=15V, V_{GS}=4.5V, I_D=3A$		4.6		nC
Gate-Source Charge	Q_{gs}			0.7		
Gate-Drain Charge	Q_{gd}			1.5		
Turn-on delay time	$t_{d(on)}$	$V_{DS}=10V, V_{GS}=4.5V, I_D=3A$ $R_G=3.3\Omega$		1.6		nS
Turn-on rise time	t_r			42		
Turn-off delay time	$t_{d(off)}$			14		
Turn-off fall time	t_f			7		
Source-Drain Diode characteristics						
Diode Forward Current ^{1,4)}	I_S	$V_D=V_G=0V$, Force Current			4.2	A
Diode Forward voltage ²⁾	V_{SD}	$V_{GS}=0V, I_S=1A$			1.2	V

Notes:

- 1) The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2) The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
- 3) The power dissipation is limited by 150°C junction temperature.
- 4) The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.
- 5) Guaranteed by design, not subject to production testing.

Typical Characteristics

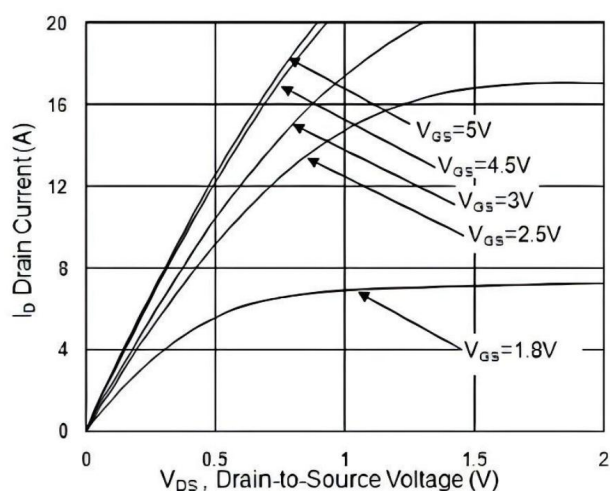


Fig.1 Typical Output Characteristics

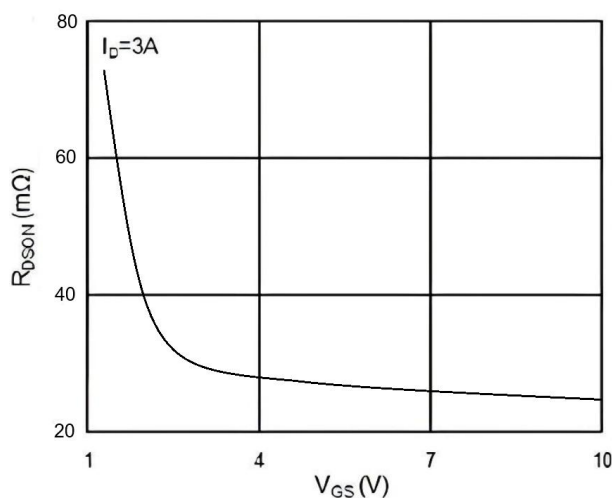


Fig.2 On-Resistance vs. G-S Voltage

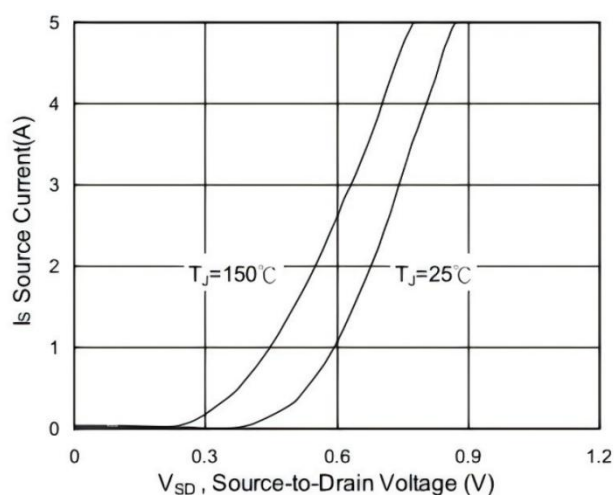


Fig.3 Source Drain Forward Characteristics

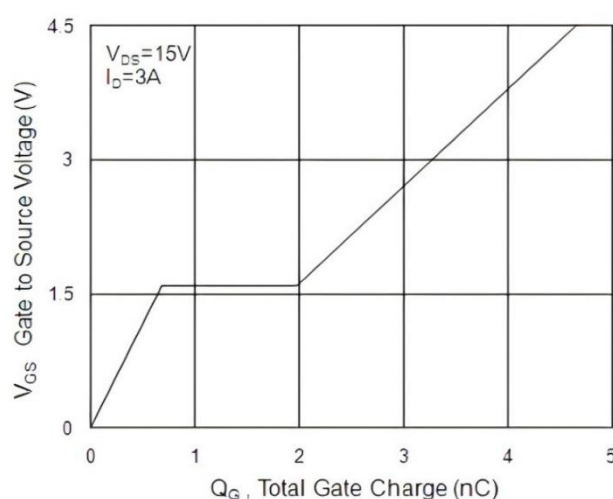


Fig.4 Gate-Charge Characteristics

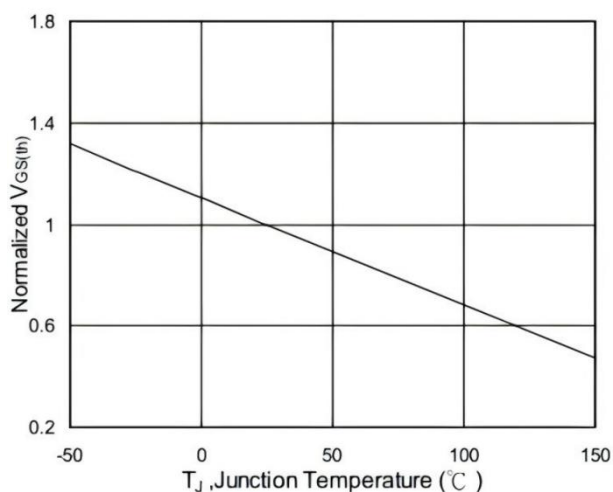


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

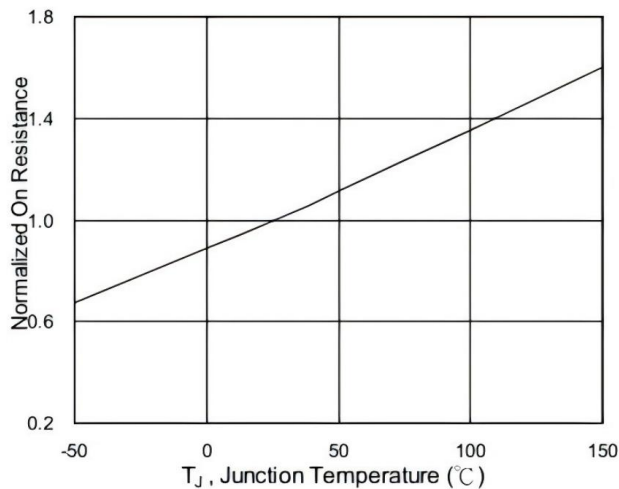


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

Typical Characteristics

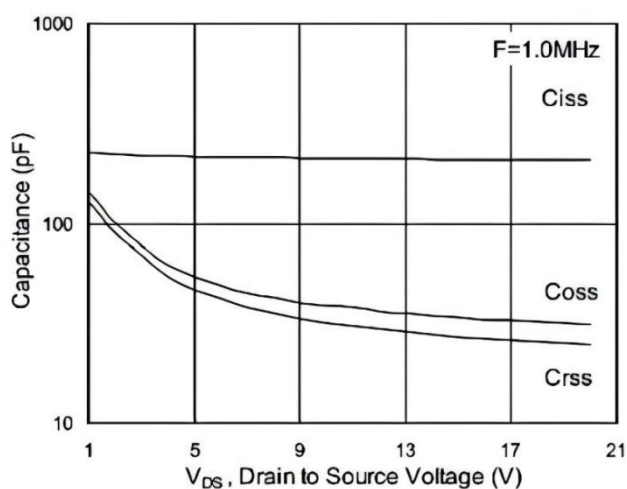


Fig.7 Capacitance

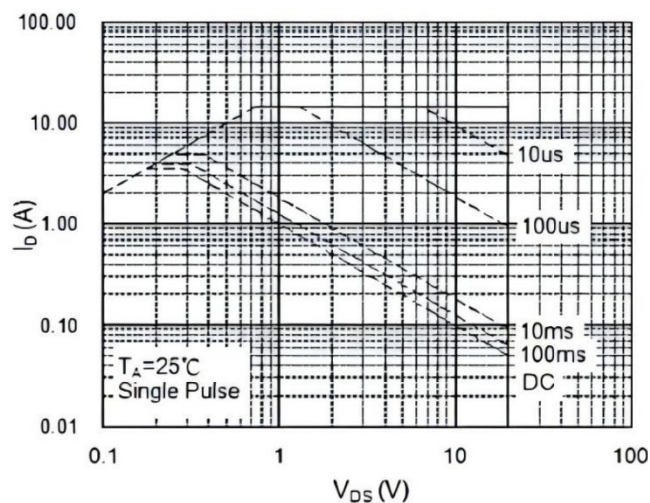


Fig.8 Safe Operating Area

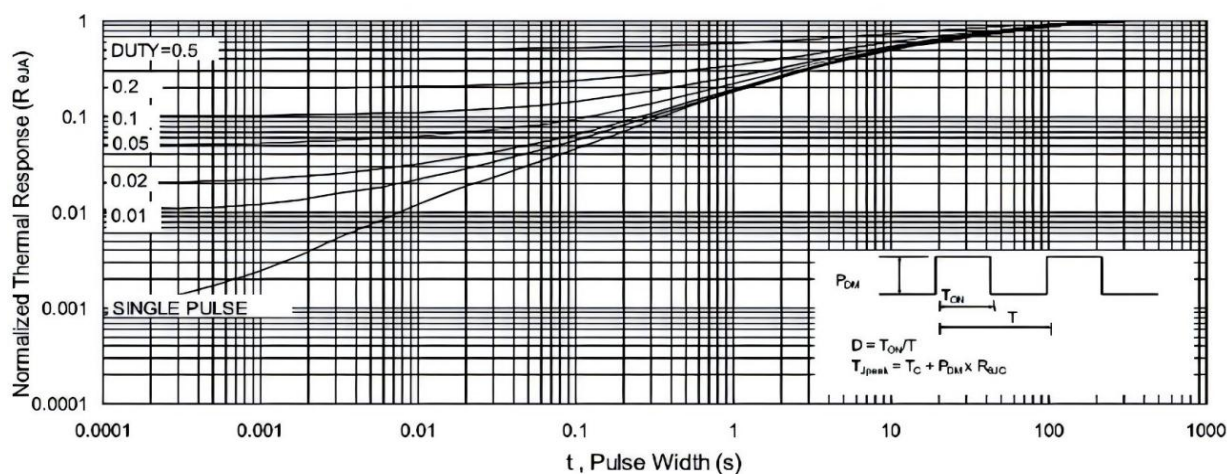


Fig.9 Normalized Maximum Transient Thermal Impedance

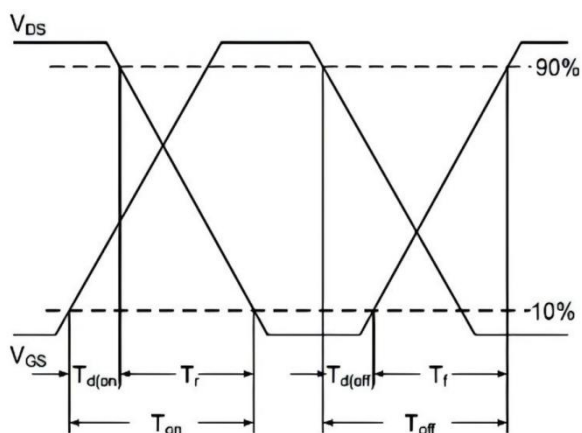


Fig.10 Switching Time Waveform

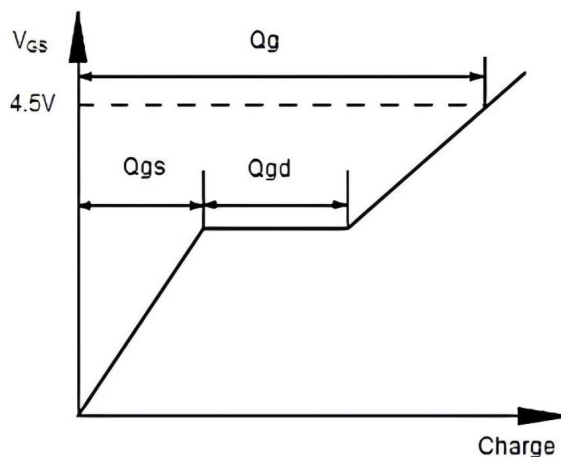
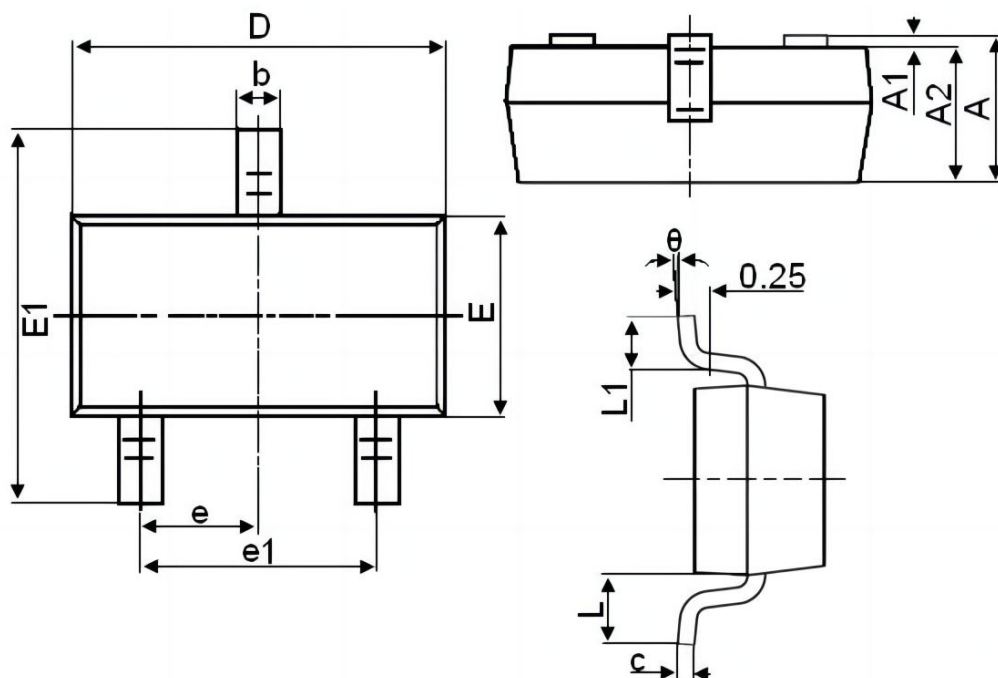


Fig.11 Gate Charge Waveform

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	0.080	0.150	0.003	0.006
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°