

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
20V	300mΩ@4.5V	0.5A
	400mΩ@2.5V	
	700mΩ@1.8V	

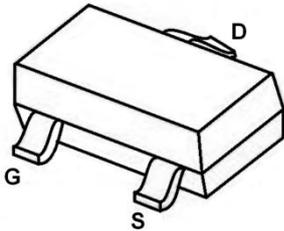
### Feature

- Trench power MV MOSFET technology
- High power and current handing capability
- ESD protected
- Suffix "-Q1" for AEC-Q101

### Application

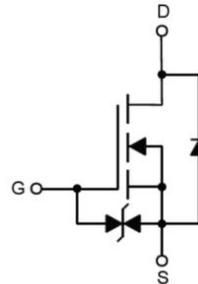
- PWM application
- Load switch

### Package

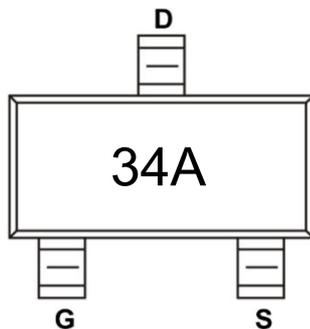


SOT-523

### Circuit diagram



### Marking



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current	$I_D$	0.5	A
Continuous Drain Current ( $T_A=70^\circ\text{C}$ )	$I_D(70^\circ\text{C})$	0.4	A
Pulsed Drain Current <sup>1)</sup>	$I_{DM}$	3.3	A
Power Dissipation	$P_D$	0.18	W
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	694	$^\circ\text{C}/\text{W}$
Operating Junction Temperature	$T_J$	-55 ~ +150	$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

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

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	20			V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS}=20\text{V}, V_{GS}=0\text{V}$			1	$\mu\text{A}$
Gate-body leakage current	$I_{GSS}$	$V_{DS}=0\text{V}, V_{GS}=\pm 10\text{V}$			$\pm 10$	$\mu\text{A}$
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	0.35	0.75	1.1	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS}=4.5\text{V}, I_D=0.5\text{A}$		220	300	m $\Omega$
		$V_{GS}=2.5\text{V}, I_D=0.4\text{A}$		290	400	
		$V_{GS}=1.8\text{V}, I_D=0.2\text{A}$		420	700	
<b>Dynamic characteristics<sup>3)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS}=10\text{V}, V_{GS}=0\text{V}, f=1\text{MHz}$		56		pF
Output Capacitance	$C_{oss}$			20		
Reverse Transfer Capacitance	$C_{rss}$			2.5		
Total Gate Charge	$Q_g$	$V_{DS}=10\text{V}, V_{GS}=4.5\text{V}, I_D=0.5\text{A}$		1		nC
Gate-Source Charge	$Q_{gs}$			0.28		
Gate-Drain Charge	$Q_{gd}$			0.22		
Turn-on delay time	$t_{d(on)}$	$V_{DS}=10\text{V}, V_{GS}=4.5\text{V}, I_D=0.5\text{A}$ $R_G=10\Omega$		2		nS
Turn-on rise time	$t_r$			18.8		
Turn-off delay time	$t_{d(off)}$			10		
Turn-off fall time	$t_f$			23		
<b>Source-Drain Diode characteristics</b>						
Diode Forward Current	$I_S$				0.5	A
Diode Forward voltage <sup>2)</sup>	$V_{SD}$	$V_{GS}=0\text{V}, I_S=0.5\text{A}$			1.2	V
Reverse Recovery Time	$T_{rr}$	$I_F=0.5\text{A}, di/dt=-20\text{A}/\mu\text{s}$		14.4		nS
Reverse Recovery Charge	$Q_{rr}$			0.4		nC

Notes:

- 1) Repetitive Rating: Pulse width limited by maximum junction temperature.
- 2) Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 0.5\%$ .
- 3) Guaranteed by design, not subject to production testing.

## Typical Characteristics

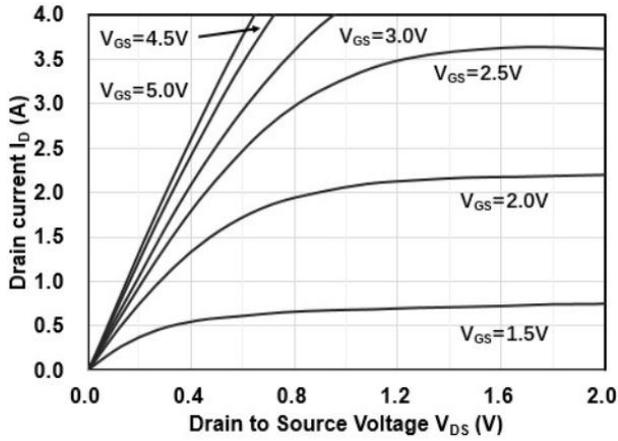


Figure1. Output Characteristics

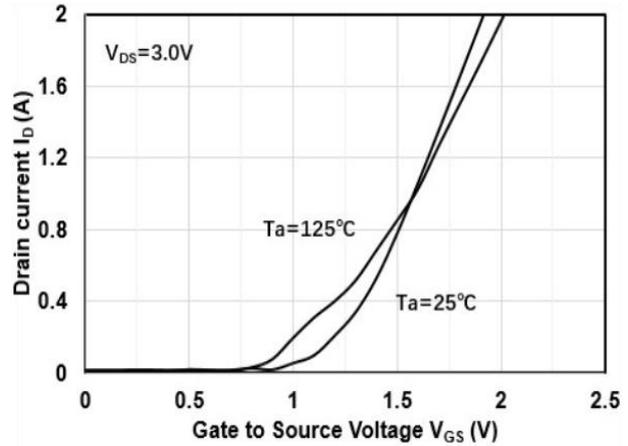


Figure2. Transfer Characteristics

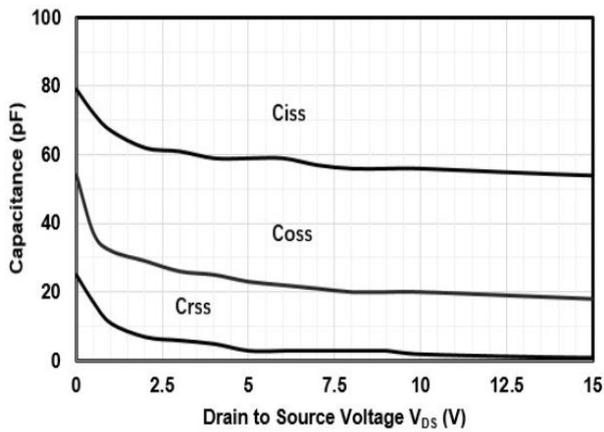


Figure3. Capacitance Characteristics

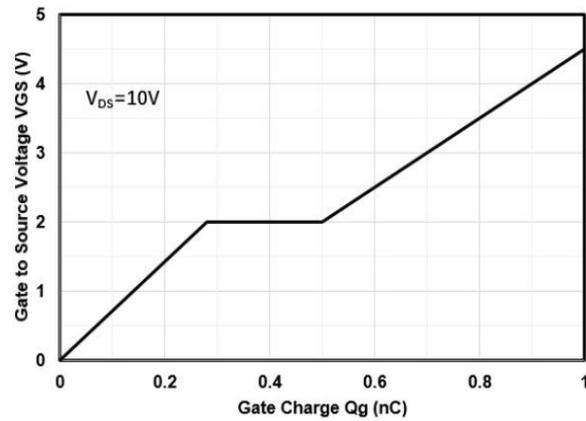


Figure4. Gate Charge

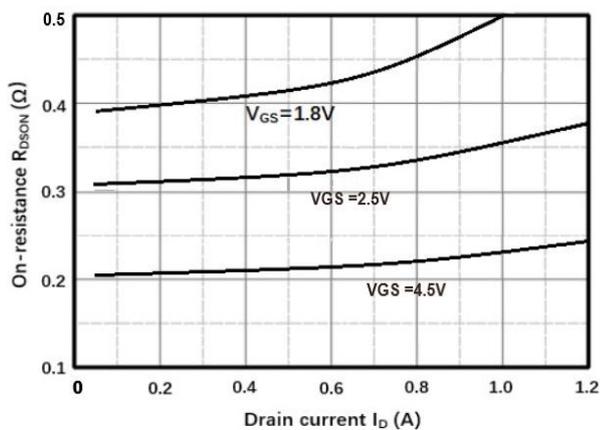


Figure5. Drain-Source on Resistance

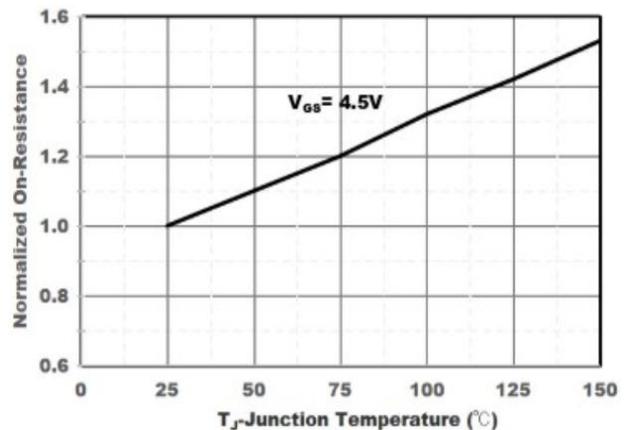


Figure6. Drain-Source on Resistance

## Typical Characteristics

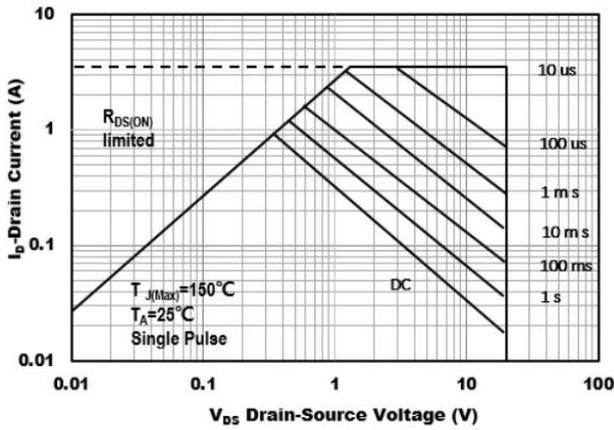


Figure7. Safe Operation Area

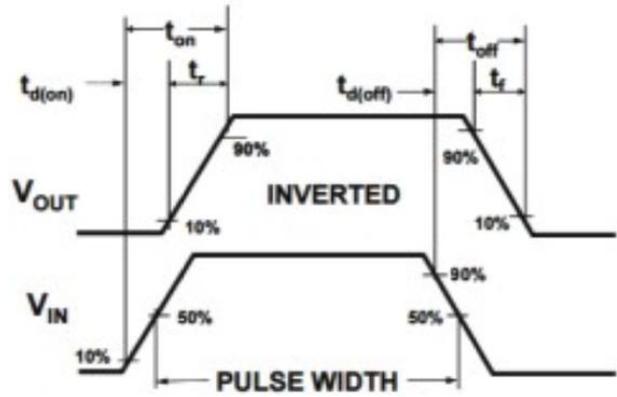
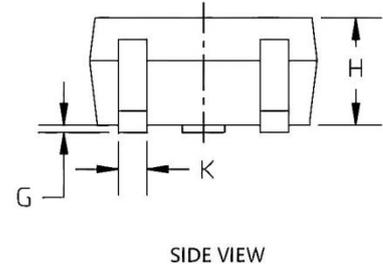
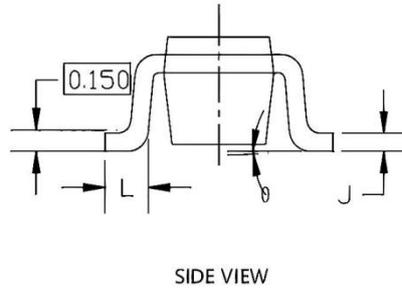
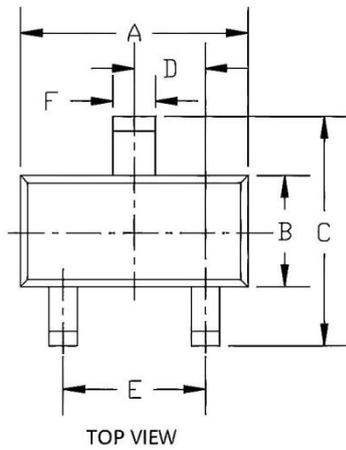


Figure8. Switching wave

### SOT-523 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.500	1.700	0.059	0.067
B	0.750	0.850	0.030	0.033
C	1.450	1.750	0.057	0.069
D	0.500 TYP.		0.020 TYP.	
E	0.900	1.100	0.035	0.043
F	0.250	0.450	0.010	0.018
G	0.000	0.100	0.000	0.004
H	0.600	0.800	0.024	0.031
J	0.100	0.200	0.004	0.008
K	0.150	0.350	0.006	0.014
L	0.260	0.460	0.010	0.018
$\theta$	0°	8°	0°	8°