

Product Summary

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

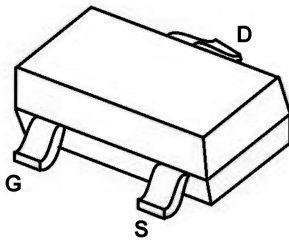
Feature

- Trench Power LV MOSFET technology
- High Power and current handing capability
- ESD Protect
- Suffix "-Q1" for AEC-Q101

Application

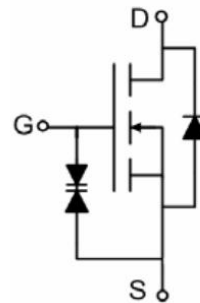
- PWM application
- Load switch

Package

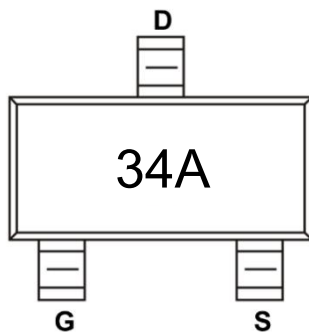


SOT-523

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}	± 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 ¹⁾	I_{DM}	3.3	A
Power Dissipation	P_D	0.18	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	694	$^\circ\text{C}/\text{W}$
Junction Temperature	T_J	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
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu\text{A}$	20			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 20V, V_{GS} = 0V$			1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 10V, V_{DS} = 0V$			± 10	μA
		$V_{GS} = \pm 8V, V_{DS} = 0V$			± 2	
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	0.35	0.75	1.10	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 0.5A$		220	300	m Ω
		$V_{GS} = 2.5V, I_D = 0.4A$		290	400	
		$V_{GS} = 1.8V, I_D = 0.2A$		420	700	
Dynamic characteristics³⁾						
Input Capacitance	C_{iss}	$V_{DS} = 10V, V_{GS} = 0V, f = 1\text{MHz}$		56		pF
Output Capacitance	C_{oss}			20		
Reverse Transfer Capacitance	C_{rss}			2.5		
Total Gate Charge	Q_g	$V_{DS} = 10V, V_{GS} = 4.5V, I_D = 0.5A$		1		nC
Gate Source Charge	Q_{gs}			0.28		
Gate Drain Charge	Q_{gd}			0.22		
Gate Resistance	R_g	$f = 1\text{MHz}, \text{Open drain}$		50		Ω
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 10V, V_{GS} = 4.5V, I_D = 0.5A, R_G = 10\Omega$		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		
Source-Drain Diode characteristics						
Diode Forward voltage ²⁾	V_{SD}	$V_{GS} = 0V, I_S = 0.5A$			1.2	V
Body-Diode Continuous Current	I_S				0.5	A
Reverse Recovery Charge	Q_{rr}	$V_{GS} = 0V, I_F = 0.5A,$		0.4		nC
Reverse recovery Time	t_{rr}	$di/dt = 20A/\mu\text{s}$		14.4		nS

Notes:

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

Typical Characteristics

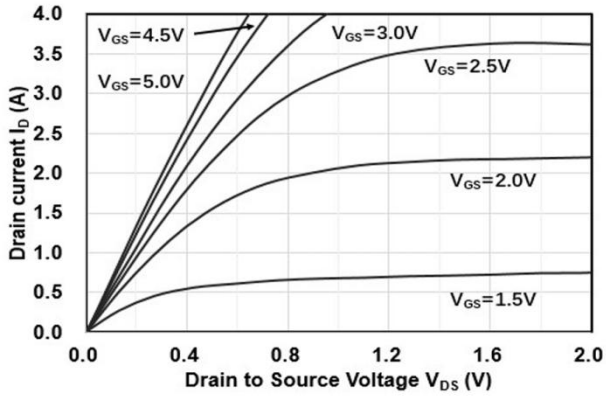


Figure1. Output Characteristics

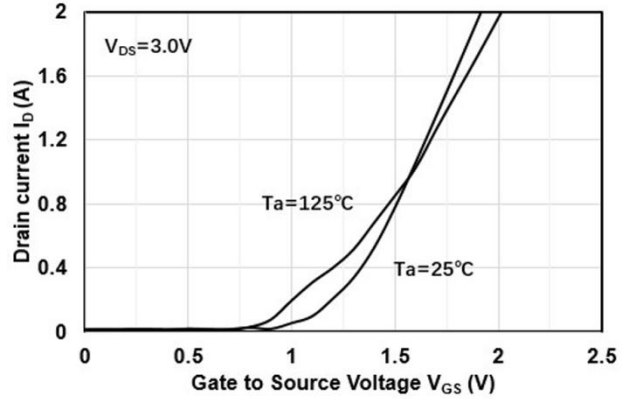


Figure2. Transfer Characteristics

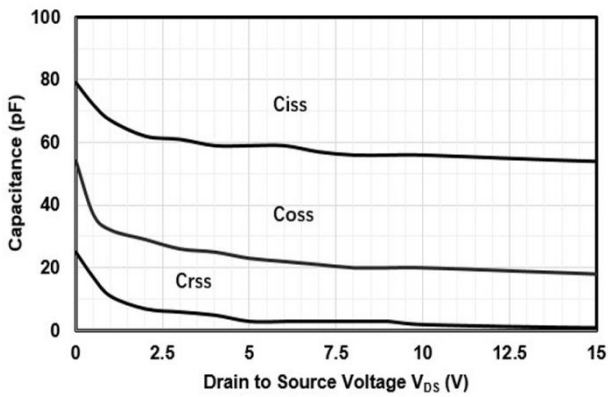


Figure3. Capacitance Characteristics

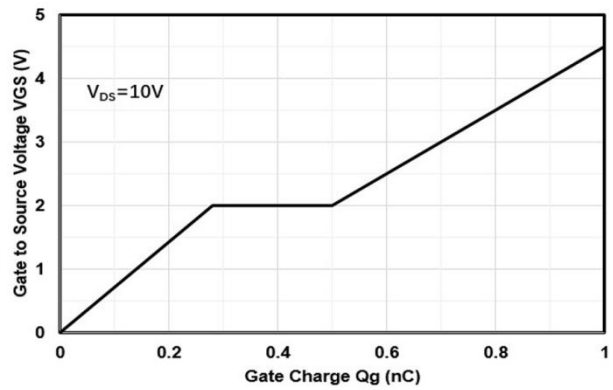


Figure4. Gate Charge

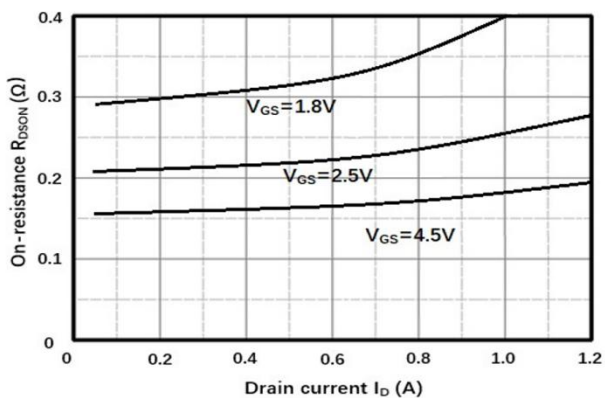


Figure5. Drain-Source on Resistance

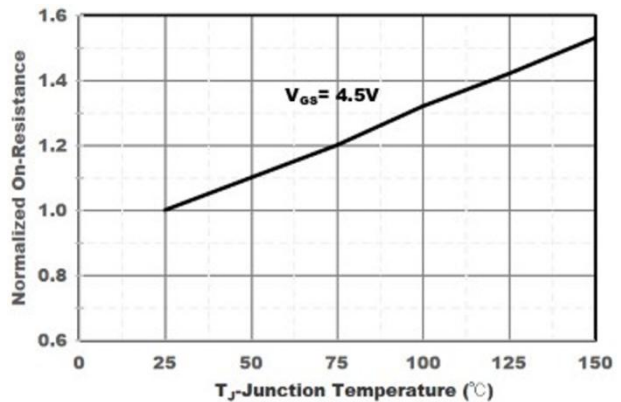


Figure6. Drain-Source on Resistance

Typical Characteristics

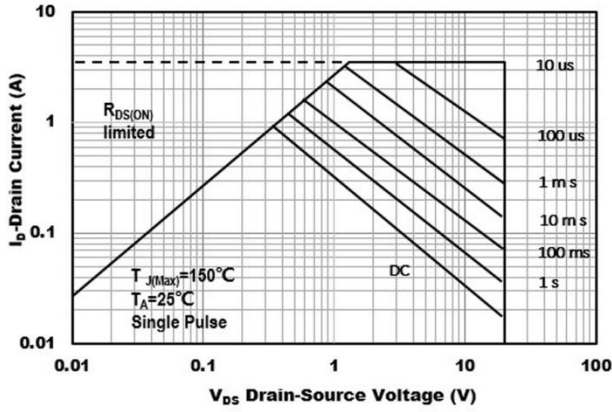


Figure7. Safe Operation Area

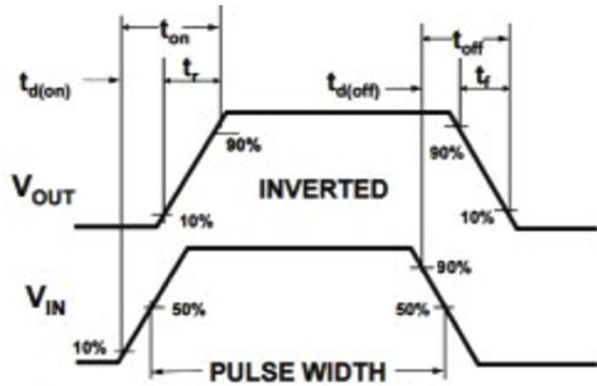
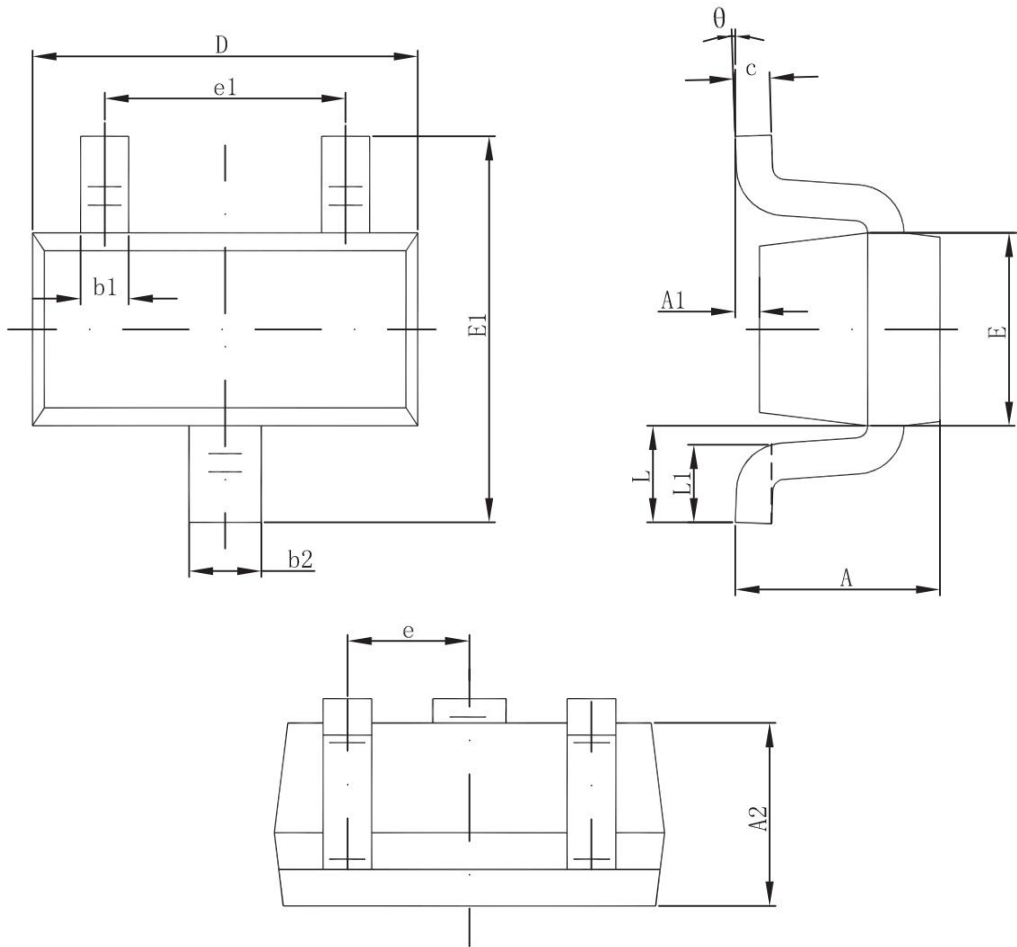


Figure8. Switching wave

SOT-523 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.600	0.900	0.024	0.035
A1	0.000	0.100	0.000	0.004
A2	0.600	0.800	0.024	0.031
b1	0.150	0.350	0.006	0.014
b2	0.250	0.450	0.010	0.018
c	0.100	0.200	0.004	0.008
D	1.500	1.700	0.059	0.067
E	0.700	0.900	0.028	0.035
E1	1.450	1.750	0.057	0.069
e	0.500 TYP.		0.020 TYP.	
e1	0.900	1.100	0.035	0.043
L	0.400 REF.		0.016 REF.	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°