

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
30V	30mΩ@4.5V	5A
	35mΩ@2.5V	
	50mΩ@1.8V	

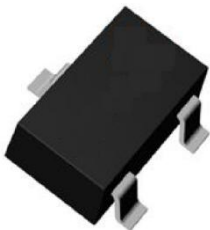
## Feature

- Trench power LV MOSFET technology
- Voltage controlled small signal switch
- Low input capacitance
- Fast switching speed
- Low input / output Leakage
- Suffix "-Q1" for AEC-Q101

## Application

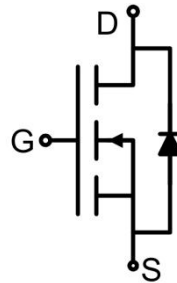
- Battery operated systems
- Solid-state relays
- Direct logic\_level interface:TTL/CMOS

## Package

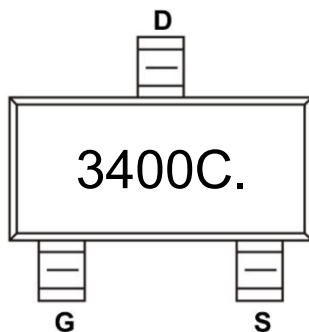


SOT-23

## Circuit diagram



## Marking



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current	$I_D$	5	A
Continuous Drain Current ( $T_A=100^\circ\text{C}$ )	$I_D(100^\circ\text{C})$	3	A
Pulsed Drain Current <sup>1)</sup>	$I_{DM}$	30	A
Power Dissipation <sup>2)</sup>	$P_D$	1	W
Thermal Resistance Junction to Ambient <sup>3)</sup>	$R_{\theta JA}$	125	$^\circ\text{C}/\text{W}$
Operating Junction Temperature	$T_J$	-55 ~ +150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-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	$V_{(BR)DSS}$	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	30			V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS}=30\text{V}, V_{GS}=0\text{V}$			1	$\mu\text{A}$
Gate-body leakage current	$I_{GSS}$	$V_{DS}=0\text{V}, V_{GS}=\pm 12\text{V}$			$\pm 100$	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	0.45	0.7	1	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS}=4.5\text{V}, I_D=5\text{A}$		23	30	m $\Omega$
		$V_{GS}=2.5\text{V}, I_D=3\text{A}$		27	35	
		$V_{GS}=1.8\text{V}, I_D=2\text{A}$		35	50	
<b>Dynamic characteristics<sup>4)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS}=15\text{V}, V_{GS}=0\text{V}, f=1\text{MHz}$		550		pF
Output Capacitance	$C_{oss}$			60		
Reverse Transfer Capacitance	$C_{rss}$			50		
Total Gate Charge	$Q_g$	$V_{DS}=15\text{V}, V_{GS}=10\text{V}, I_D=5\text{A}$		16		nC
Gate-Source Charge	$Q_{gs}$			2		
Gate-Drain Charge	$Q_{gd}$			2		
Turn-on delay time	$t_{d(on)}$	$V_{DS}=15\text{V}, V_{GS}=10\text{V}, I_D=5\text{A}$ $R_G=3\Omega$		6		nS
Turn-on rise time	$t_r$			49		
Turn-off delay time	$t_{d(off)}$			19		
Turn-off fall time	$t_f$			89		
<b>Source-Drain Diode characteristics</b>						
Diode Forward Current	$I_S$				5	A
Diode Forward voltage	$V_{SD}$	$V_{GS}=0\text{V}, I_S=5\text{A}$			1.2	V
Reverse Recovery Time	$T_{rr}$	$I_F=5\text{A}, di/dt=-100\text{A}/\mu\text{s}$		6		nS
Reverse Recovery Charge	$Q_{rr}$			2		nC

Notes:

- 1) Repetitive rating; pulse width limited by max. junction temperature.
- 2)  $P_D$  is based on max. junction temperature, using junction-case thermal resistance.
- 3) The value of  $R_{\theta JA}$  is measured with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in the still air environment with  $T_A=25^\circ\text{C}$ . The maximum allowed junction temperature of 150 $^\circ\text{C}$ . The value in any given application depends on the user's specific board design.
- 4) Guaranteed by design, not subject to production testing.

## Typical Characteristics

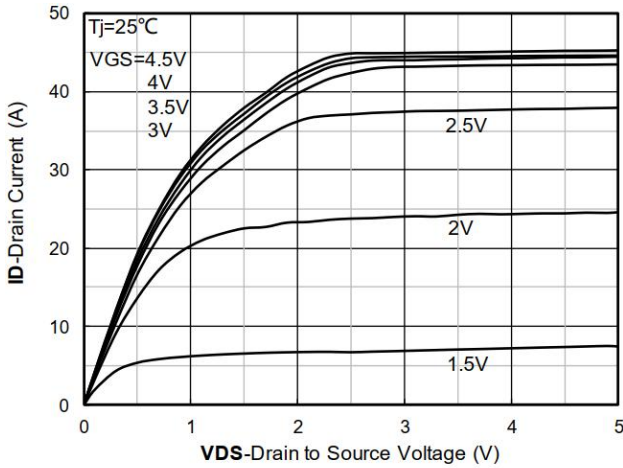


Figure 1. Output Characteristics

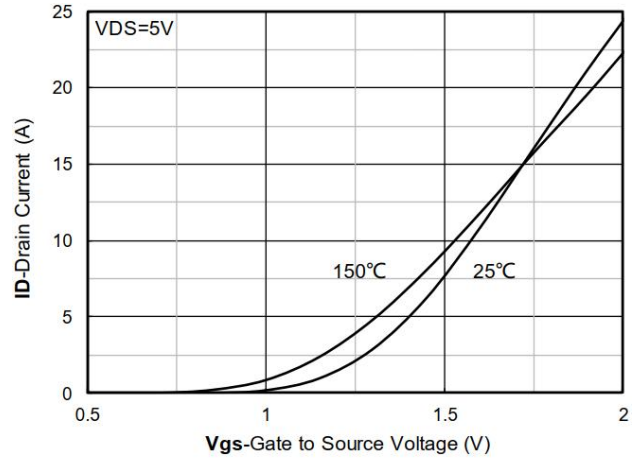


Figure 2. Transfer Characteristics

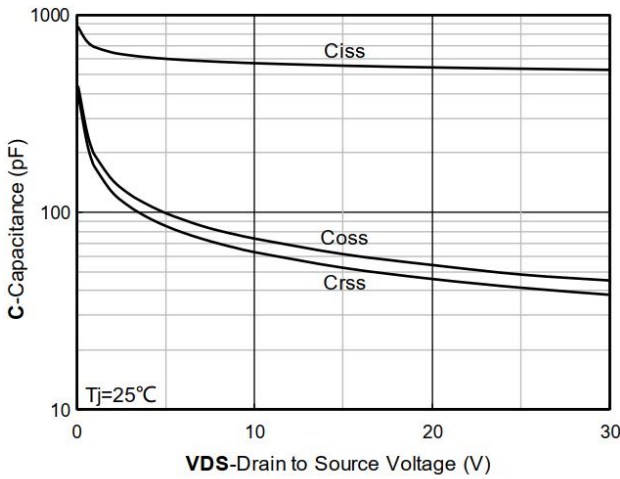


Figure 3. Capacitance Characteristics

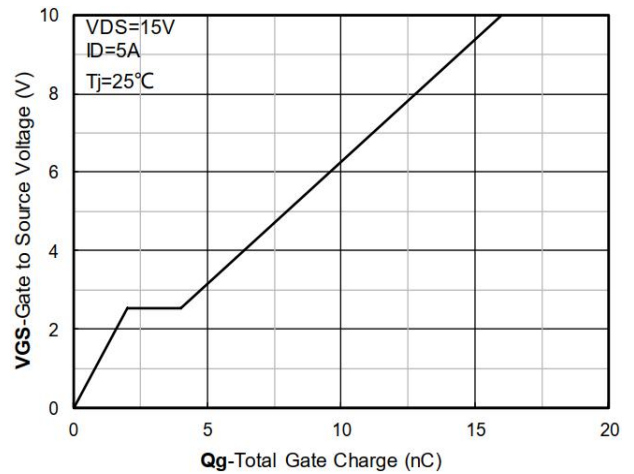


Figure 4. Gate Charge

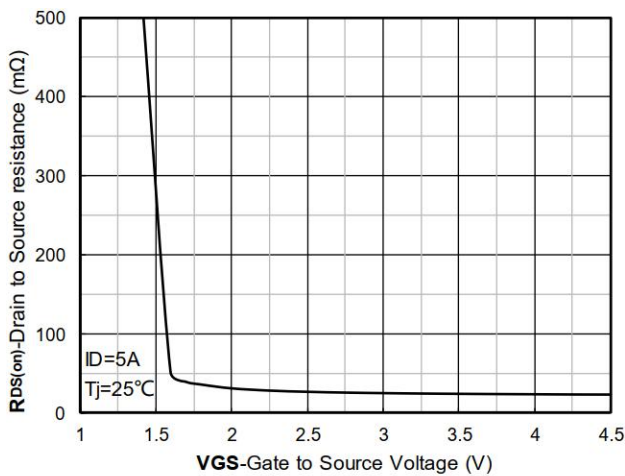


Figure 5. On-Resistance vs Gate to Source Voltage

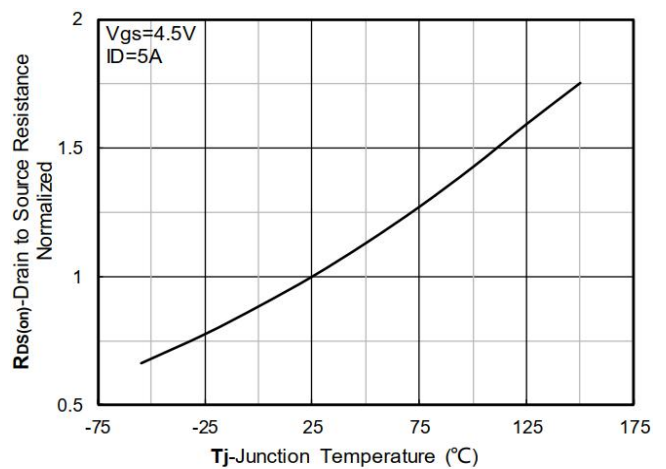


Figure 6. Normalized On-Resistance

## Typical Characteristics

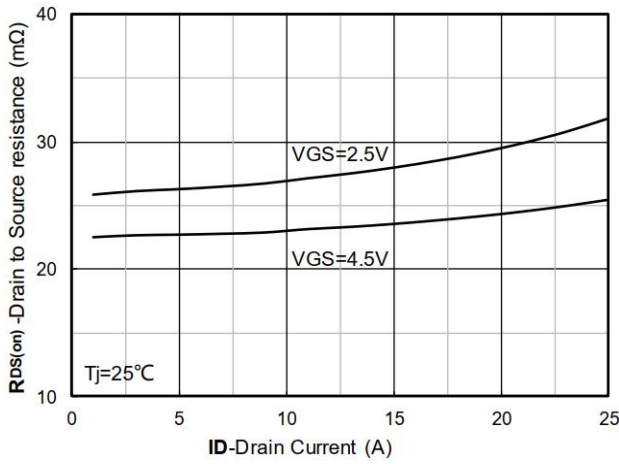


Figure 7.  $R_{DS(on)}$  VS Drain Current

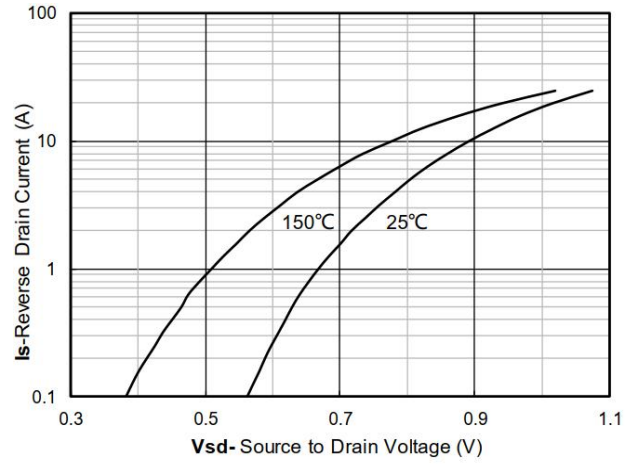


Figure 8. Forward characteristics of reverse diode

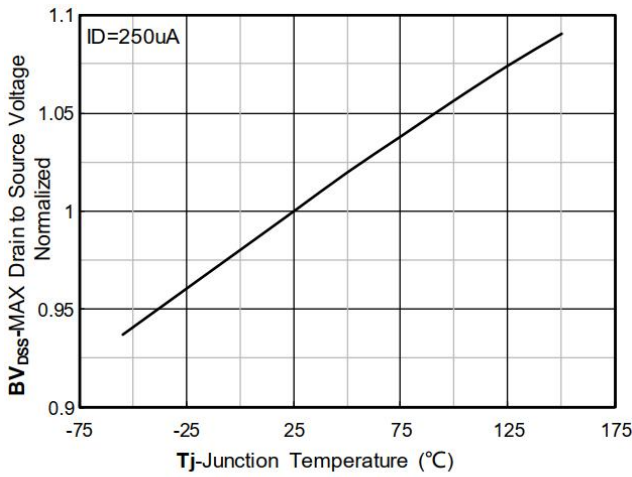


Figure 9. Normalized breakdown voltage

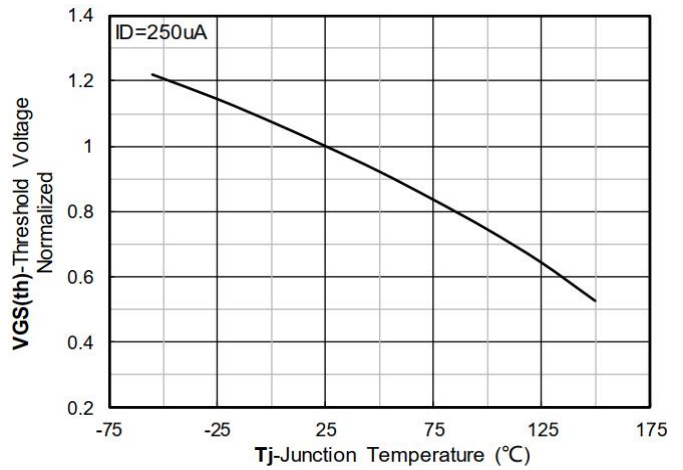


Figure 10. Normalized Threshold voltage

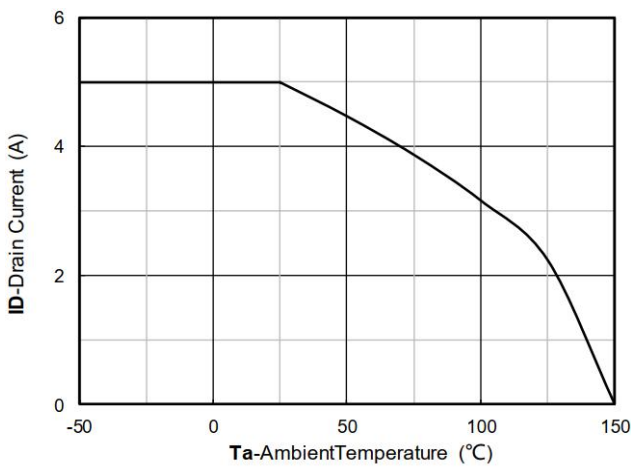


Figure 11. Current dissipation

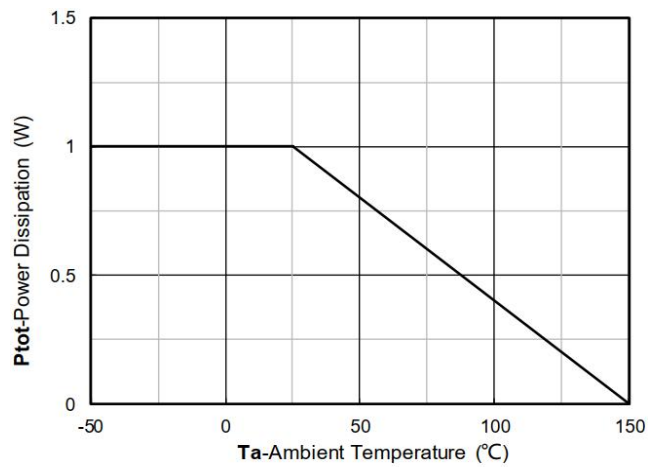


Figure 12. Power dissipation

## Typical Characteristics

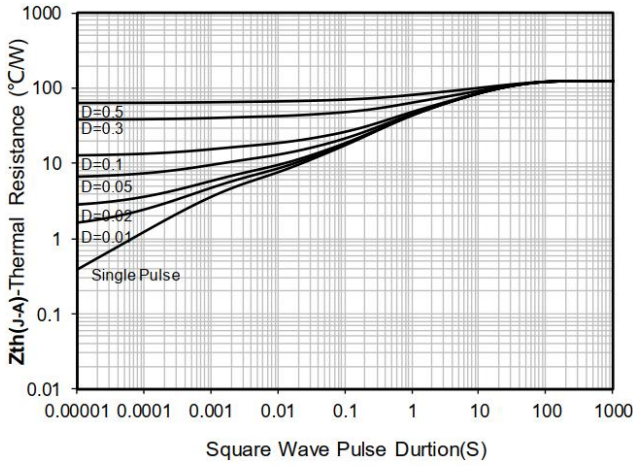


Figure 13. Maximum Transient Thermal Impedance

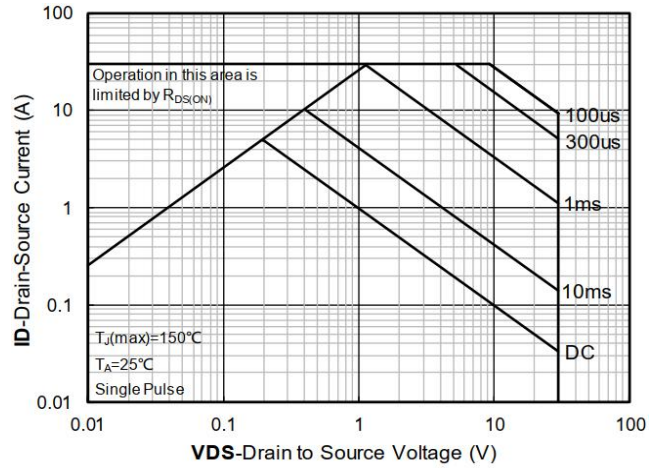
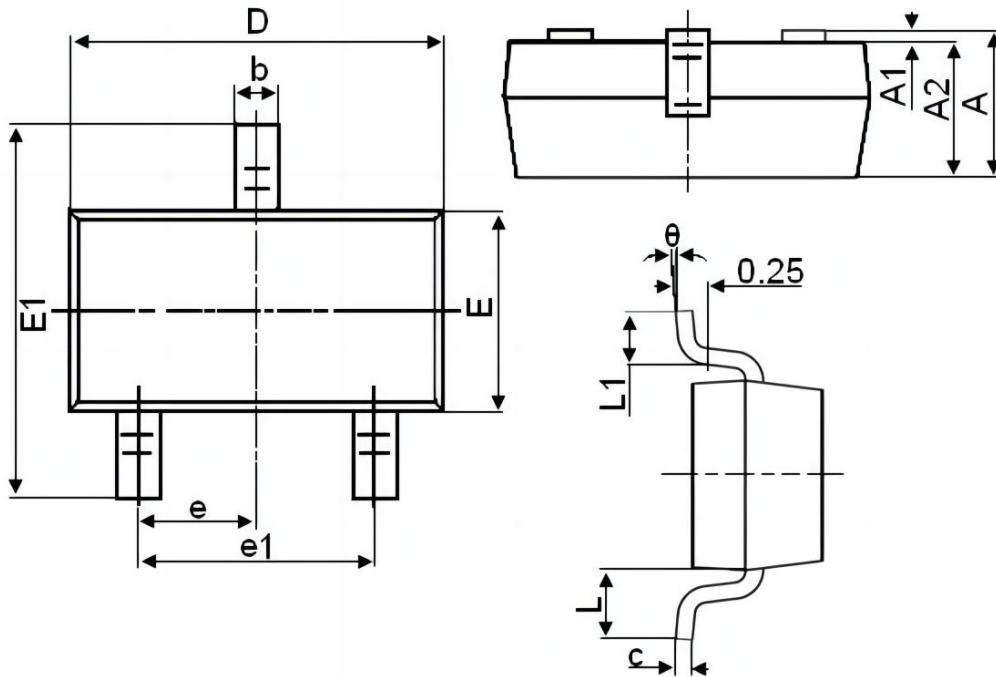


Figure 14. Safe Operation Area

## 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	0.200	0.003	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 REF.		0.037 REF.	
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
theta	0°	8°	0°	8°