

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
-60V	72mΩ@-10V	-3.6A
	90mΩ@-4.5V	

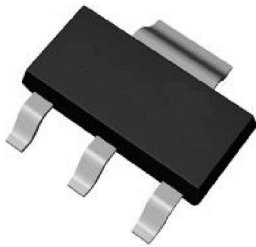
Feature

- High density cell design for low $R_{DS(ON)}$
- High speed switching
- Suffix "-Q1" for AEC-Q101

Application

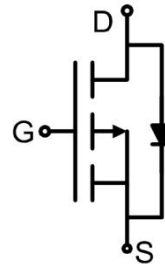
- PWM applications
- Power management
- Load switch

Package



SOT-223

Circuit diagram



Marking



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^{1,2)} ($V_{GS} = -10\text{V}$)	I_D	-3.6	A
Continuous Drain Current ^{1,2)} ($V_{GS} = -10\text{V}$, $T_A=100^\circ\text{C}$)	$I_{D(100^\circ\text{C})}$	-2.3	A
Pulsed Drain Current($t_p \leq 10\mu\text{s}$)	I_{DM}	-28.8	A
Power Dissipation ^{1,2)}	P_D	1.76	W
Thermal Resistance Junction to Ambient ²⁾	$R_{\theta JA}$	71	$^\circ\text{C}/\text{W}$
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
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{V}$, $I_D = -250\mu\text{A}$	-60			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = -60\text{V}$, $V_{GS} = 0\text{V}$			-1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$			± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = -250\mu\text{A}$	-1	-1.5	-2	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = -10\text{V}$, $I_D = -2.7\text{A}$		57	72	m Ω
		$V_{GS} = -4.5\text{V}$, $I_D = -1.4\text{A}$		66	90	
Dynamic characteristics³⁾						
Input Capacitance	C_{iss}	$V_{DS} = -30\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$		1190		pF
Output Capacitance	C_{oss}			63		
Reverse Transfer Capacitance	C_{rss}			56		
Total Gate Charge	Q_g	$V_{DS} = -30\text{V}$, $V_{GS} = -10\text{V}$ $I_D = -2.7\text{A}$		30		nC
Gate-Source Charge	Q_{gs}			2		
Gate-Drain Charge	Q_{gd}			4		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -30\text{V}$, $V_{GS} = -10\text{V}$ $I_D = -2.7\text{A}$, $R_{GEN} = 3\Omega$		7.4		nS
Turn-on rise time	t_r			3.5		
Turn-off delay time	$t_{d(off)}$			43.3		
Turn-off fall time	t_f			15.4		
Source-Drain Diode characteristics						
Diode Continuous Current	I_S				-3.6	A
Diode Forward voltage	V_{SD}	$V_{GS} = 0\text{V}$, $I_S = -1.9\text{A}$			-1.2	V
Reverse recover time	T_{rr}	$V_{GS} = 0\text{V}$, $V_R = -15\text{V}$, $I_F = -2.7\text{A}$ $di/dt = -100\text{A}/\mu\text{s}$		20		nS
Reverse recovery charge	Q_{rr}			22		nC

Notes:

- 1) The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
- 2) The value of $R_{\theta JA}$ is measured with the device mounted on the 40mm*40mm*1.1mm single layer FR-4 PCB board with 1 in² pad of 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.
- 3) Guaranteed by design, not subject to production.

Typical Characteristics

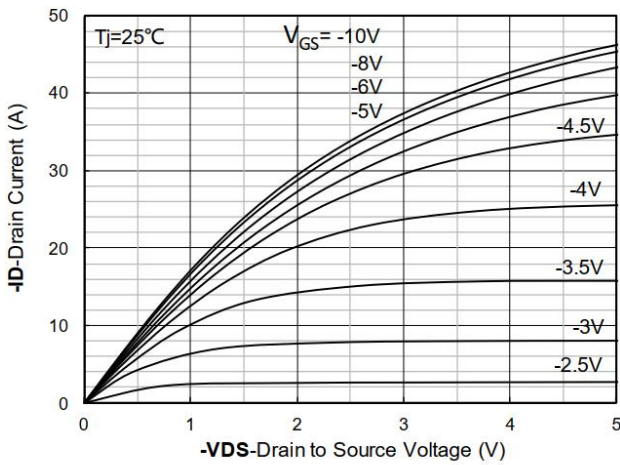


Figure 1. Output Characteristics; typical values

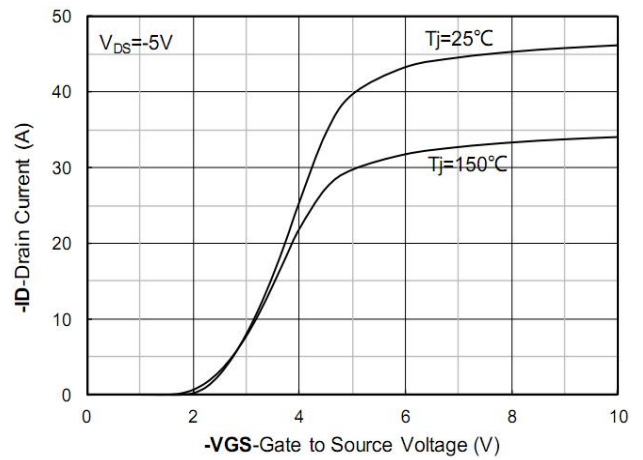


Figure 2. Transfer Characteristics; typical values

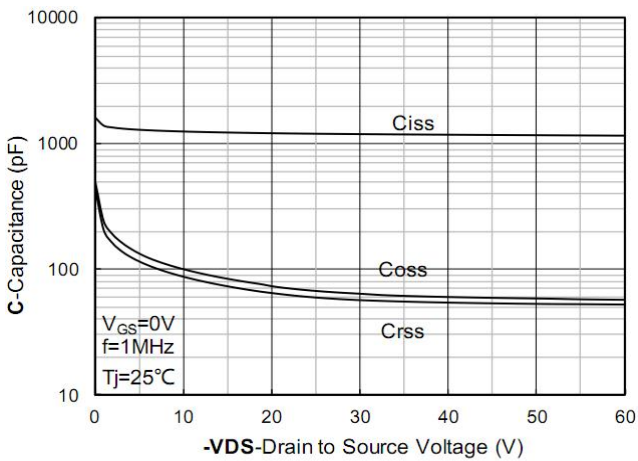


Figure 3. Capacitance Characteristics; typical values

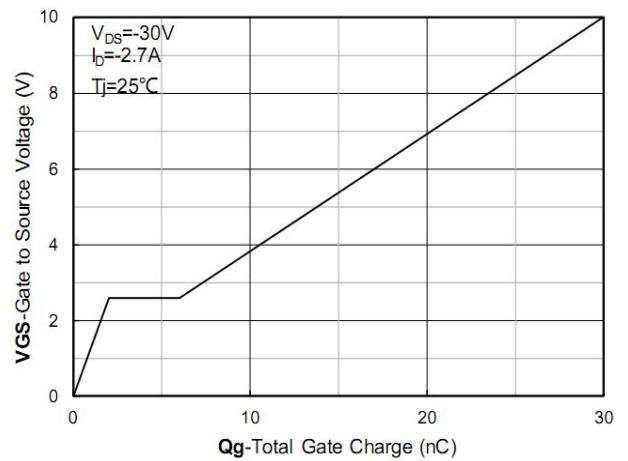


Figure 4. Gate Charge; typical values

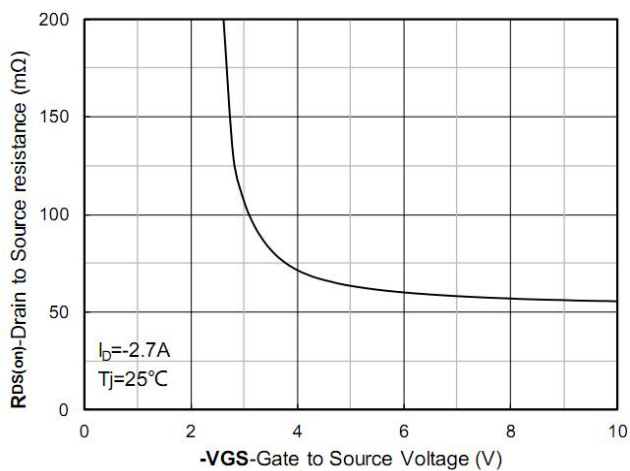


Figure 5. On-Resistance vs. Gate to Source Voltage; typical values

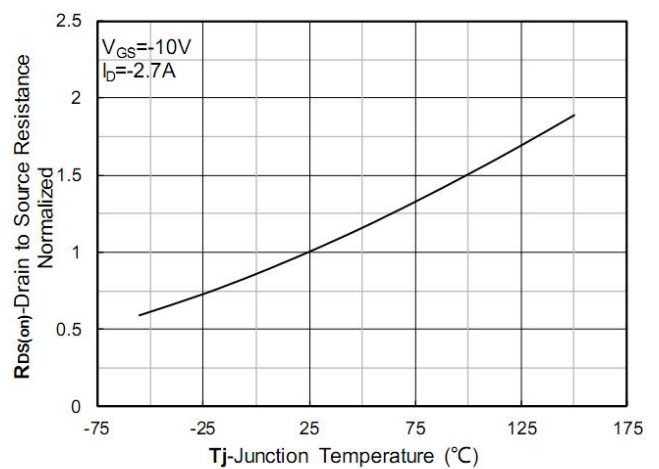


Figure 6. Normalized On-Resistance

Typical Characteristics

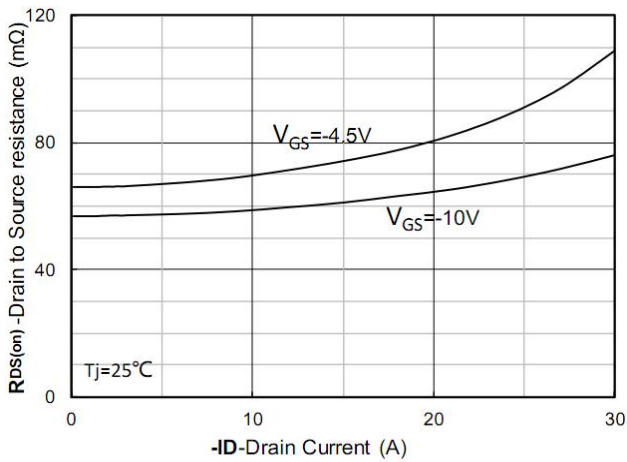


Figure 7. $R_{DS(on)}$ vs. Drain Current; typical values

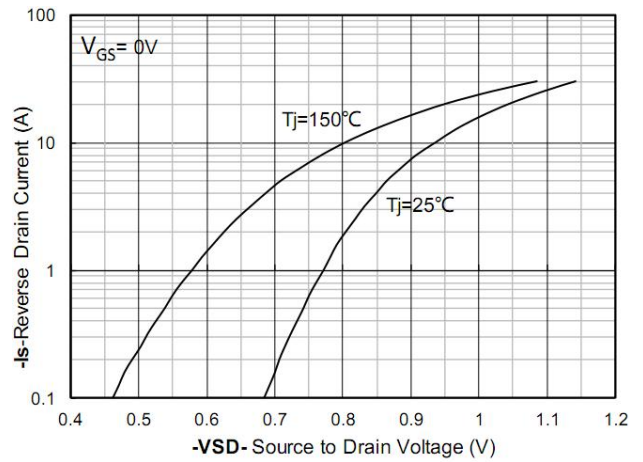


Figure 8. Forward characteristics of reverse diode; typical values

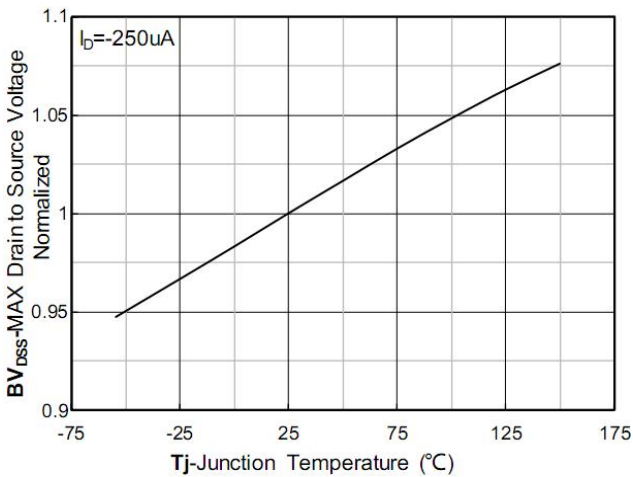


Figure 9. Normalized breakdown voltage

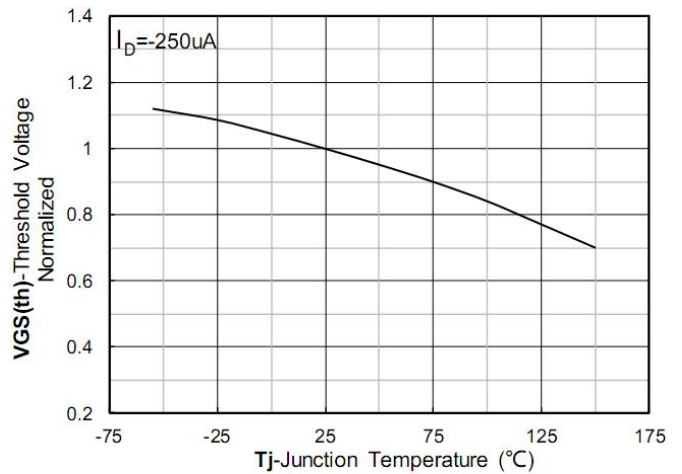


Figure 10. Normalized Threshold voltage

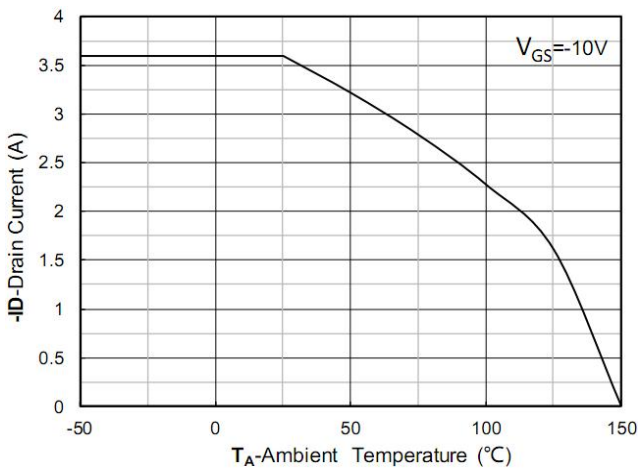


Figure 11. Current dissipation

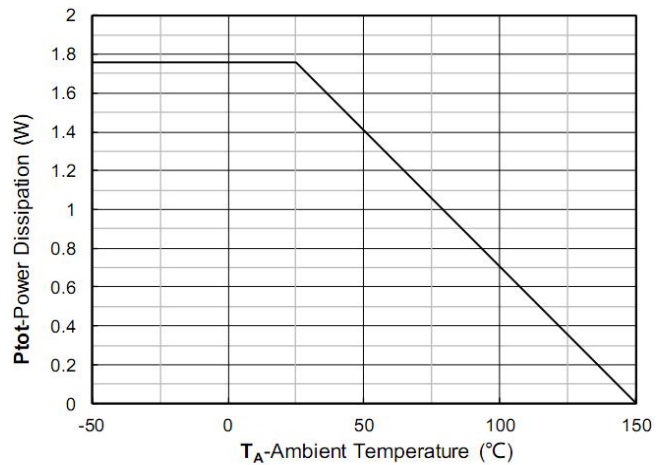


Figure 12. Power dissipation

Typical Characteristics

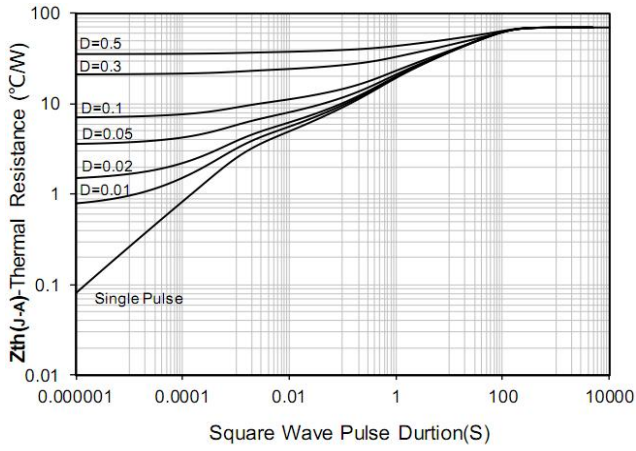


Figure 13. Maximum Transient Thermal Impedance

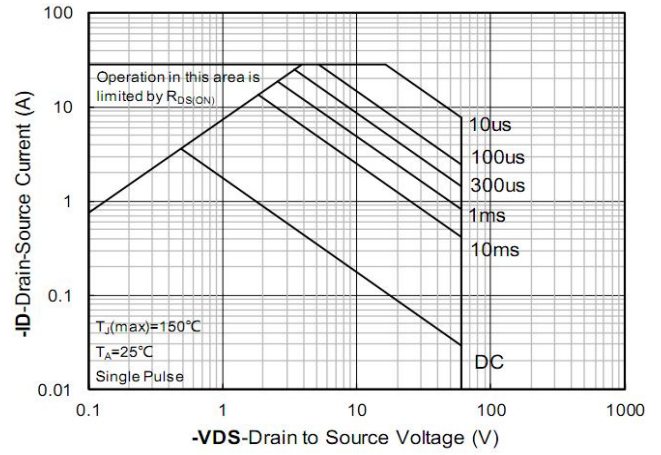
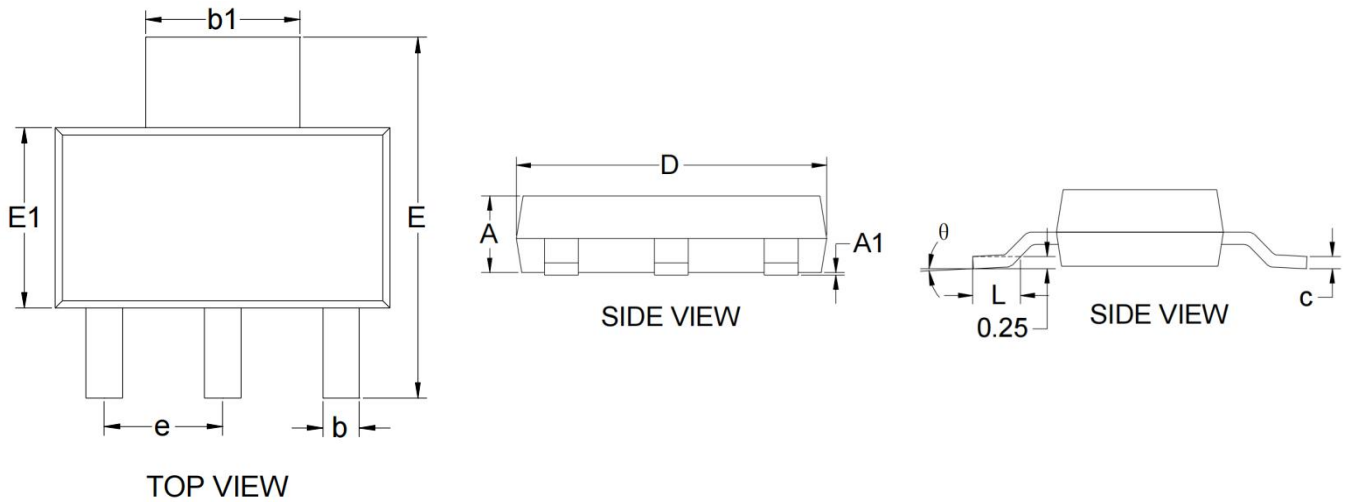


Figure 14. Safe Operation Area

SOT-223 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.500	1.700	0.059	0.067
A1	0.020	0.100	0.000	0.004
b	0.660	0.840	0.026	0.033
b1	2.900	3.100	0.114	0.122
c	0.230	0.350	0.009	0.014
D	6.300	6.700	0.248	0.264
E	6.700	7.300	0.264	0.287
E1	3.300	3.700	0.130	0.146
e	2.200	2.400	0.087	0.094
L	0.750	1.250	0.030	0.049
θ	0°	10°	0°	10°