

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
60V	1.4Ω@10V	0.3A
	1.4Ω@4.5V	
	2.6Ω@2.5V	

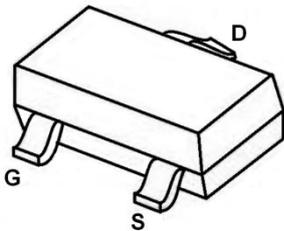
Feature

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

Application

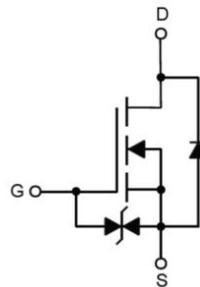
- Battery operated systems
- Solid-state relays
- Direct logic-level interface: TTL/CMOS

Package

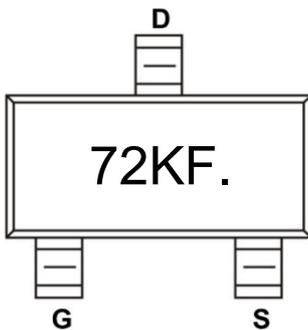


SOT-323

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	0.3	A
Continuous Drain Current ^{1,2)} ($T_A = 100^\circ\text{C}$, $V_{GS} = 10\text{V}$)	$I_D(100^\circ\text{C})$	0.17	A
Pulsed Drain Current ($t_P \leq 10\mu\text{s}$)	I_{DM}	2.4	A
Power Dissipation ^{1,2)}	P_D	0.31	W
Thermal Resistance Junction to Ambient ²⁾	$R_{\theta JA}$	403	$^\circ\text{C}/\text{W}$
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}	$V_{DS} = 0\text{V}$, $V_{GS} = \pm 20\text{V}$			± 10	μA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$	0.55	0.85	1.15	V
Drain-Source on-resistance	$R_{DS(on)}$	$V_{GS} = 10\text{V}$, $I_D = 0.3\text{A}$		0.97	1.4	Ω
		$V_{GS} = 4.5\text{V}$, $I_D = 0.2\text{A}$		1	1.4	
		$V_{GS} = 2.5\text{V}$, $I_D = 0.1\text{A}$		1.3	2.6	
Dynamic characteristics³⁾						
Input capacitance	C_{iss}	$V_{DS} = 30\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$		22.8		pF
Output capacitance	C_{oss}		4.4			
Reverse transfer capacitance	C_{rss}		1.7			
Total Gate Charge	Q_g	$V_{DS} = 30\text{V}$, $V_{GS} = 10\text{V}$, $I_D = 0.3\text{A}$		1.08		nC
Gate-Source Charge	Q_{gs}		0.08			
Gate-Drain Charge	Q_{gd}		0.15			
Turn-on delay time	$t_{d(on)}$	$V_{DS} = 30\text{V}$, $V_{GS} = 10\text{V}$, $I_D = 0.3\text{A}$ $R_G = 3\Omega$		2.9		nS
Turn-on rise time	t_r		2.9			
Turn-off delay time	$t_{d(off)}$		15.8			
Turn-off fall time	t_f		44.2			
Source-Drain Diode characteristics						
Diode Forward Current	I_S	$T_A = 25^\circ\text{C}$			0.3	A
Diode forward voltage	V_{SD}	$V_{GS} = 0\text{V}$, $I_S = 0.3\text{A}$			1.2	V
Reverse recovery time	T_{rr}	$V_{GS} = 0\text{V}$, $V_R = 30\text{V}$, $I_S = 0.3\text{A}$		34.6		nS
Reverse Recovery Charge	Q_{rr}	$di/dt = -100\text{A}/\mu\text{s}$		10		nC

Notes:

- The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
- 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.
- Guaranteed by design, not subject to production testing.

Typical Characteristics

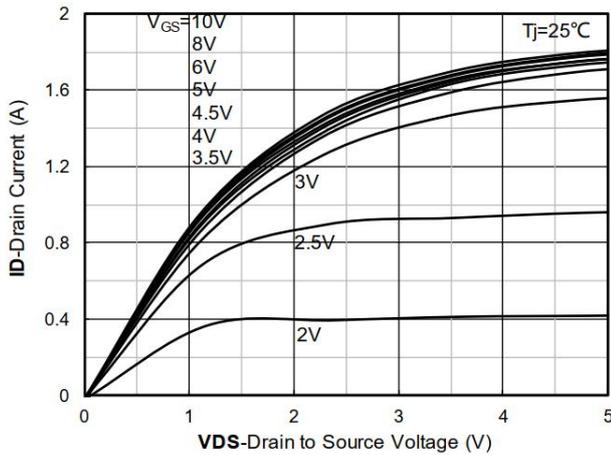


Figure 1. Output Characteristics; typical values

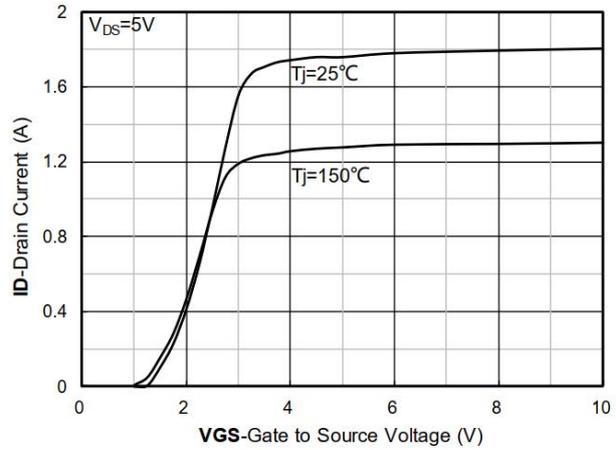


Figure 2. Transfer Characteristics; typical values

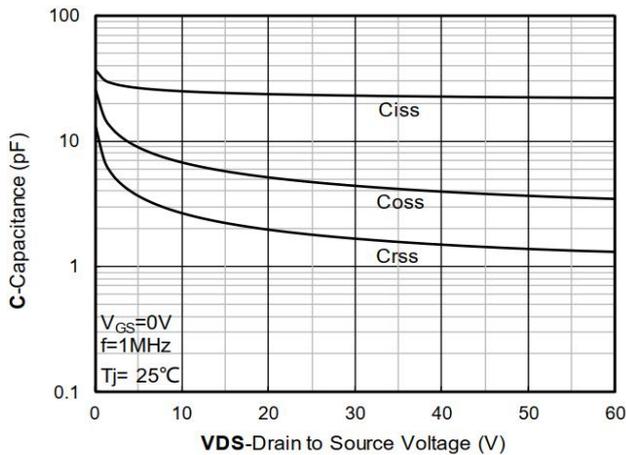


Figure 3. Capacitance Characteristics; typical values

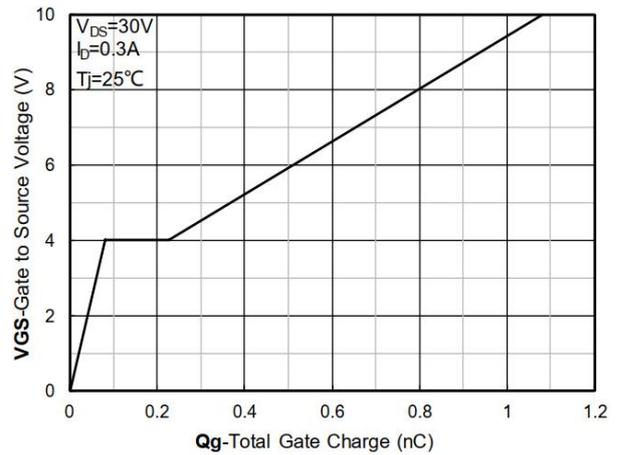


Figure 4. Gate Charge; typical values

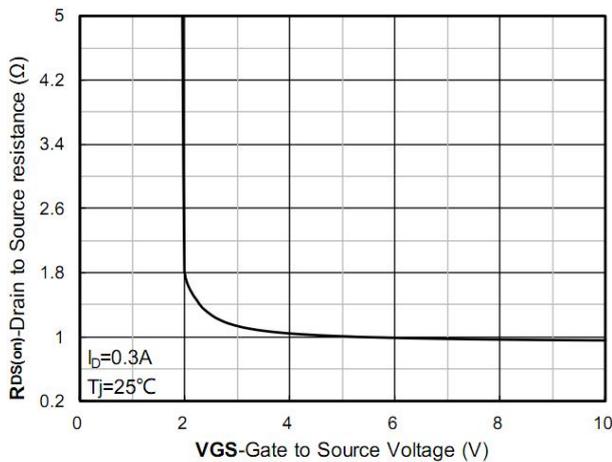


Figure 5. On-Resistance vs. Gate to Source Voltage; typical values

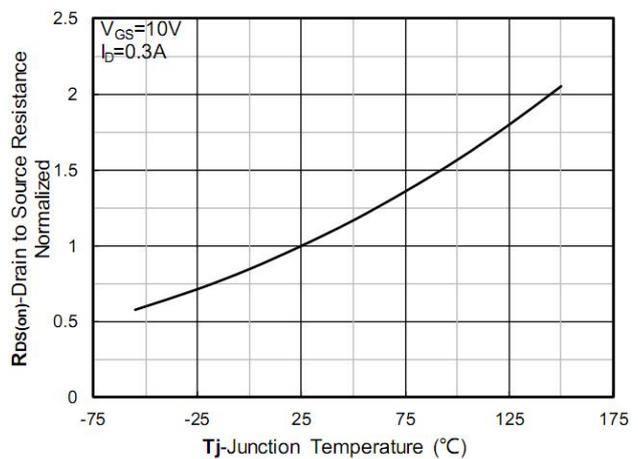


Figure 6. Normalized On-Resistance

Typical Characteristics

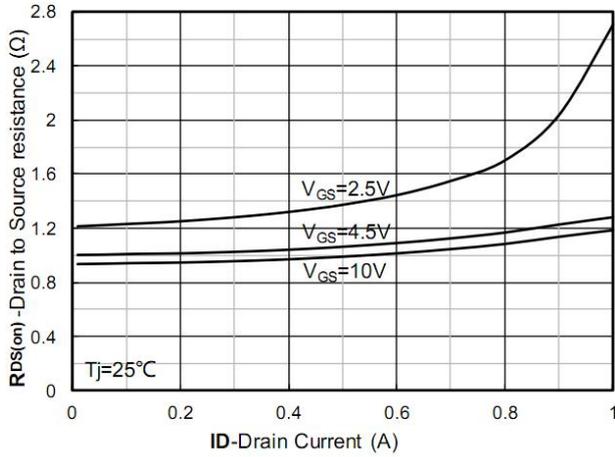


Figure 7. $R_{DS(on)}$ vs. Drain Current; typical values

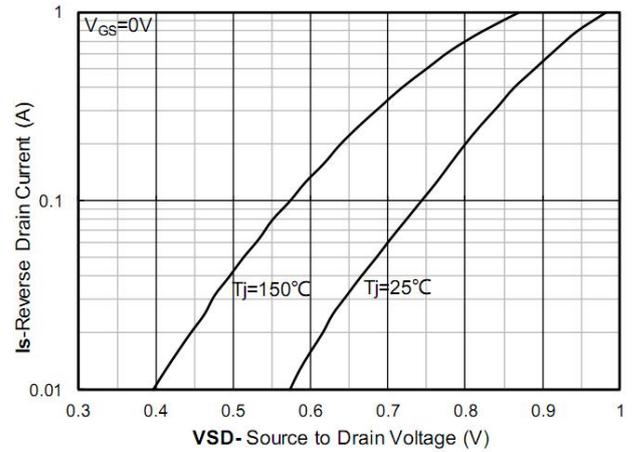


Figure 8. Forward characteristics of reverse diode;

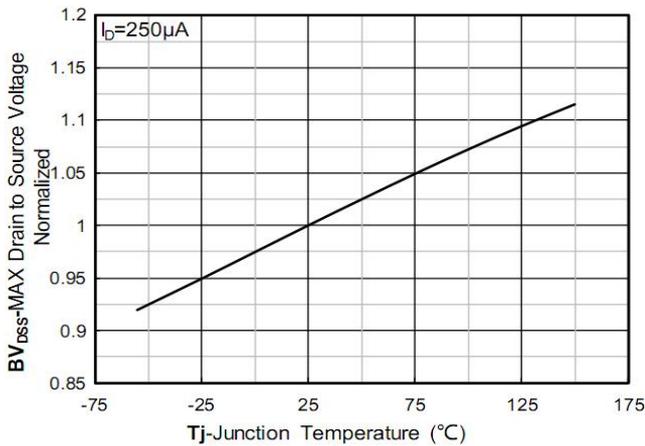


Figure 9. Normalized breakdown voltage

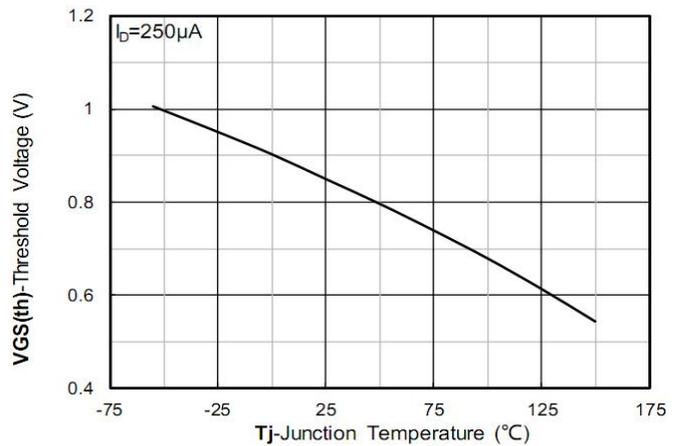


Figure 10. Gate Threshold voltage; typical values

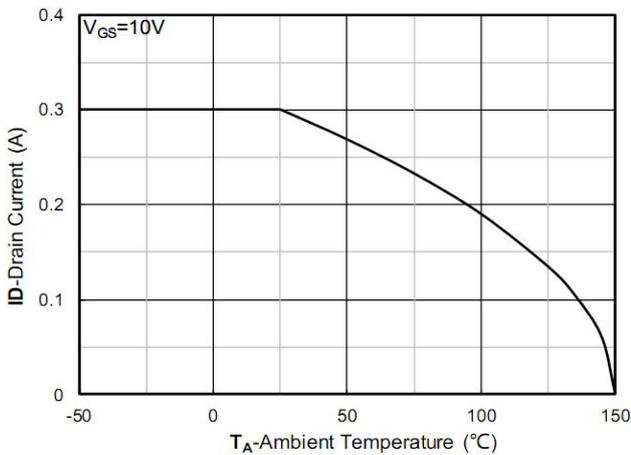


Figure 11. Current dissipation

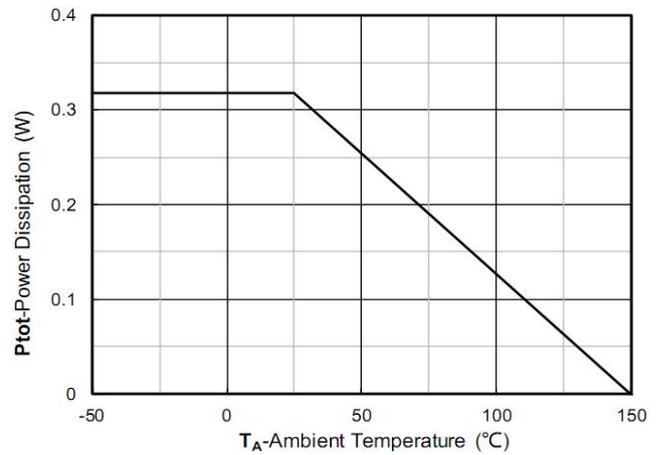


Figure 12. Power dissipation

Typical Characteristics

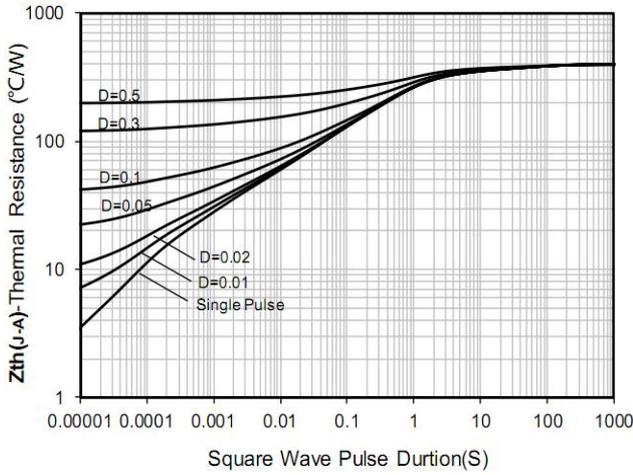


Figure 13. Maximum Transient Thermal Impedance

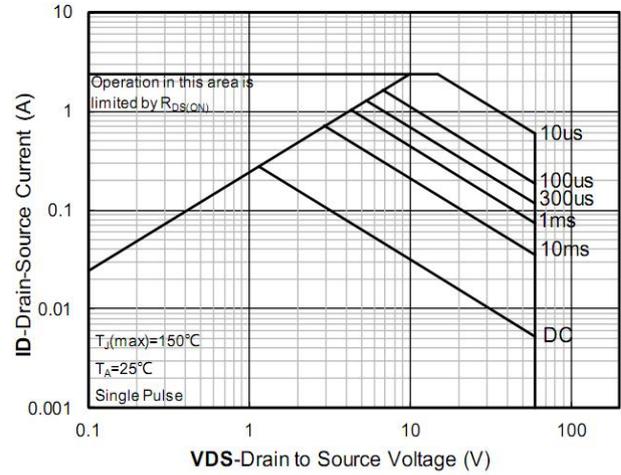
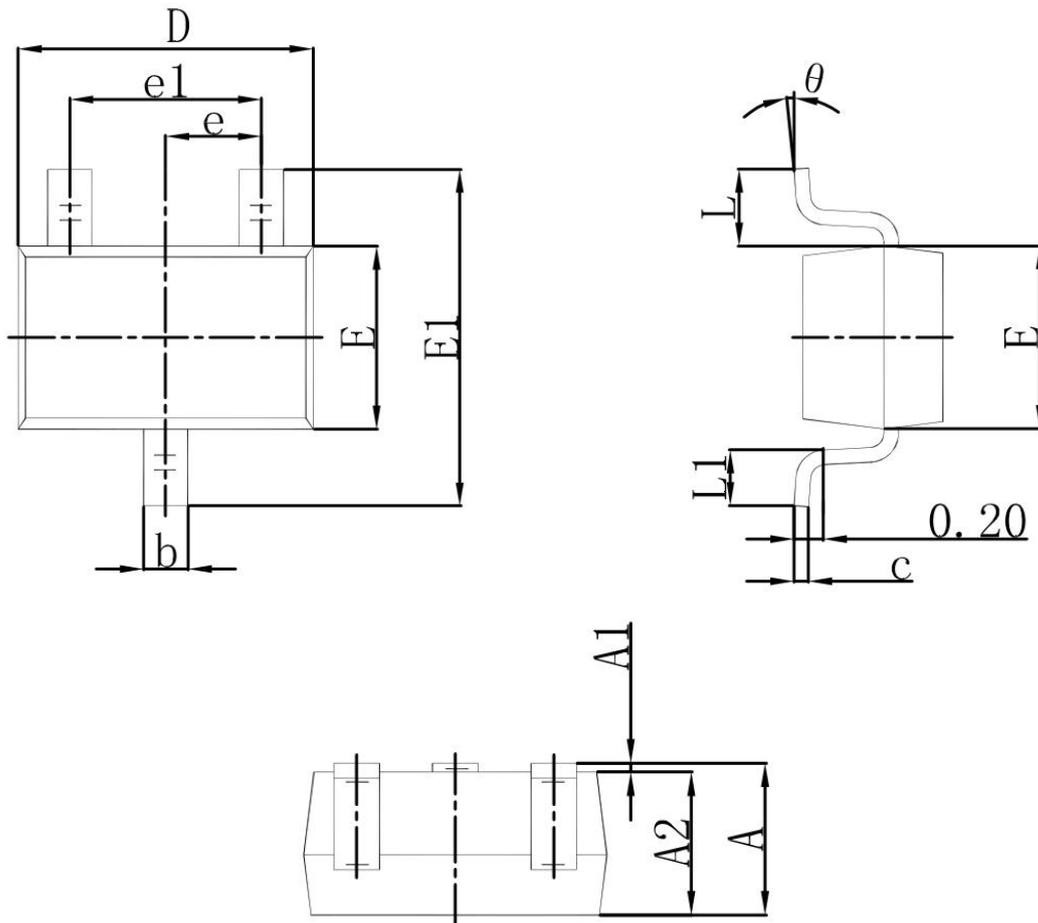


Figure 14. Safe Operation Area

SOT-323 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.400	0.006	0.016
c	0.100	0.250	0.004	0.010
D	1.800	2.200	0.071	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP.		0.026 TYP.	
e1	1.200	1.400	0.047	0.055
L	0.525 REF.		0.021 REF.	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°