

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
40V	28mΩ@10V	5.1A

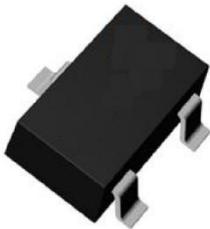
Feature

- Low $R_{ds(on)}$ & FOM
- Extremely low switching loss
- Suffix "-Q1" for AEC-Q101

Application

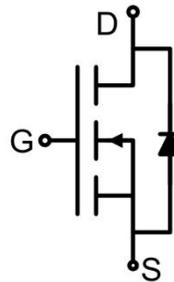
- Power management
- Portable equipment

Package

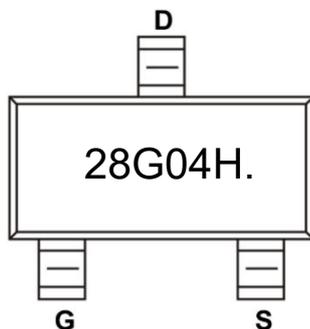


SOT-23

Circuit diagram



Marking



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^{1,2)} ($V_{GS} = 10\text{V}$)	I_D	5.1	A
Continuous Drain Current ^{1,2)} ($V_{GS} = 10\text{V}$, $T_A=100^\circ\text{C}$)	$I_{D(100^\circ\text{C})}$	3.6	A
Pulsed Drain Current ¹⁾ ($t_P \leq 10\mu\text{s}$)	I_{DM}	41	A
Power Dissipation ^{1,2)}	P_D	1.3	W
Thermal Resistance from Junction to Ambient ²⁾	$R_{\theta JA}$	115	$^\circ\text{C}/\text{W}$
Operating Junction Temperature	T_J	$-55 \sim +175$	$^\circ\text{C}$
Storage Temperature	T_{STG}	$-55 \sim +175$	$^\circ\text{C}$

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	$V_{(BR)DSS}$	$V_{GS} = 0\text{V}$, $I_D = 250\mu\text{A}$	40			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 40\text{V}$, $V_{GS} = 0\text{V}$			1	μA
Gate-body leakage current	I_{GSS}	$V_{DS} = 0\text{V}$, $V_{GS} = \pm 20\text{V}$			± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$	2	2.8	3.6	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 10\text{V}$, $I_D = 4.3\text{A}$		22	28	m Ω
Dynamic characteristics³⁾						
Input Capacitance	C_{iss}	$V_{DS} = 20\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$		240		pF
Output Capacitance	C_{oss}			93		
Reverse Transfer Capacitance	C_{rss}			4		
Gate Charge	Q_g	$V_{DS} = 20\text{V}$, $V_{GS} = 10\text{V}$, $I_D = 4.3\text{A}$		3.96		nC
Gate-Source Charge	Q_{gs}			1.05		
Gate-Drain Charge	Q_{gd}			0.98		
Turn-on delay time	$t_{d(on)}$	$V_{DS} = 20\text{V}$, $V_{GS} = 10\text{V}$, $I_D = 4.3\text{A}$ $R_{GEN} = 3\Omega$		5.12		nS
Turn-on rise time	t_r			2.35		
Turn-off delay time	$t_{d(off)}$			8.64		
Turn-off fall time	t_f			2.4		
Source-Drain Diode characteristics						
Diode Forward current	I_S	$T_A = 25^\circ\text{C}$			5.1	A
Diode Forward voltage	V_{SD}	$V_{GS} = 0\text{V}$, $I_S = 4.3\text{A}$			1.2	V
Reverse Recovery Time	T_{rr}	$V_{GS} = 0\text{V}$, $V_R = 20\text{V}$, $I_F = 4.3\text{A}$ $di/dt = -100\text{A}/\mu\text{s}$		14.9		nS
Reverse Recovery Charge	Q_{rr}			8		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 FR4 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 175 $^\circ\text{C}$. The value in any given application depends on the user's specific board design.
- 3) Guaranteed by design, not subject to production testing.

Typical Characteristics

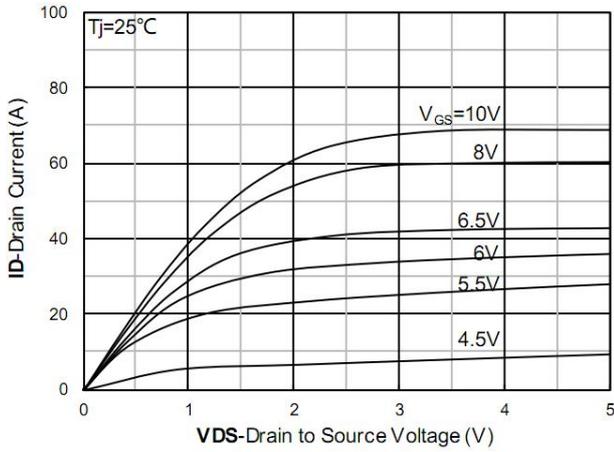


Figure 1. Output Characteristics; typical values

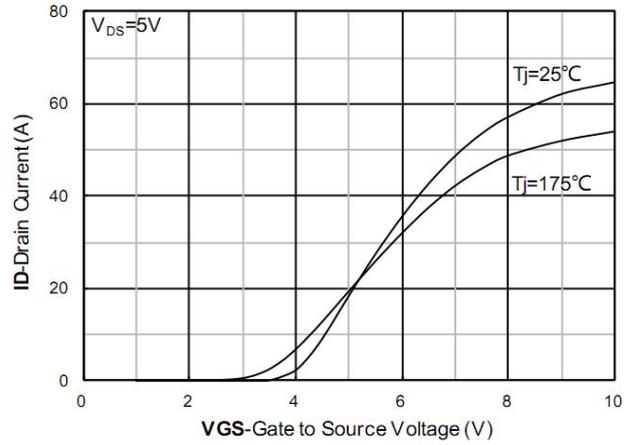


Figure 2. Transfer Characteristics; typical values

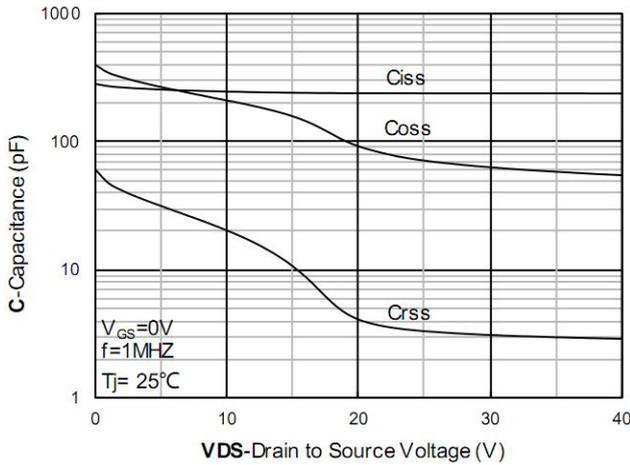


Figure 3. Capacitance Characteristics; typical values

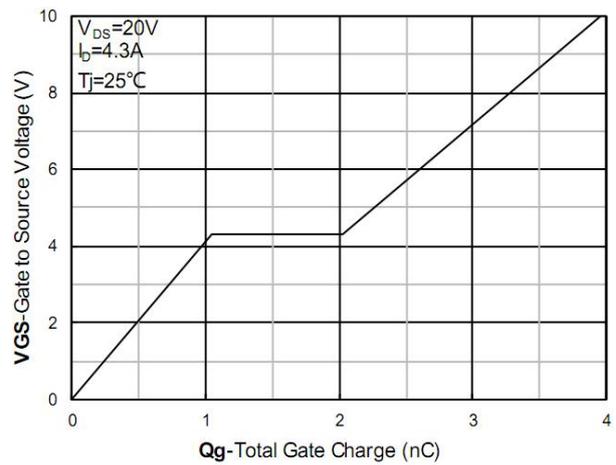


Figure 4. Gate Charge; typical values

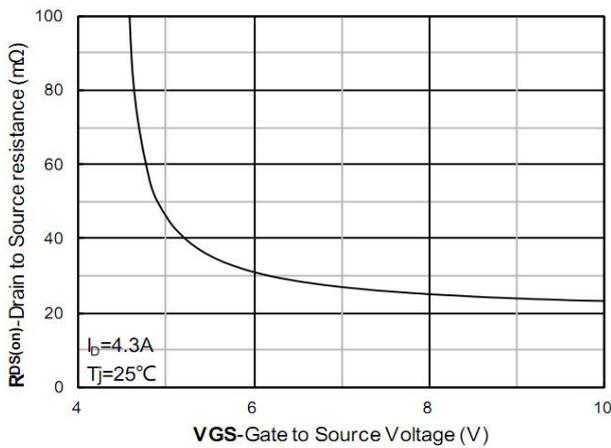


Figure 5. On-Resistance vs. Gate to Source Voltage; typical values

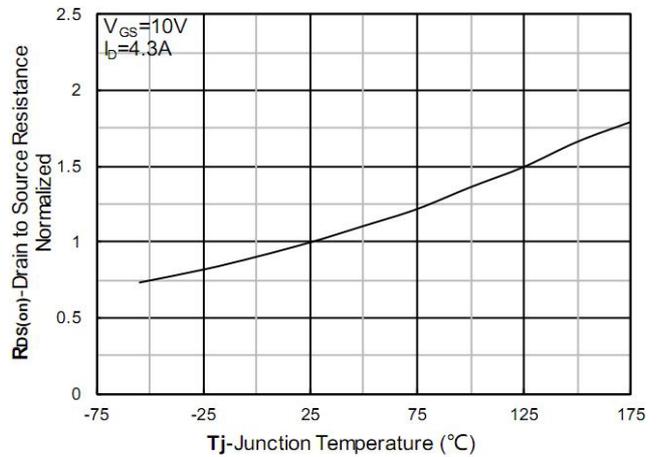


Figure 6. Normalized On-Resistance

Typical Characteristics

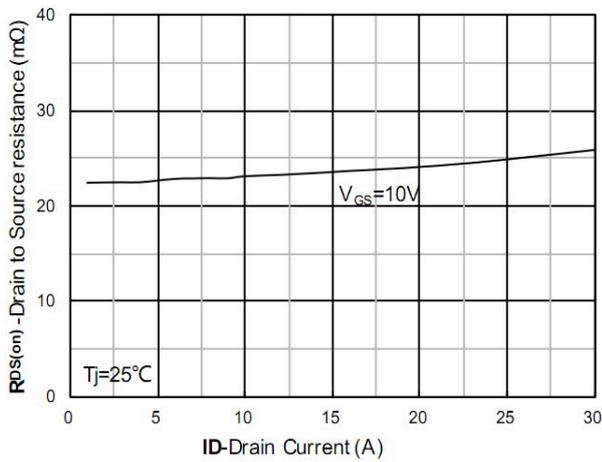


Figure 7. $R_{DS(on)}$ vs. Drain Current; typical values

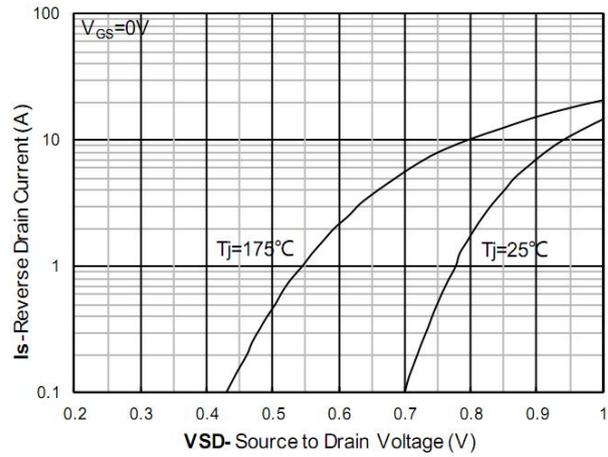


Figure 8. Forward characteristics of reverse diode; typical values

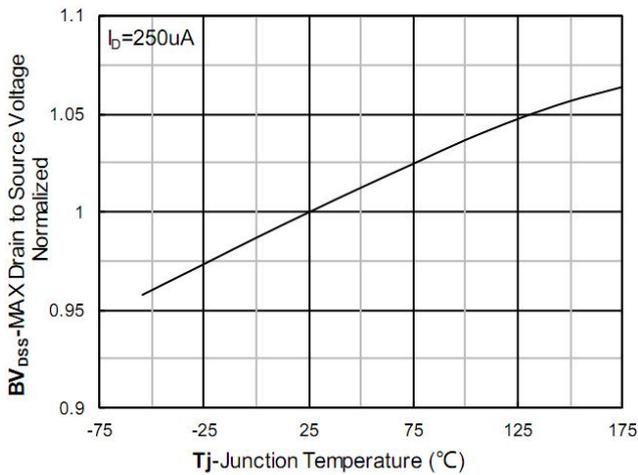


Figure 9. Normalized breakdown voltage

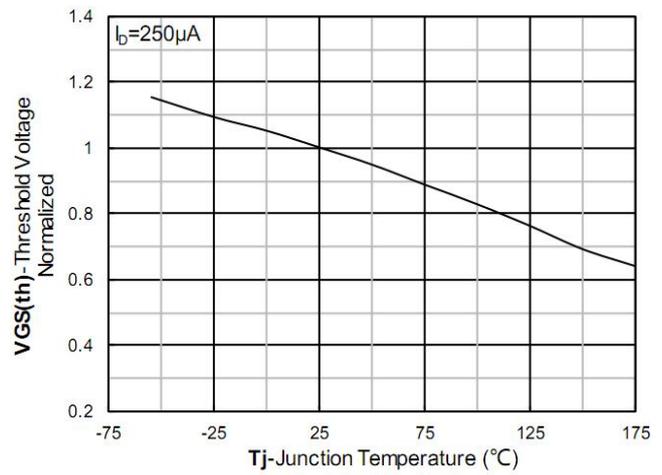


Figure 10. Normalized Threshold voltage

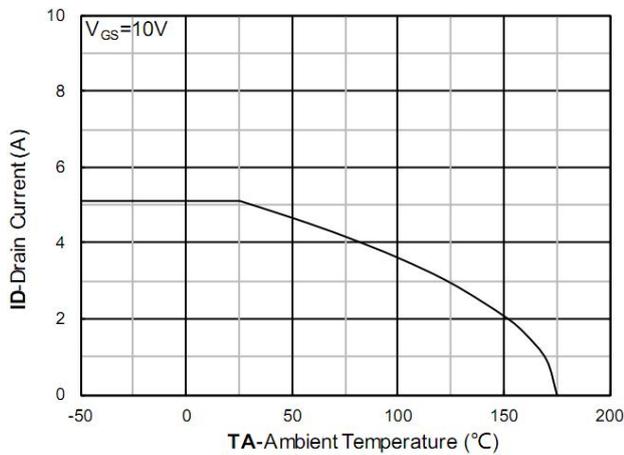


Figure 11. Current dissipation

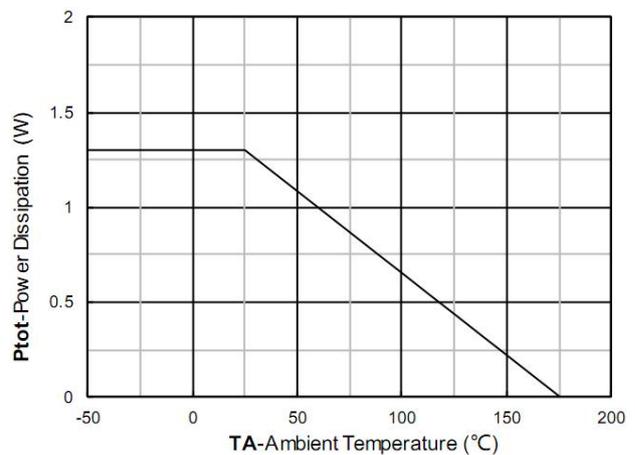


Figure 12. Power dissipation

Typical Characteristics

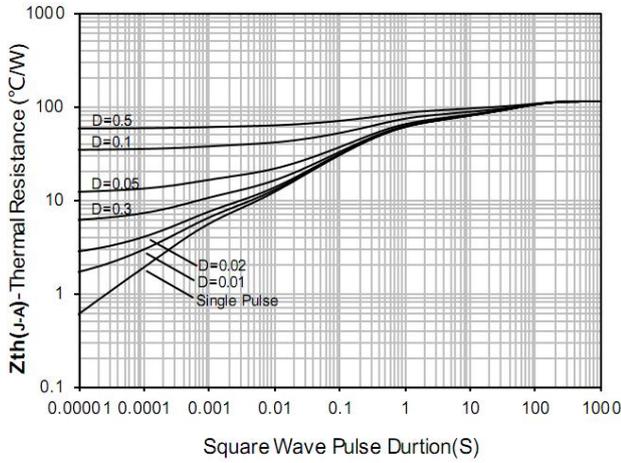


Figure 13. Maximum Transient Thermal Impedance

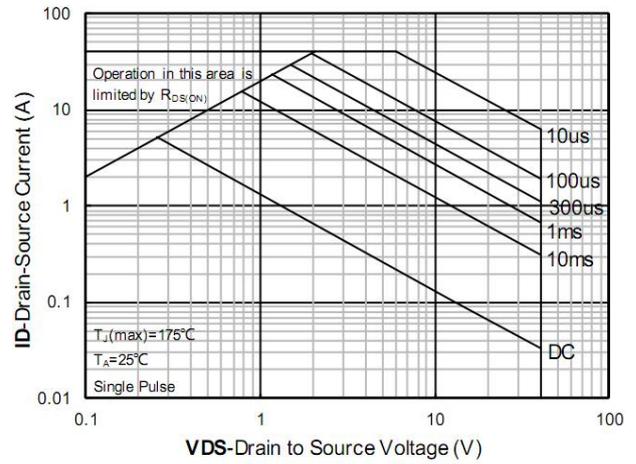
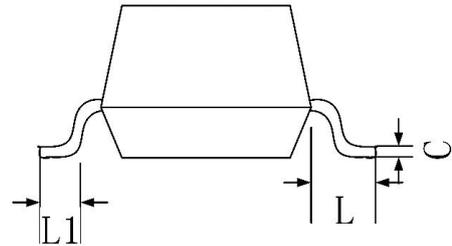
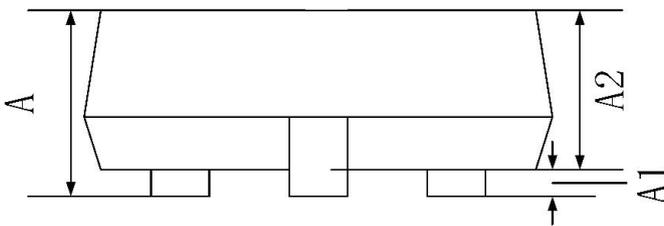
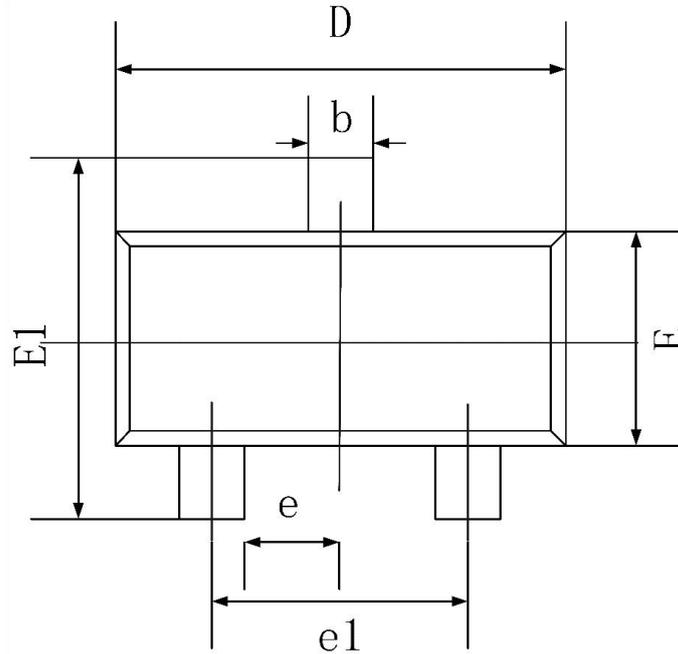


Figure 14. Safe Operation Area

SOT-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	0.100	0.200	0.004	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 TYP.		0.037 TYP.	
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
θ	0°	8°	0°	8°