

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
30V	500mΩ@4.5V	0.5A
	700mΩ@2.5V	
	1100mΩ@1.8V	

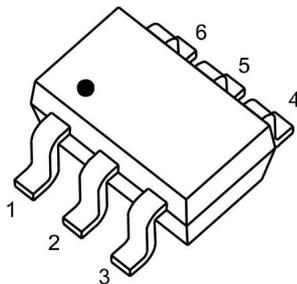
Feature

- Voltage controlled small signal switch
- Low input Capacitance
- Fast Switching Speed
- ESD Protection
- Suffix "-Q1" for AEC-Q101

Application

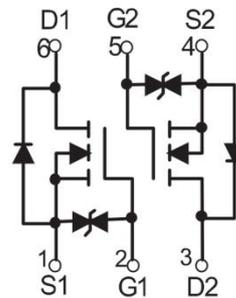
- Battery operated systems
- Solid-state relays
- Direct logic-level interface: TTL/CMOS

Package



SOT-363

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}	± 12	V
Continuous Drain Current ^{1,2)} ($V_{GS} = 10\text{V}$)	I_D	0.5	A
Continuous Drain Current ^{1,2)} ($V_{GS} = 10\text{V}$, $T_A = 100^\circ\text{C}$)	$I_D(100^\circ\text{C})$	0.3	A
Pulsed Drain Current ($t_p \leq 10\mu\text{s}$)	I_{DM}	4	A
Power Dissipation ^{1,2)}	P_D	0.304	W
Thermal Resistance Junction to Ambient ²⁾	$R_{\theta JA}$	411	$^\circ\text{C}/\text{W}$
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	$V_{(BR)DSS}$	$V_{GS} = 0\text{V}$, $I_D = 250\mu\text{A}$	30			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 30\text{V}$, $V_{GS} = 0\text{V}$			1	μA
Gate-body leakage current	I_{GSS}	$V_{DS} = 0\text{V}$, $V_{GS} = \pm 12\text{V}$			± 10	μA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$	0.5	1	1.5	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 4.5\text{V}$, $I_D = 0.5\text{A}$		330	500	m Ω
		$V_{GS} = 2.5\text{V}$, $I_D = 0.3\text{A}$		440	700	
		$V_{GS} = 1.8\text{V}$, $I_D = 0.1\text{A}$		700	1100	
Dynamic characteristics³⁾						
Input Capacitance	C_{iss}	$V_{DS} = 15\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$		35		pF
Output Capacitance	C_{oss}			5.9		
Reverse Transfer Capacitance	C_{rss}			3.8		
Total Gate Charge	Q_g	$V_{DS} = 5\text{V}$, $V_{GS} = 4.5\text{V}$, $I_D = 0.5\text{A}$		0.55		nC
Gate-Source Charge	Q_{gs}			0.12		
Gate-Drain Charge	Q_{gd}			0.11		
Turn-on delay time	$t_{d(on)}$	$V_{DS} = 5\text{V}$, $V_{GS} = 4.5\text{V}$, $I_D = 0.5\text{A}$ $R_G = 50\Omega$		4.1		nS
Turn-on rise time	t_r			3.2		
Turn-off delay time	$t_{d(off)}$			28		
Turn-off fall time	t_f			9		
Source-Drain Diode characteristics						
Diode Forward Current	I_S				0.5	A
Diode Forward voltage	V_{SD}	$V_{GS} = 0\text{V}$, $I_S = 0.25\text{A}$			1.2	V
Reverse Recovery Time	T_{rr}	$V_{GS} = 0\text{V}$, $V_R = 10\text{V}$, $I_S = 0.5\text{A}$		11		nS
Reverse Recovery Charge	Q_{rr}	$di/dt = -100\text{A}/\mu\text{s}$		1.5		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 testing.

Typical Characteristics

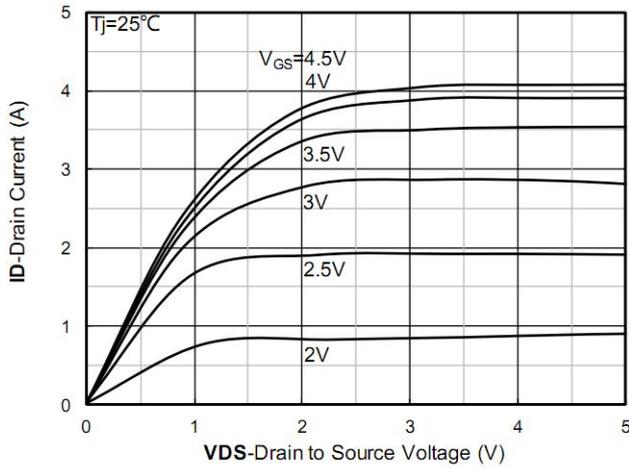


Figure 1. Output Characteristics; typical values

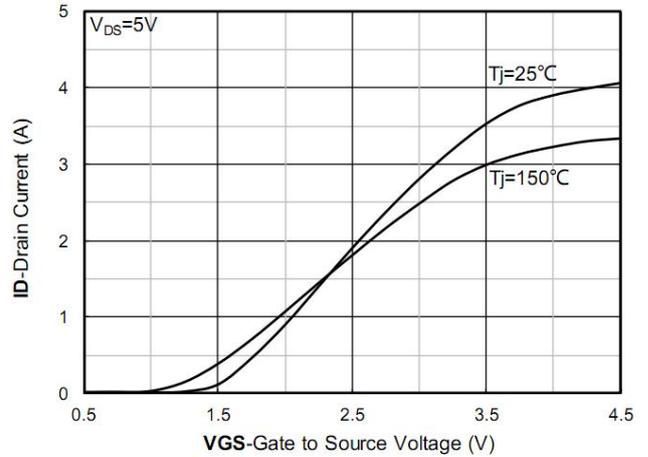


Figure 2. Transfer Characteristics; typical values

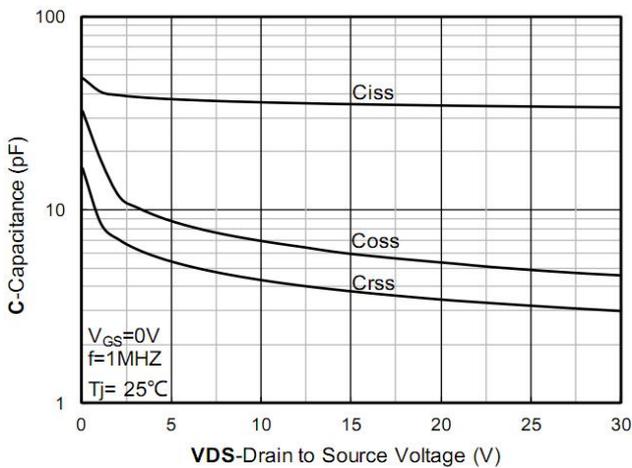


Figure 3. Capacitance Characteristics; typical values

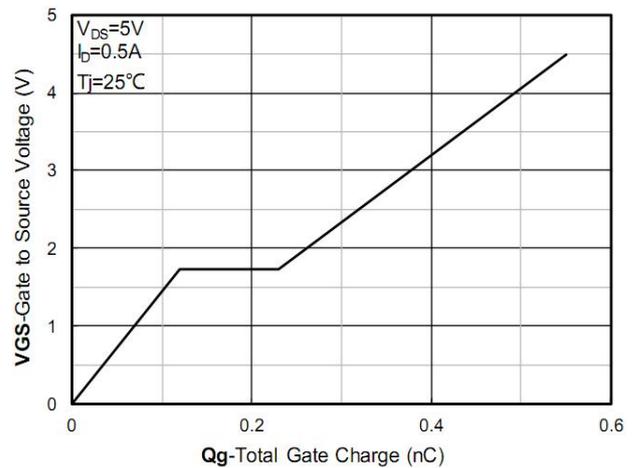


Figure 4. Gate Charge; typical values

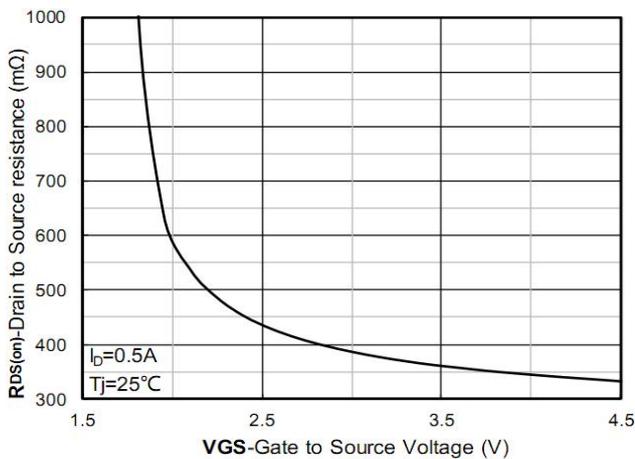


Figure 5. On-Resistance vs. Gate to Source Voltage; typical values

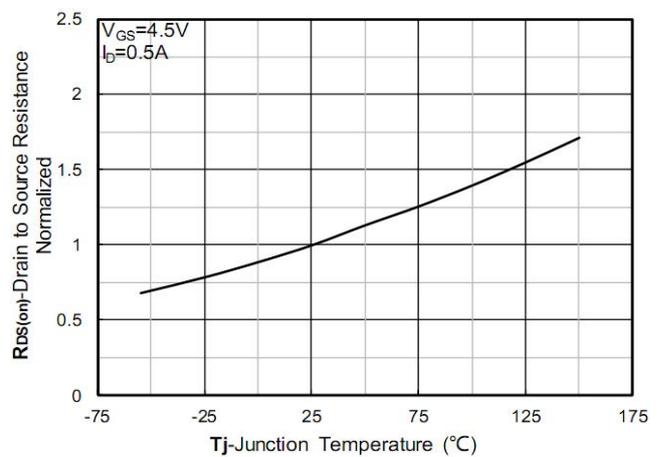


Figure 6. Normalized On-Resistance

Typical Characteristics

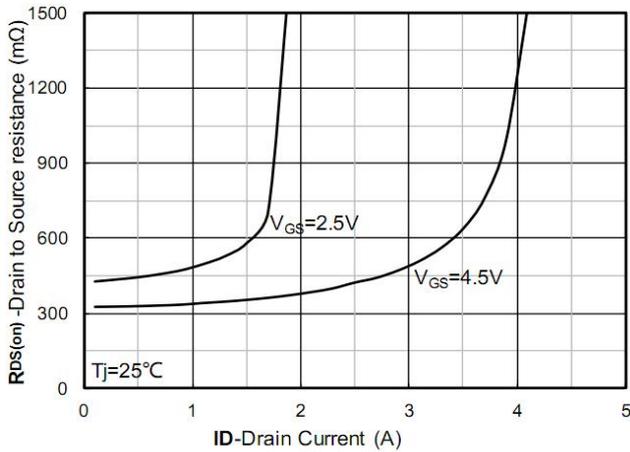


Figure 7. $R_{DS(on)}$ vs. Drain Current; typical values

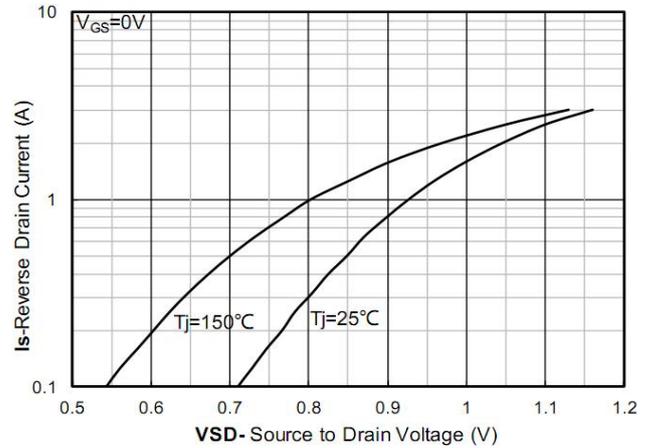


Figure 8. Forward characteristics of reverse diode; typical values

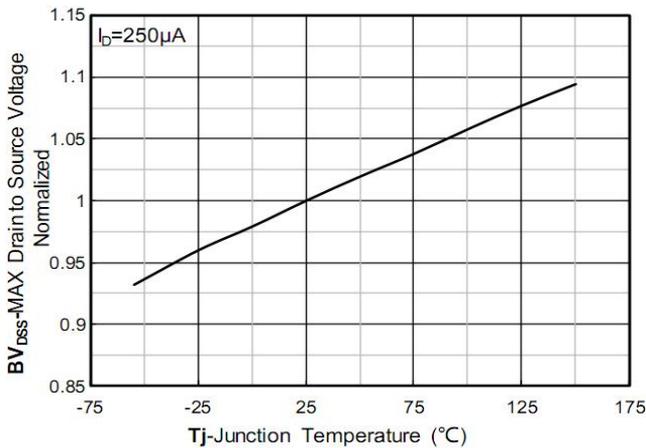


Figure 9. Normalized breakdown voltage

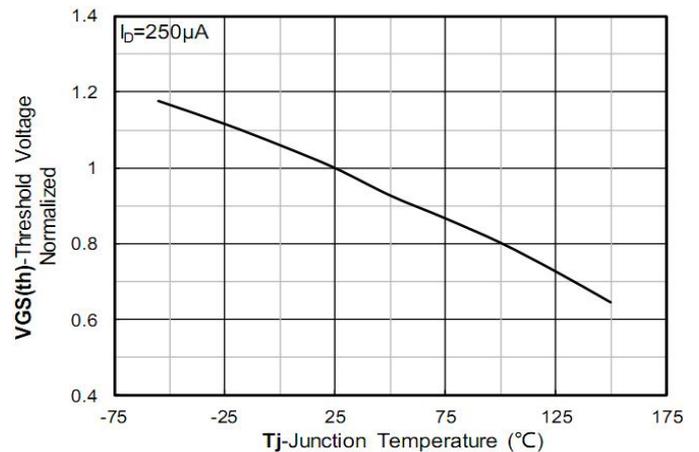


Figure 10. Normalized Threshold voltage

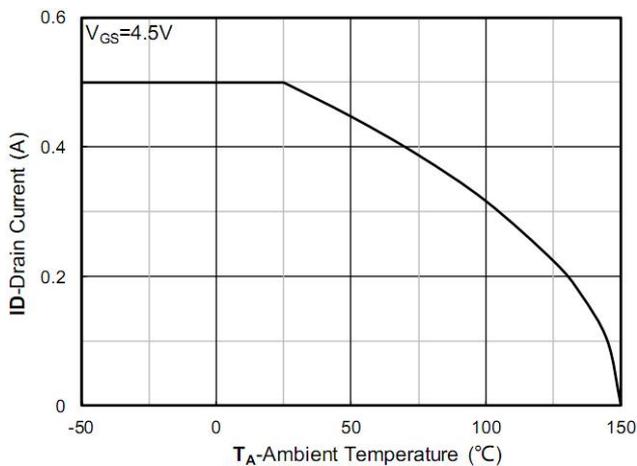


Figure 11. Current dissipation

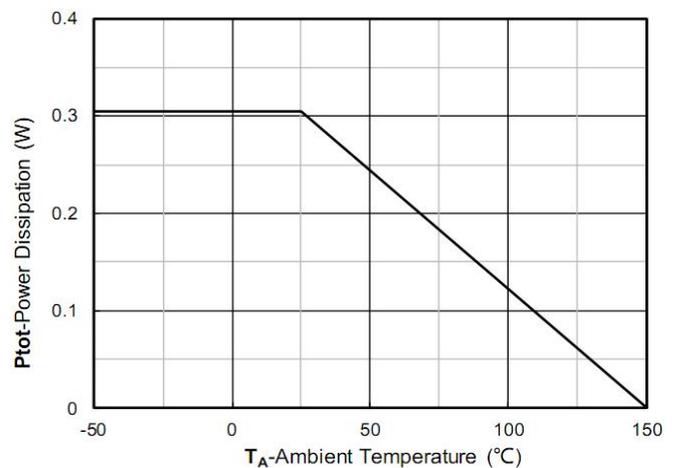


Figure 12. Power dissipation

Typical Characteristics

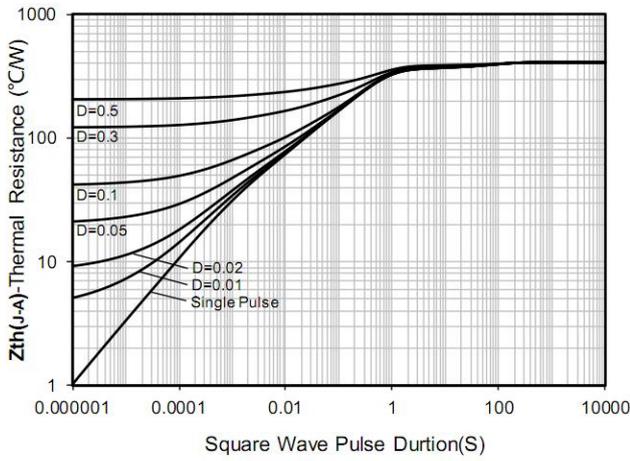


Figure 13. Maximum Transient Thermal Impedance

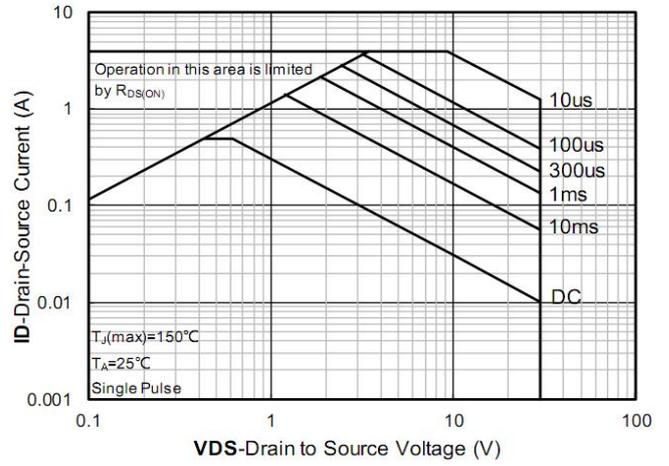
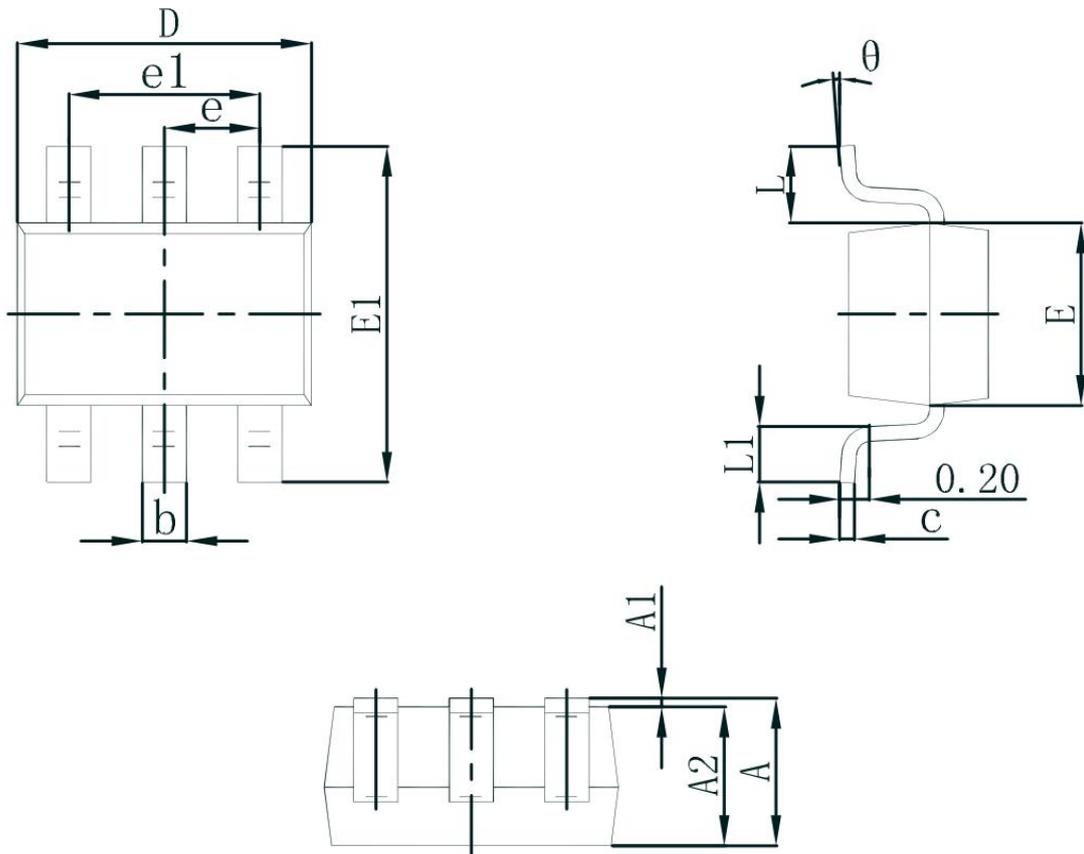


Figure 14. Safe Operation Area

SOT-363 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	0.350	0.006	0.014
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	2.000	2.200	0.079	0.087
e	0.650 TYP.		0.026 TYP.	
e1	1.200	1.400	0.047	0.055
L	0.525 REF.		0.021 REF.	
L1	0.200	0.400	0.008	0.016
θ	0°	8°	0°	8°