

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
-20V	25mΩ@-4.5V	-5A
	40mΩ@-2.5V	

Feature

- High power and current handling capability
- Surface Mount Package
- Suffix "-Q1" for AEC-Q101

Application

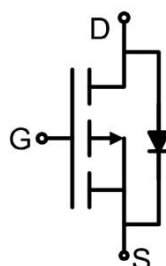
- Motor drive
- Load switch
- Power management

Package

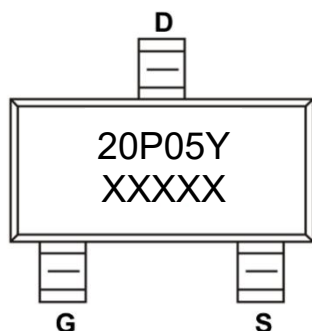


SOT-23-3L

Circuit diagram



Marking



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current	I_D	-5	A
Pulsed Drain Current ¹⁾	I_{DM}	-20	A
Power Dissipation	P_D	1.5	W
Thermal Resistance Junction to Ambient ²⁾	$R_{\theta JA}$	83.3	$^{\circ}\text{C}/\text{W}$
Operating Junction Temperature	T_J	-55 ~ +150	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-55 ~ +150	$^{\circ}\text{C}$

Electrical characteristics ($T_A=25^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =-250μA	-20			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =-20V, V _{GS} =0V			-1	μA
Gate-body leakage current	I _{GSS}	V _{DS} =0V, V _{GS} =±12V			±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-0.5	-0.7	-1.4	V
Drain-source on-resistance ³⁾	R _{DS(on)}	V _{GS} =-4.5V, I _D =-5A		20	25	mΩ
		V _{GS} =-2.5V, I _D =-5A		30	40	
Dynamic characteristics ⁴⁾						
Input Capacitance	C _{iss}	V _{DS} =-10V, V _{GS} =0V, f =1MHz		2015		pF
Output Capacitance	C _{oss}			190		
Reverse Transfer Capacitance	C _{rss}			173		
Total Gate Charge	Q _g	V _{DS} =-10V, V _{GS} =-4.5V I _D =-5A		15		nC
Gate-Source Charge	Q _{gs}			1.8		
Gate-Drain Charge	Q _{gd}			2.8		
Turn-on delay time	t _{d(on)}	V _{DS} =-10V, V _{GS} =-4.5V R _L =10Ω, R _G =6Ω		4.5		nS
Turn-on rise time	t _r			9.2		
Turn-off delay time	t _{d(off)}			18.7		
Turn-off fall time	t _f			3.3		
Source-Drain Diode characteristics						
Diode Forward Current	I _S				-5	A
Diode Forward voltage ³⁾	V _{SD}	V _{GS} =0V, I _S =-5A			-1.2	V

Notes:

- 1) Repetitive Rating: Pulse width limited by maximum junction temperature.
- 2) Surface Mounted on FR4 Board, $t \leq 10$ sec.
- 3) Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.
- 4) Guaranteed by design, not subject to production.

Typical Characteristics

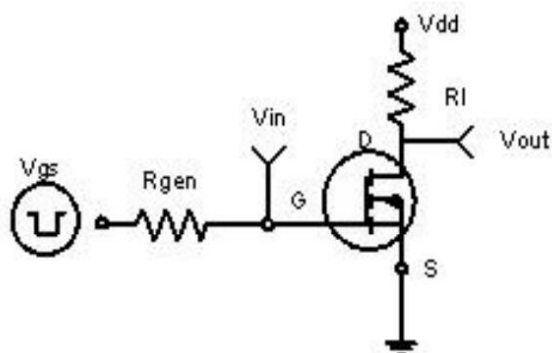


Figure 1 Switching Test Circuit

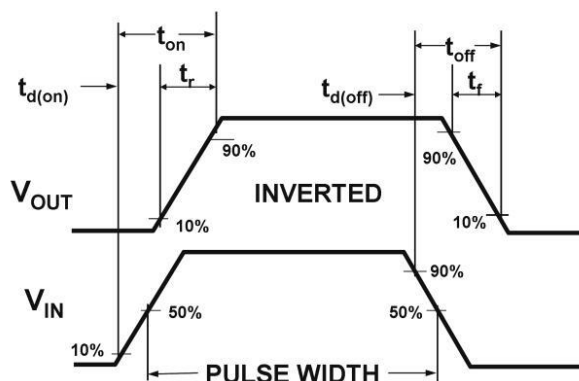


Figure 2 Switching Waveforms

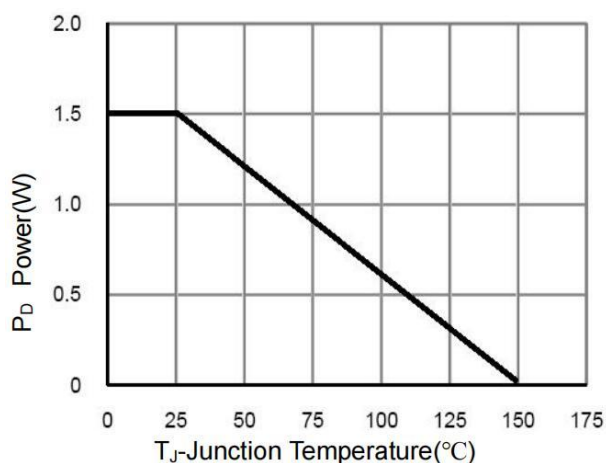


Figure 3 Power Dissipation

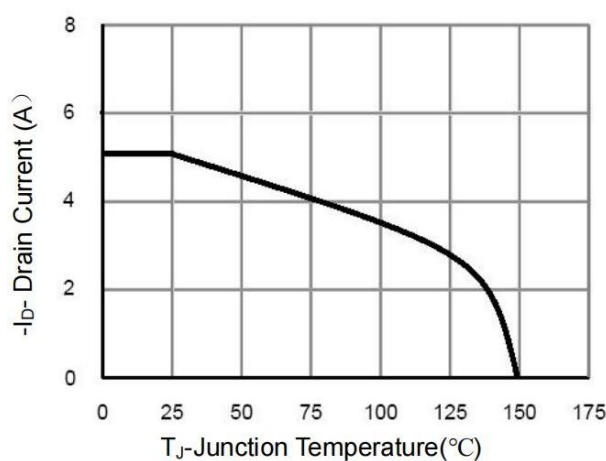


Figure 4 Drain Current

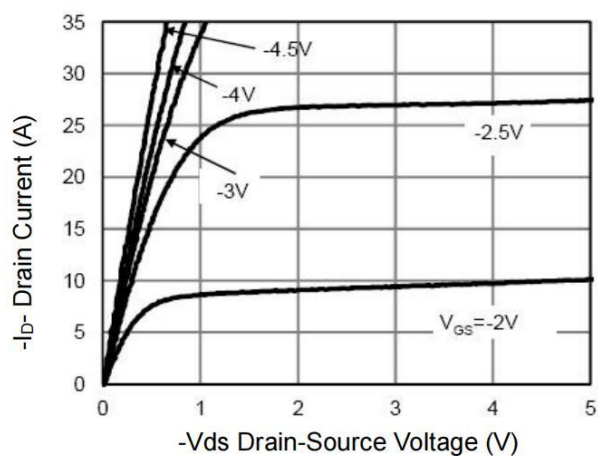


Figure 5 Output Characteristics

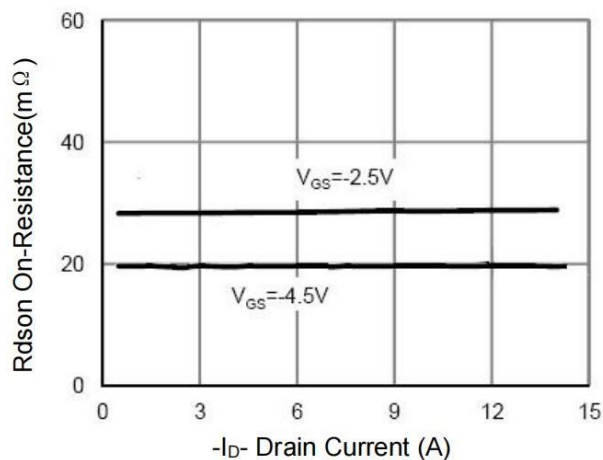


Figure 6 Drain-Source On-Resistance

Typical Characteristics

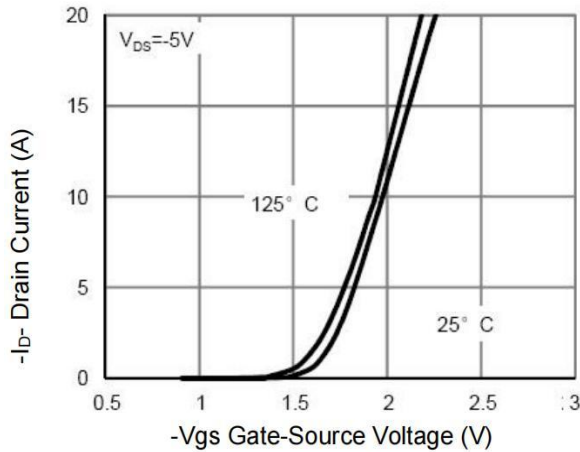


Figure 7 Transfer Characteristics

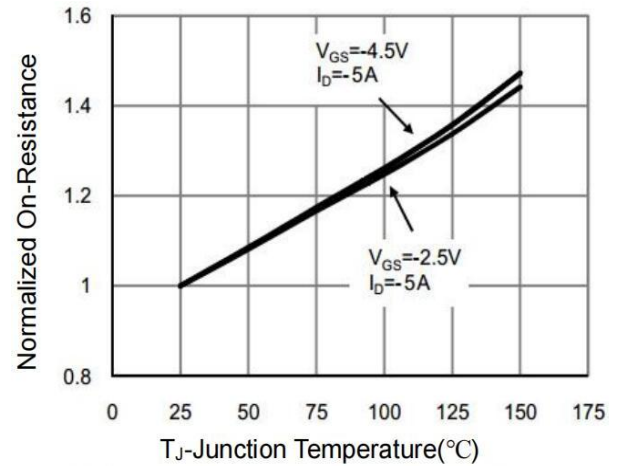


Figure 8 Drain-Source On-Resistance

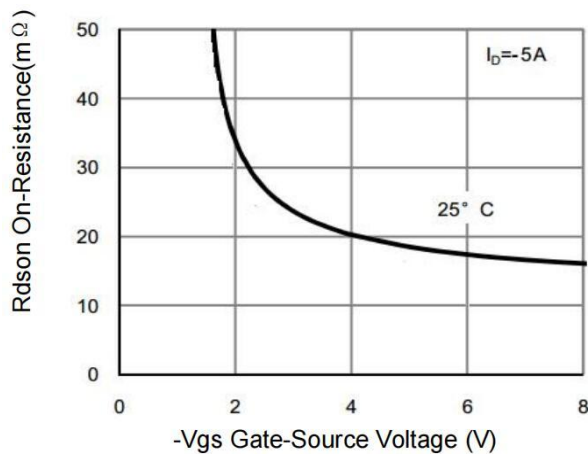


Figure 9 Rdson vs Vgs

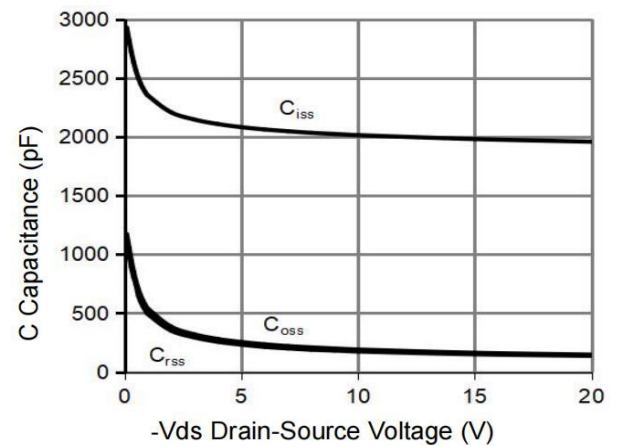


Figure 10 Capacitance vs Vds

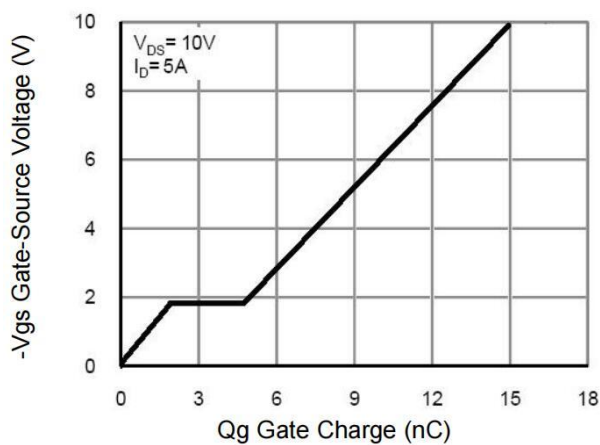


Figure 11 Gate Charge

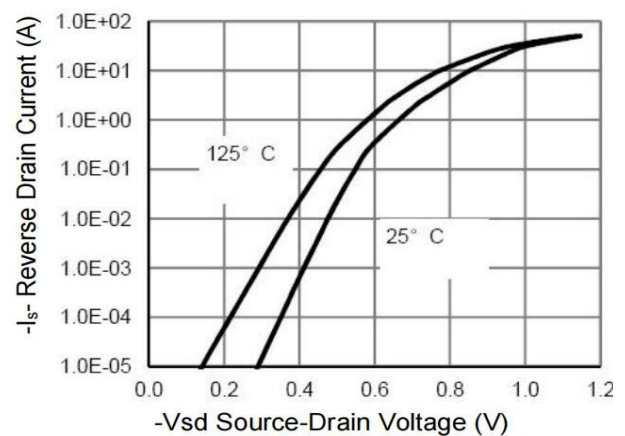


Figure 12 Source- Drain Diode Forward

Typical Characteristics

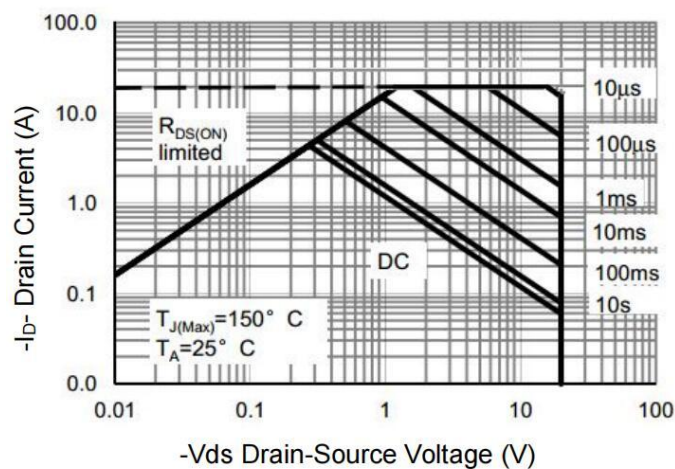


Figure 13 Safe Operation Area

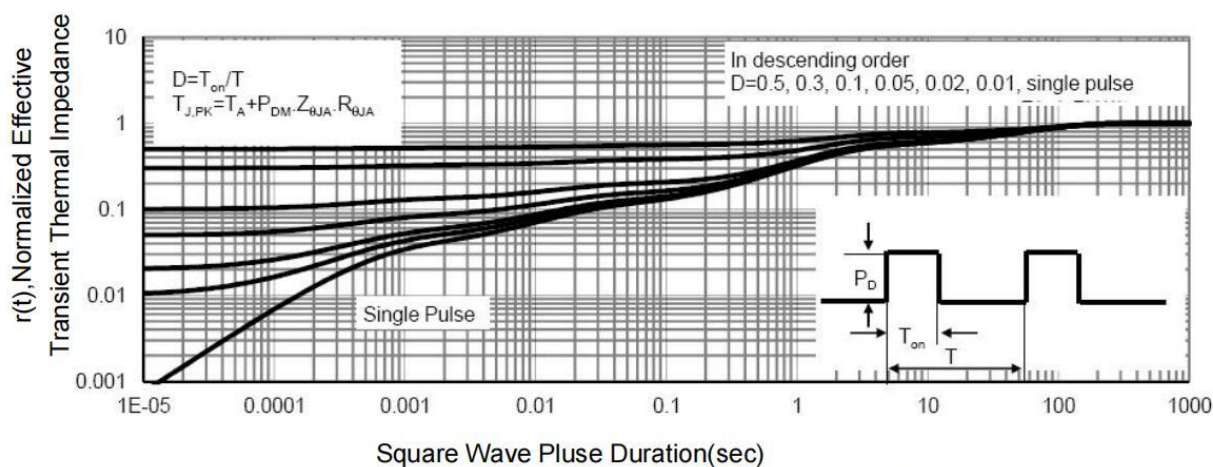
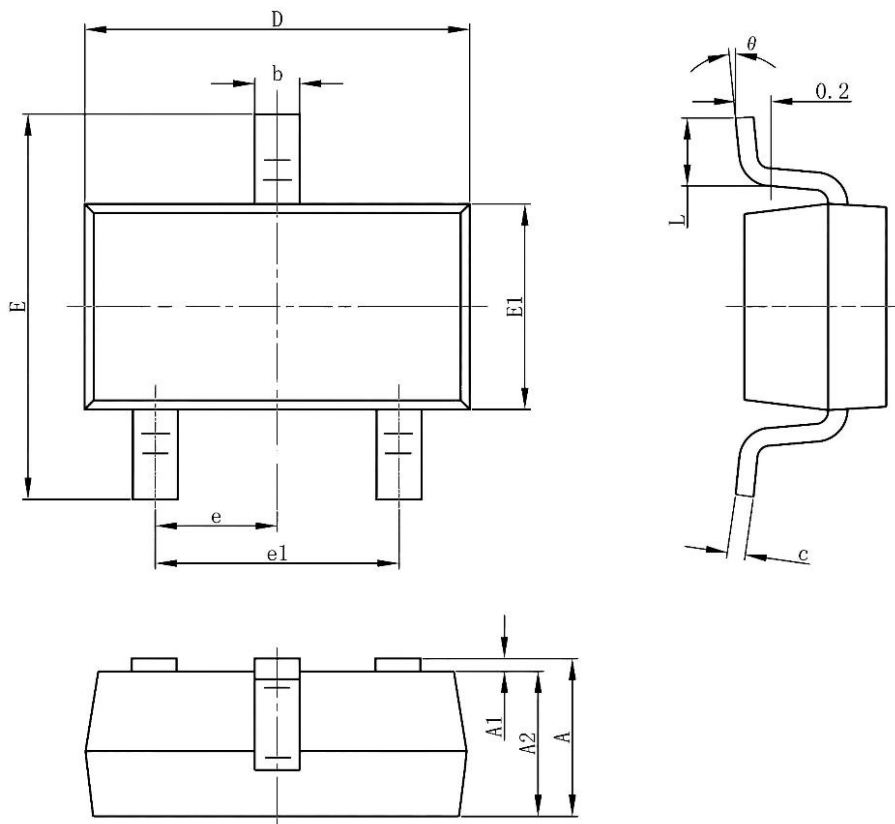


Figure 14 Normalized Maximum Transient Thermal Impedance

SOT-23-3L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950 BSC.		0.037 BSC.	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°