

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D	$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
20V	65mΩ@4.5V	3.2A	-20V	160mΩ@-4.5V	-2.1A
	85mΩ@2.5V			280mΩ@-2.5V	

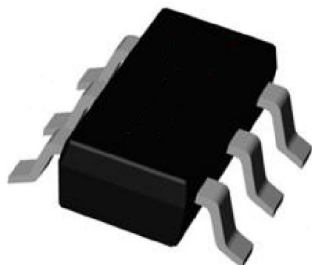
Feature

- Advanced trench technology
- Complementary P + N channel
- Fast switching speed
- Suffix "-Q1" for AEC-Q101

Application

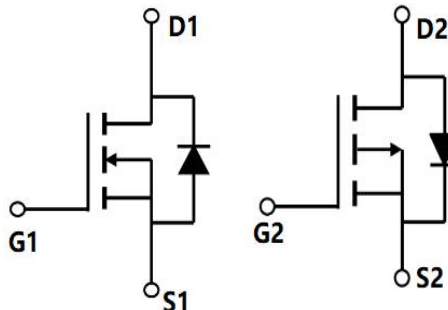
- Load switch
- Power management

Package

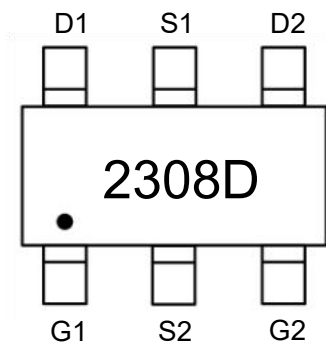


SOT-23-6L

Circuit diagram



Marking



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

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	V_{DS}	20	-20	V
Gate-Source Voltage	V_{GS}	± 12	± 12	V
Continuous Drain Current ¹⁾	I_D	3.2	-2.1	A
Continuous Drain Current ¹⁾ ($T_A=70^{\circ}\text{C}$)	$I_D (70^{\circ}\text{C})$	2.6	-1.7	A
Pulsed Drain Current ¹⁾ ($t_p=10\mu\text{s}$)	I_{DM}	16	-12	A
Single Pulse Avalanche Energy ^{2,3)}	E_{AS}	2	2	mJ
Power Dissipation ¹⁾	P_D	1	1	W
Thermal Resistance Junction to Ambient ¹⁾	$R_{\theta JA}$	125	125	$^{\circ}\text{C/W}$
Operating Junction Temperature	T_J	-55 ~ +150	-55 ~ +150	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-55 ~ +150	-55 ~ +150	$^{\circ}\text{C}$

N-CH 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	0.9	1.2	V
Drain-source on-resistance ⁴⁾	R _{DS(on)}	V _{GS} =4.5V, I _D =3A		54	65	mΩ
		V _{GS} =2.5V, I _D =2A		76	85	
Dynamic characteristics ⁵⁾						
Input Capacitance	C _{iss}	V _{DS} =10V, V _{GS} =0V, f =1MHz		188		pF
Output Capacitance	C _{oss}			28		
Reverse Transfer Capacitance	C _{rss}			22		
Total Gate Charge	Q _g	V _{DS} =10V, V _{GS} =4.5V, I _D =3.6A		3.3		nC
Gtae-Source Charge	Q _{gs}			0.8		
Gtae-Drain Charge	Q _{gd}			0.6		
Turn-on delay time	t _{d(on)}	V _{DS} =10V, V _{GS} =4.5V, I _D =1A R _G =6Ω		5		nS
Turn-on rise time	t _r			8.5		
Turn-off delay time	t _{d(off)}			11		
Turn-off fall time	t _f			3		
Source-Drain Diode characteristics						
Diode Forward Current	I _s				3.2	A
Diode Forward voltage ⁴⁾	V _{SD}	V _{GS} =0V, I _s =1A			1.2	V

P-CH Electrical characteristics (T_A=25 °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	-0.4	-0.6	-1	V
Drain-source on-resistance ⁴⁾	R _{DS(on)}	V _{GS} =-4.5V, I _D =-1.5A		118	160	mΩ
		V _{GS} =-2.5V, I _D =-1.1A		157	280	
Dynamic characteristics ⁵⁾						
Input Capacitance	C _{iss}	V _{DS} =-10V, V _{GS} =0V, f =1MHz		199		pF
Output Capacitance	C _{oss}			29		
Reverse Transfer Capacitance	C _{rss}			22		
Total Gate Charge	Q _g	V _{DS} =-16V, V _{GS} =-4.5V I _D =-1.5A		3.5		nC
Gtae-Source Charge	Q _{gs}			0.7		
Gtae-Drain Charge	Q _{gd}			0.8		
Turn-on delay time	t _{d(on)}	V _{DS} =-10V, V _{GS} =-4.5V I _D =-1A, R _G =5Ω		11		nS
Turn-on rise time	t _r			5		
Turn-off delay time	t _{d(off)}			20		
Turn-off fall time	t _f			8		
Source-Drain Diode characteristics						
Diode Forward Current	I _S				-2.1	A
Diode Forward voltage ⁴⁾	V _{SD}	V _{GS} =0V, I _S =-1.5A			-1.1	V

Notes:

- 1) The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2) The EAS data shows Max. rating. N: The test condition is V_{DD} = 15V, V_{GS} = 10V, L = 0.1mH.
- 3) The EAS data shows Max. rating. P: The test condition is V_{DD} = -15V, V_{GS} = -10V, L = 0.1mH.
- 4) The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%.
- 5) Guaranteed by design, not subject to production testing.

N-Channel Typical Characteristics

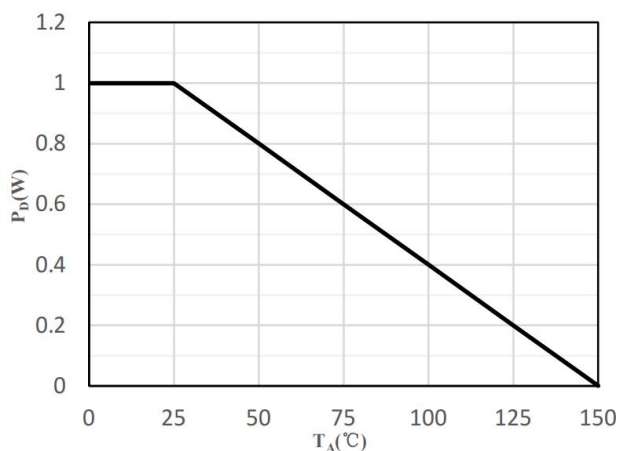


Fig 1 Power Dissipation

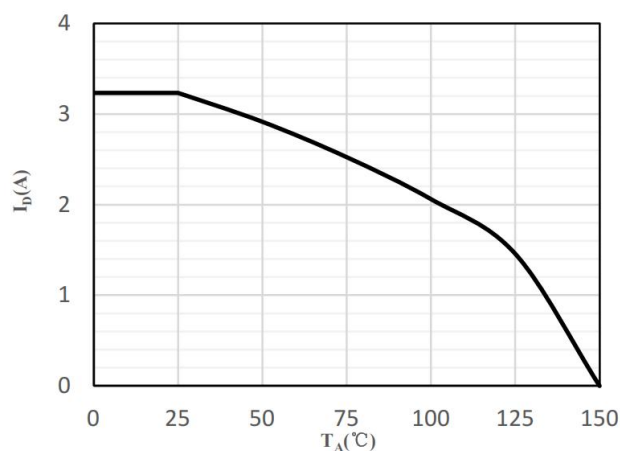


Fig 2 Drain Current

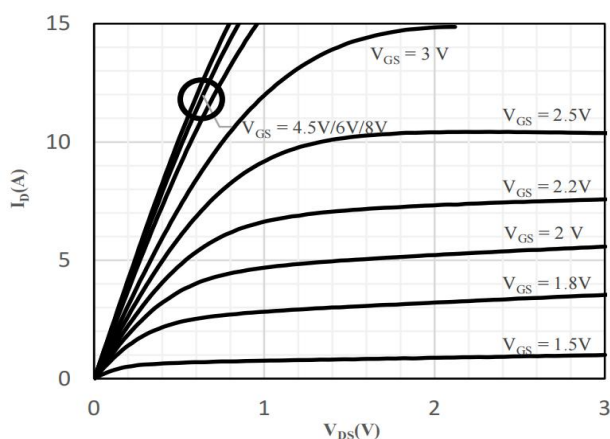


Fig 3 Typical Output Characteristics

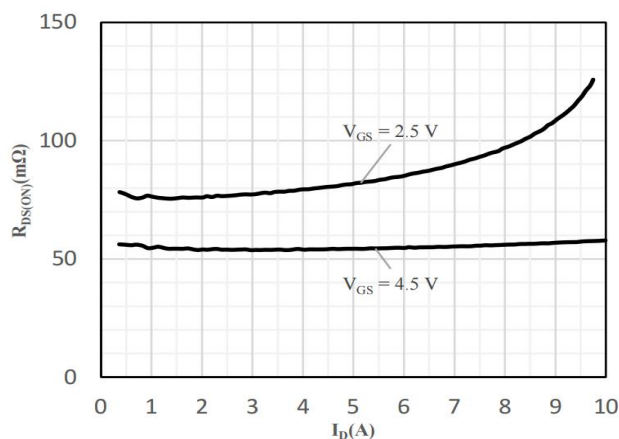


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

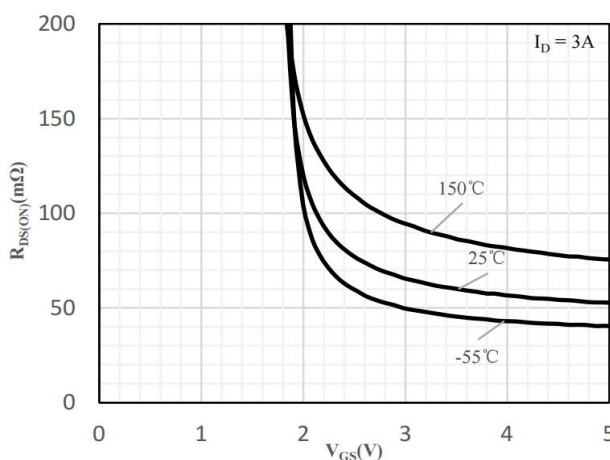


Fig 5 On-Resistance vs. Gate-Source Voltage

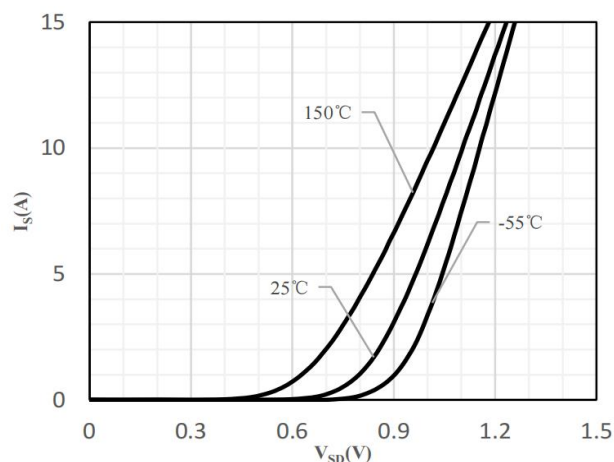


Fig 6 Body-Diode Characteristics

N-Channel Typical Characteristics

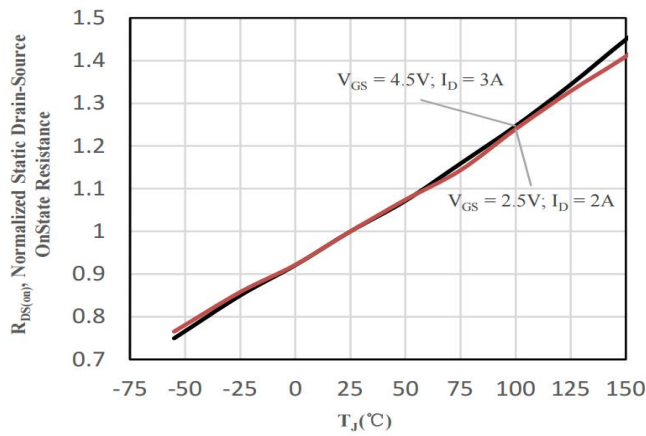


Fig 7 Normalized On-Resistance vs. Junction Temperature

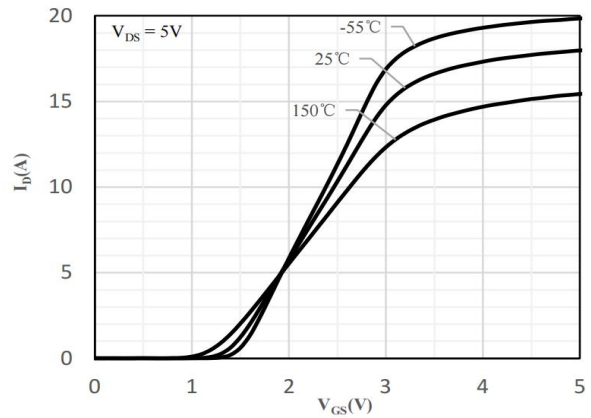


Fig 8 Transfer Characteristics

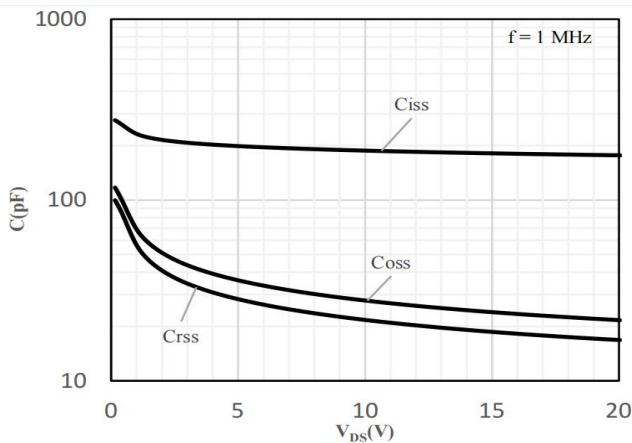


Fig 9 Capacitance Characteristics

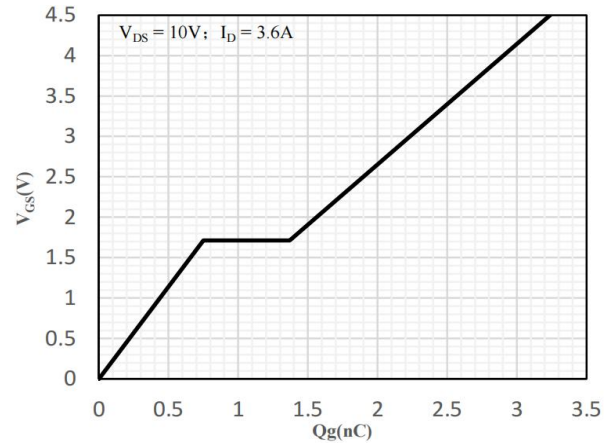


Fig 10 Gate-Charge Characteristics

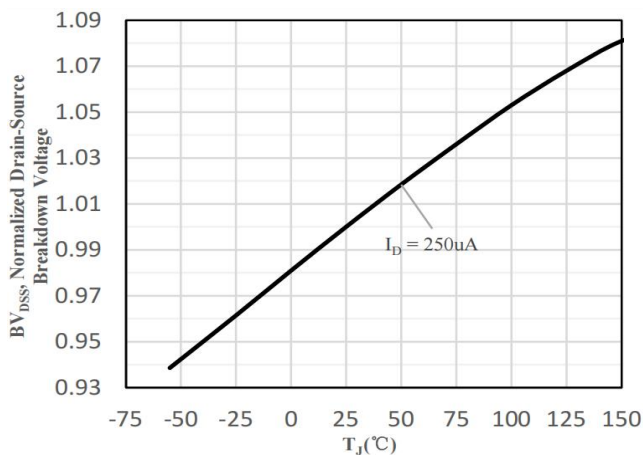


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

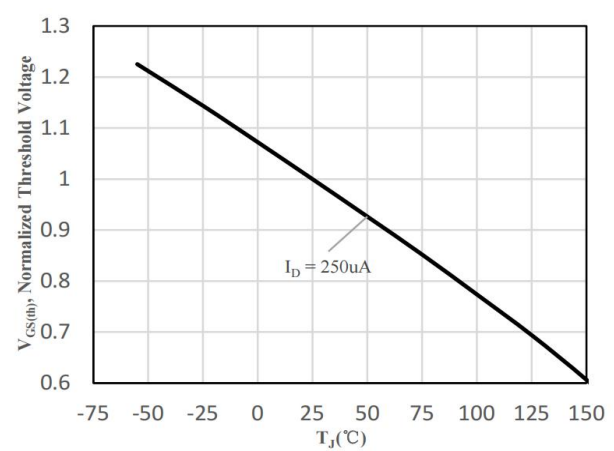


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

P-Channel Typical Characteristics

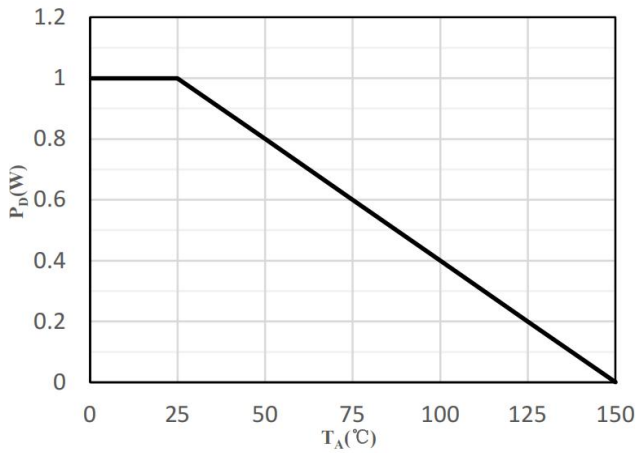


Fig 1 Power Dissipation

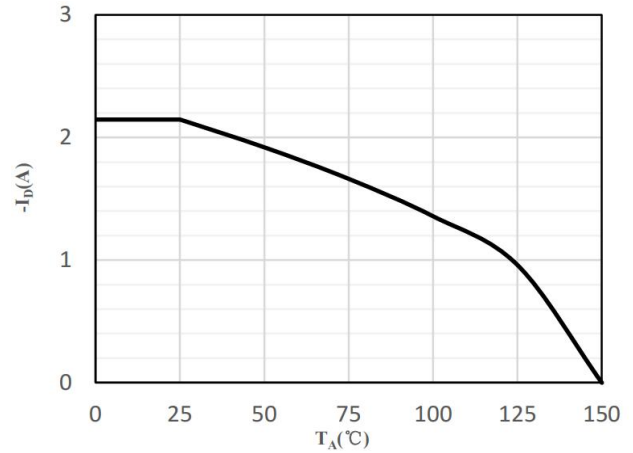


Fig 2 Drain Current

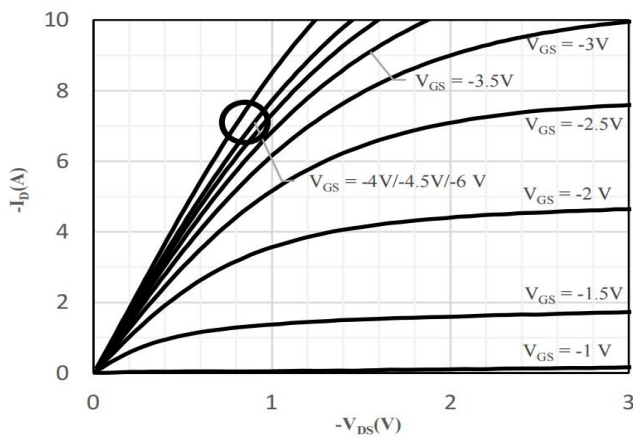


Fig 3 Typical Output Characteristics

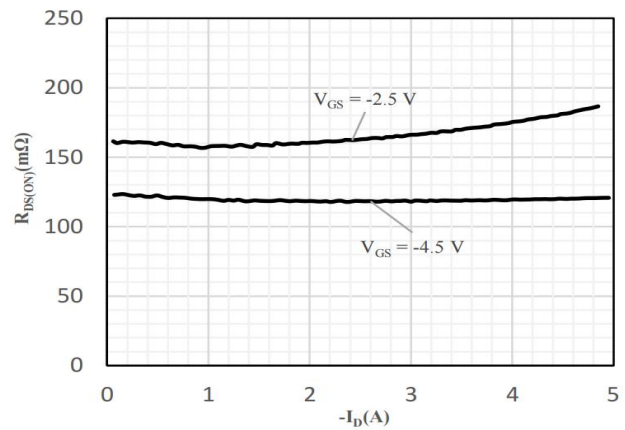


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

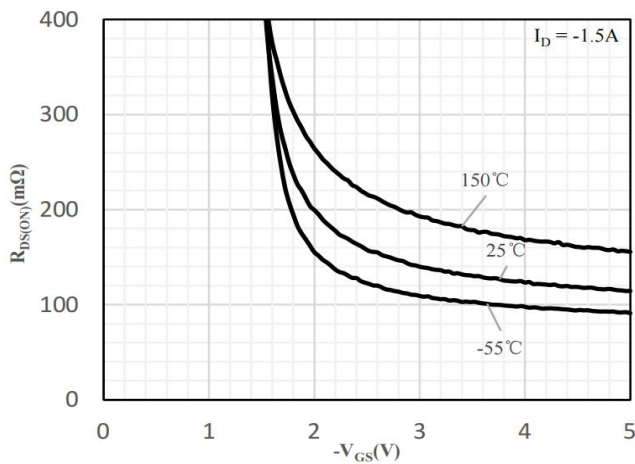


Fig 5 On-Resistance vs. Gate-Source Voltage

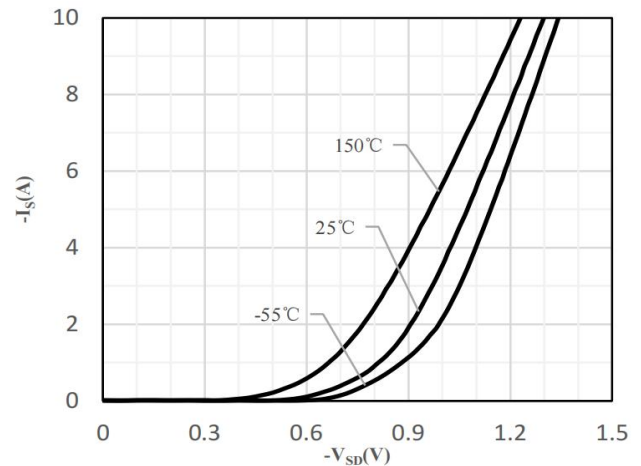


Fig 6 Body-Diode Characteristics

P-Channel Typical Characteristics

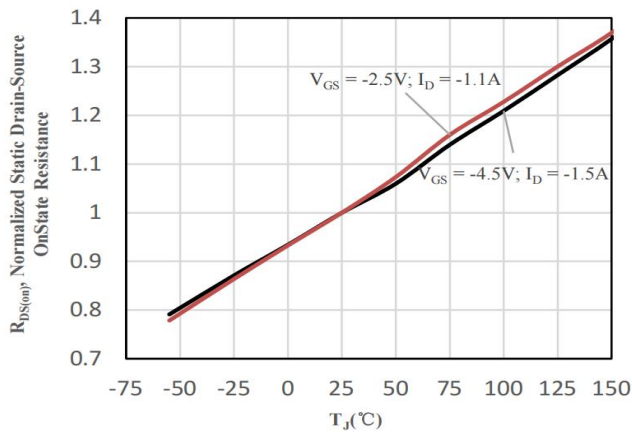


Fig 7 Normalized On-Resistance vs. Junction Temperature

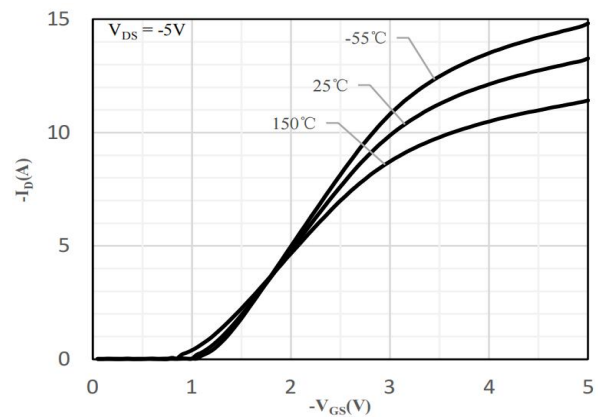


Fig 8 Transfer Characteristics

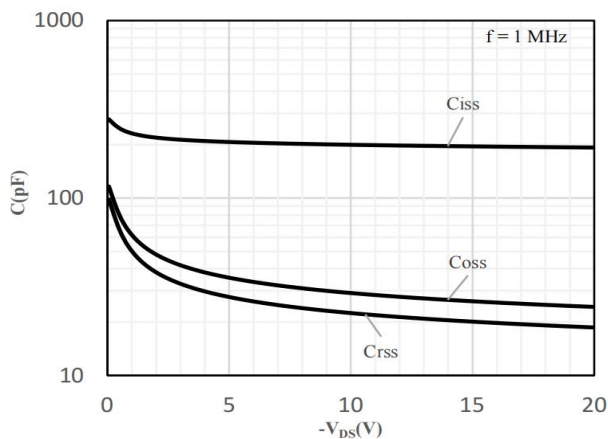


Fig 9 Capacitance Characteristics

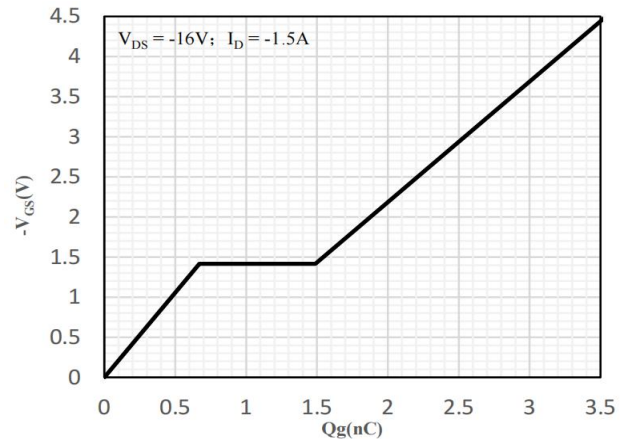


Fig 10 Gate-Charge Characteristics

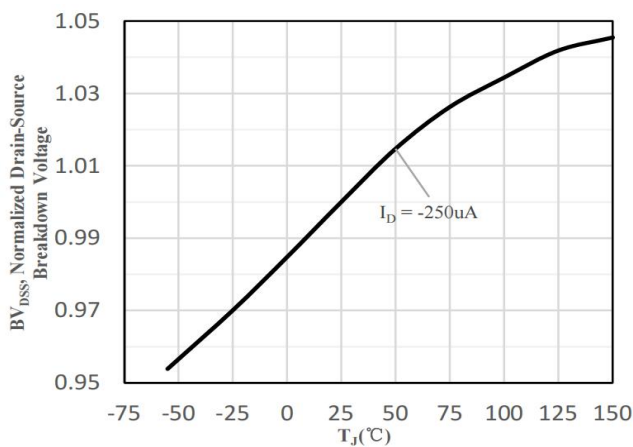


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

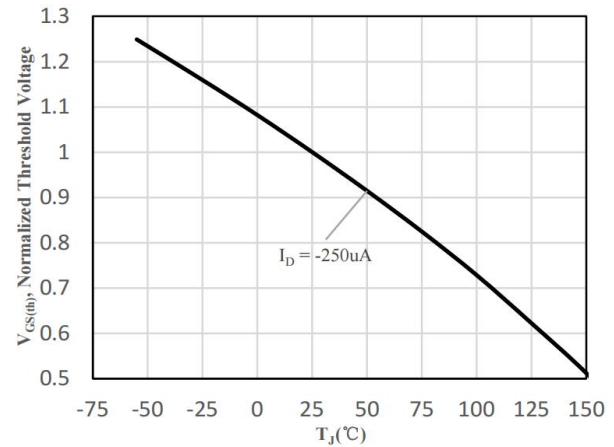
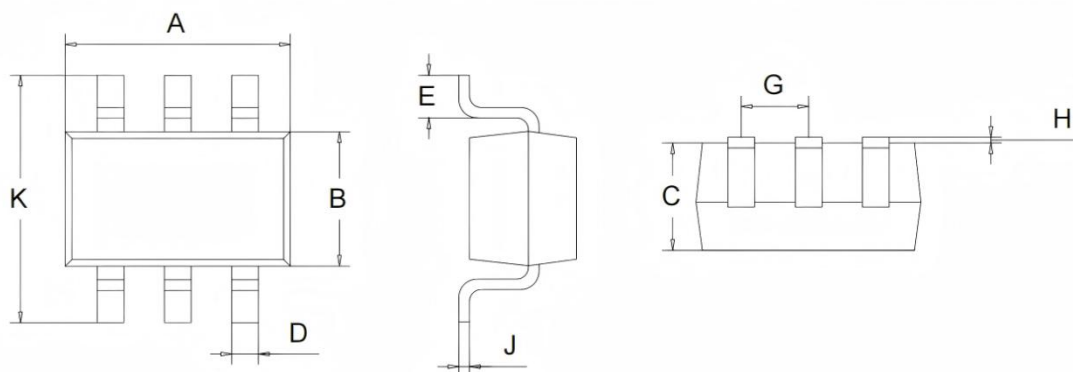


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

SOT-23-6L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.800	3.000	0.110	0.118
B	1.500	1.700	0.059	0.067
C	1.000	1.200	0.039	0.047
D	0.350	0.450	0.014	0.018
E	0.350	0.550	0.014	0.022
G	0.900	1.000	0.035	0.039
H	0.020	0.100	0.001	0.004
J	0.100	0.200	0.004	0.008
K	2.600	3.000	0.102	0.118