

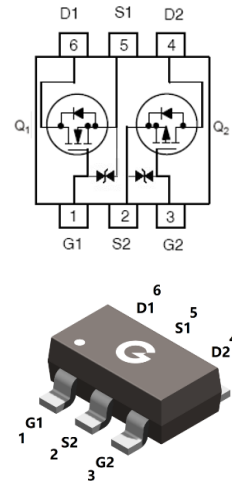
Features

- Low on-resistance
- ESD protected
- High speed switching
- Low leakage current
- HBM: JESD22-A114-B: 2
- RoHS compliant with Halogen-free

HF

Mechanical Data

- Case: SOT-23-6L
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



SOT-23-6L

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
2N7172-6L	SOT-23-6L	3000 pcs / Tape & Reel	7172

Maximum Ratings (@ T_A = 25°C unless otherwise specified)

Parameter	Symbol	Q1	Q2	Unit
Drain-to-Source Voltage	V _{DSS}	60	-60	V
Gate-to-Source Voltage	V _{GSS}	±20	±20	V
Continuous Drain Current (T _A = 25°C) *1	I _D	0.55	-0.35	A
Continuous Drain Current (T _A = 70°C) *1		0.44	-0.28	A
Pulsed Drain Current (t _p = 10μs, T _A = 25°C)	I _{DM}	2.2	-1.4	A
Single Pulse Avalanche Energy *3	E _{AS}	0.11	0.3	mJ
Power Dissipation (T _A = 25°C) *1	P _D	1		W
Operating Junction Temperature Range	T _J	-55 ~ +150		°C
Storage Temperature Range	T _{STG}	-55 ~ +150		°C

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case	R _{θJC}	-	-	70	°C/W
Thermal Resistance Junction-to-Air *1	R _{θJA}	-	-	125	°C/W

Electrical Characteristics-Q₁ (@ T_A = 25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
V _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	60	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 60V, V _{GS} = 0V	-	-	1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±20V, V _{DS} = 0V	-	-	±10	μA
On Characteristics						
R _{DS(ON)}	Drain-Source On-resistance *2	V _{GS} = 10V, I _D = 0.5A	-	1	1.5	Ω
		V _{GS} = 4.5V, I _D = 0.5A	-	1.2	4	Ω
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	1	1.5	2.5	V
Dynamic Characteristics						
g _{fs}	Transconductance	V _{DS} = 10V, I _D = 0.2A	-	0.5	-	S
C _{ISS}	Input Capacitance	V _{GS} = 0V	-	26.7	-	pF
C _{OSS}	Output Capacitance	V _{DS} = 20V	-	7.1	-	
C _{RSS}	Reverse Transfer Capacitance	f = 1.0MHz	-	2.2	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time *4	V _{DD} = 30V, V _{GS} = 10V R _L = 150Ω R _G = 25Ω I _D = 0.2A	-	6	-	nS
t _r	Turn-on Rise Time *4		-	5	-	
t _{d(OFF)}	Turn-Off Delay Time *4		-	25	-	
t _f	Turn-Off Fall Time *4		-	15	-	
Q _G	Total Gate-Charge	V _{DS} = 10V	-	0.44	-	nC
Q _{GS}	Gate to Source Charge	V _{GS} = 4.5V	-	0.14	-	nC
Q _{GD}	Gate to Drain (Miller) Charge	I _D = 0.2A	-	0.2	-	nC
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *2	I _{SD} = 0.3A, V _{GS} = 0V	-	0.85	1.2	V

Electrical Characteristics-Q₂ (@ T_A = 25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
V _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = -250μA	-60	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -60V, V _{GS} = 0V	-	-	-1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±20V, V _{DS} = 0V	-	-	±10	μA
On Characteristics						
R _{DS(ON)}	Drain-Source On-resistance *2	V _{GS} = -10V, I _D = -0.1A	-	1.8	4	Ω
		V _{GS} = -4.5V, I _D = -0.1A	-	2.3	5	
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = -250μA	-1	-1.5	-2	V
Dynamic Characteristics						
g _{fs}	Transconductance	V _{DS} = -10V, I _D = -0.2A	-	0.5	-	S
C _{ISS}	Input Capacitance	V _{GS} = 0V	-	39	-	pF
C _{OSS}	Output Capacitance	V _{DS} = -20V	-	12	-	
C _{RSS}	Reverse Transfer Capacitance	f = 1.0MHz	-	2	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time *4	V _{DS} = -15V R _L = -50Ω I _D = -2.5A	-	2.5	-	ns
t _r	Turn-on Rise Time *4		-	1	-	
t _{d(OFF)}	Turn-Off Delay Time *4		-	16	-	
t _f	Turn-Off Fall Time *4		-	8	-	
Q _G	Total Gate-Charge	V _{DS} = -25V	-	2	-	nC
Q _{GS}	Gate to Source Charge	V _{GS} = -4.5V	-	0.7	-	
Q _{GD}	Gate to Drain (Miller) Charge	I _D = -0.2A	-	0.5	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *2	I _S = -0.2A, V _{GS} = 0 V	-	-0.87	-1.4	V

Notes:

- The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper
- The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%
- The E_{AS} data shows Max. rating. N: The test condition is V_{DD} = 30V, V_{GS} = 10V, L = 0.1mH;
P: The test condition is V_{DD} = -30V, V_{GS} = -10V, L = 0.1mH
- Guaranteed by design, not subject to production

Ratings and Characteristics Curves-Q₁ (@ T_A = 25°C unless otherwise specified)

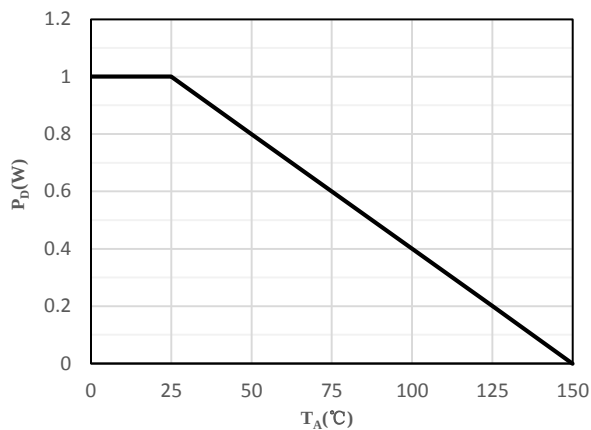


Fig 1 Power Dissipation

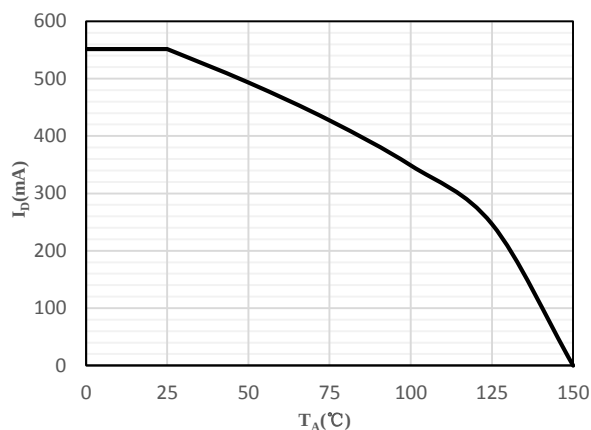


Fig 2 Drain Current

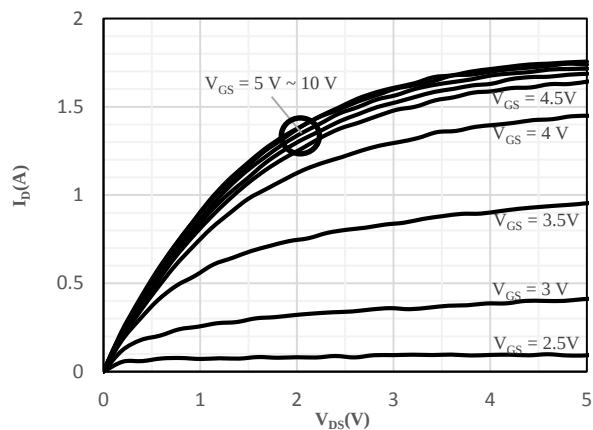
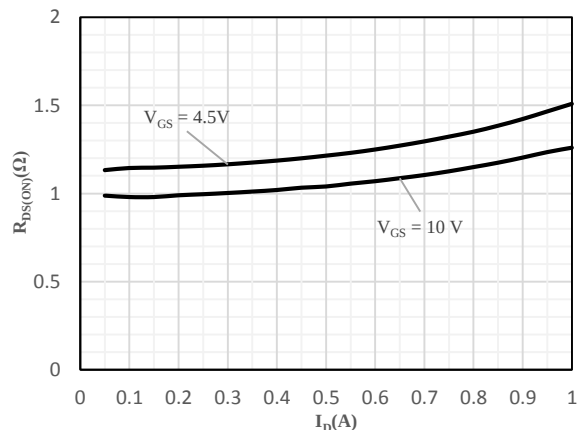


Fig 3 Typical Output Characteristics



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

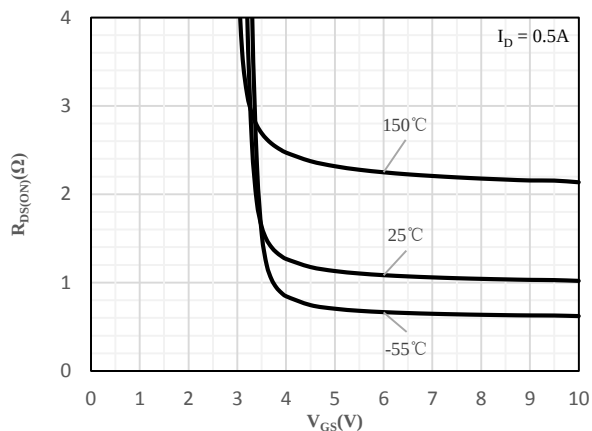


Fig 5 On-Resistance vs. Gate-Source Voltage

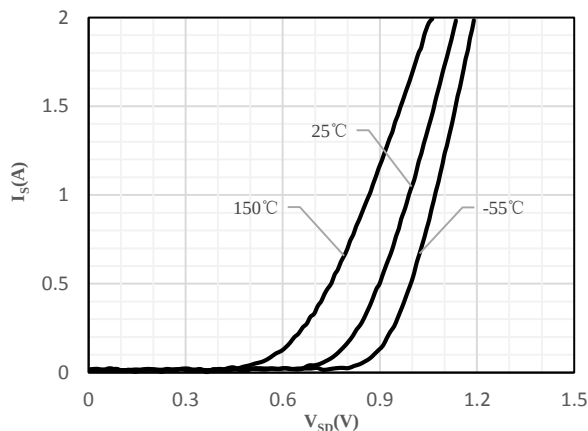


Fig 6 Body-Diode Characteristics

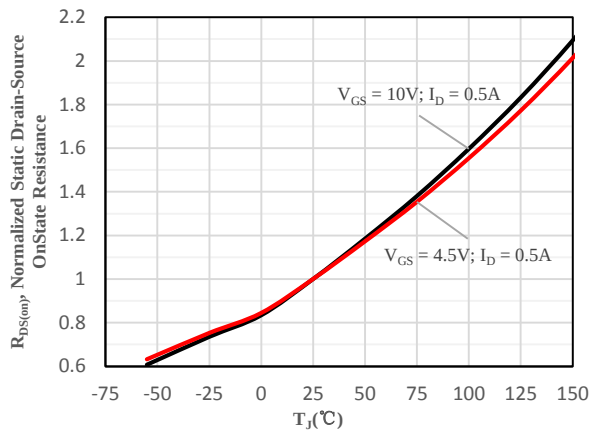


Fig 7 Normalized On-Resistance vs. Junction Temperature

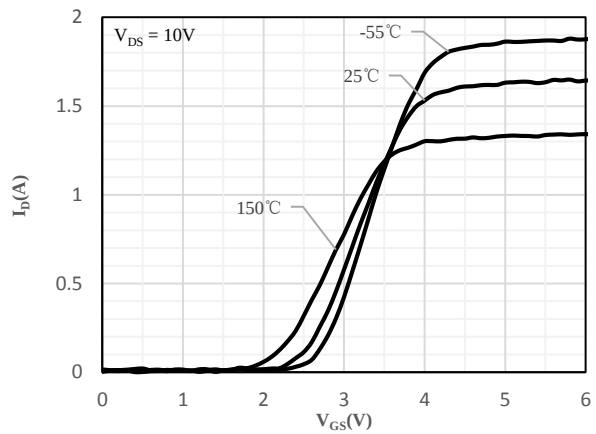


Fig 8 Transfer Characteristics

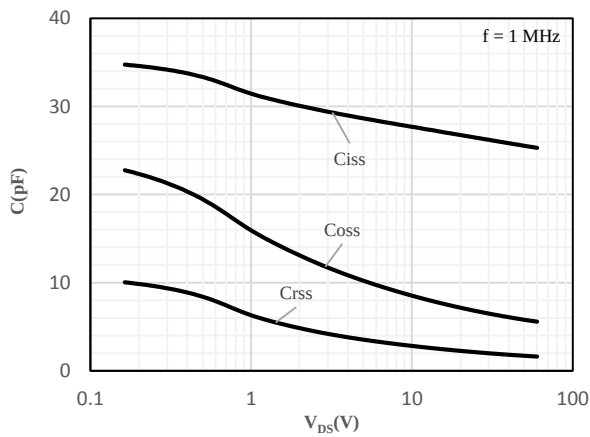


Fig 9 Capacitance Characteristics

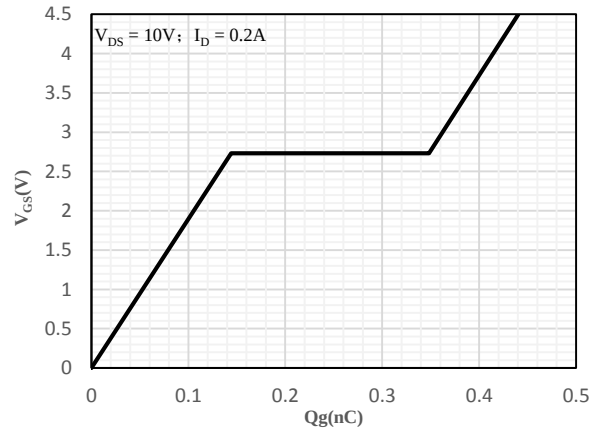


Fig 10 Gate-Charge Characteristics

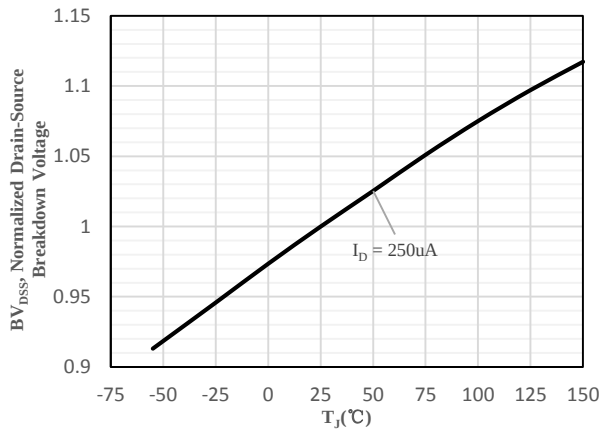


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

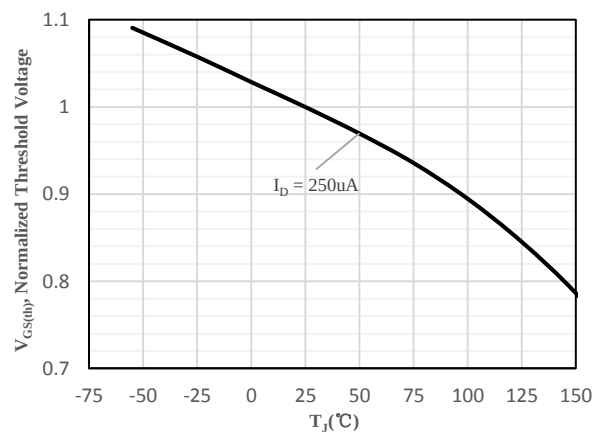


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

Ratings and Characteristics Curves-Q₂ (@ T_A = 25°C unless otherwise specified)

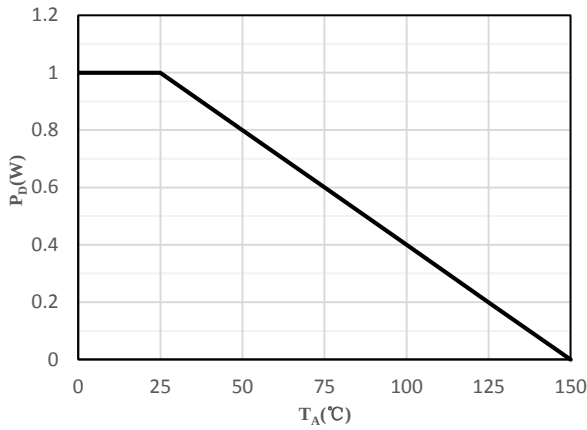


Fig 1 Power Dissipation

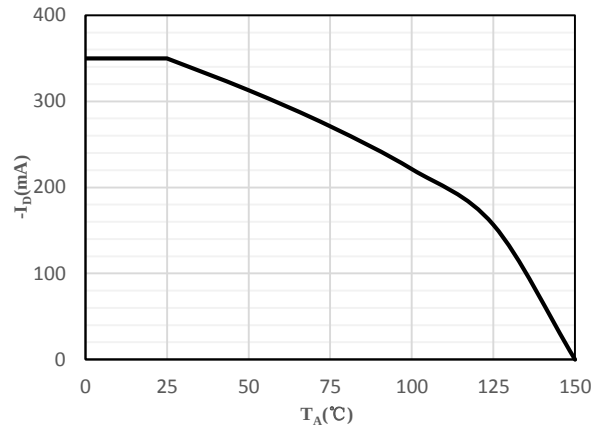


Fig 2 Drain Current

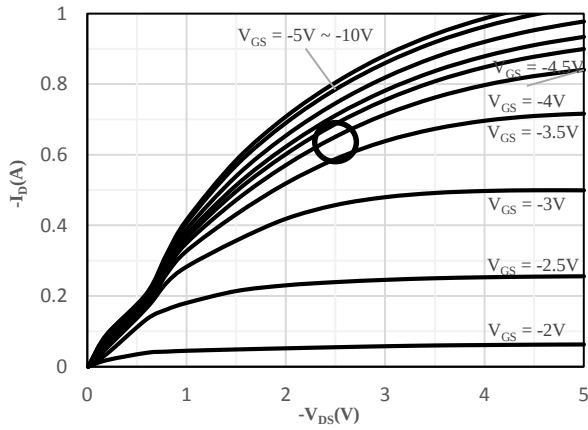


Fig 3 Typical Output Characteristics

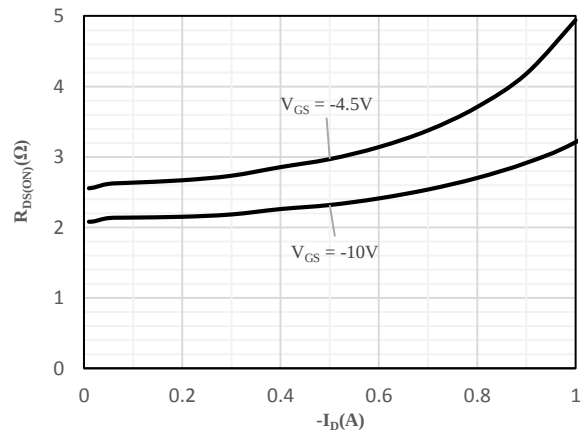


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

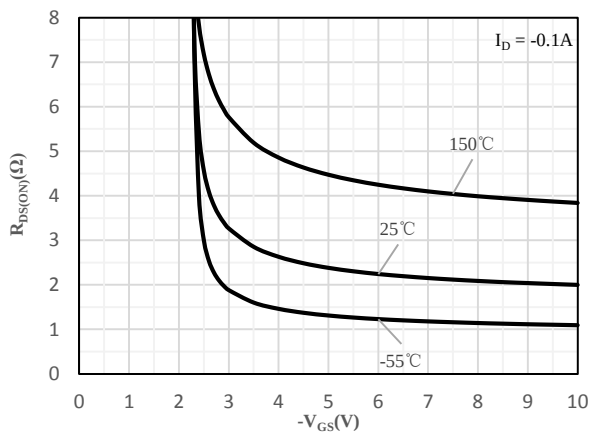


Fig 5 On-Resistance vs. Gate-Source Voltage

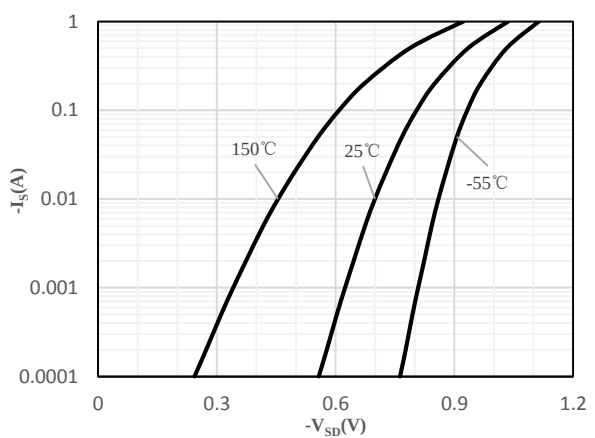


Fig 6 Body-Diode Characteristics

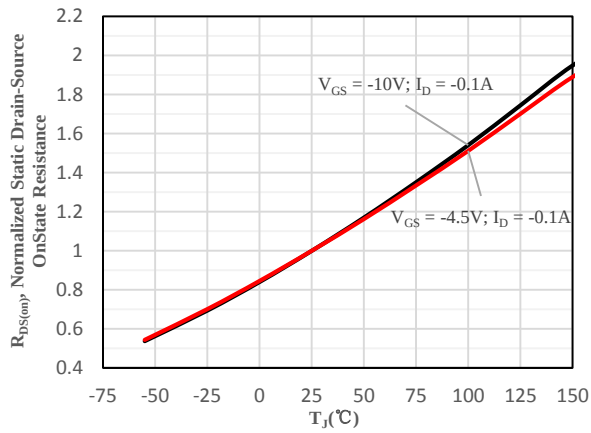


Fig 7 Normalized On-Resistance vs. Junction Temperature

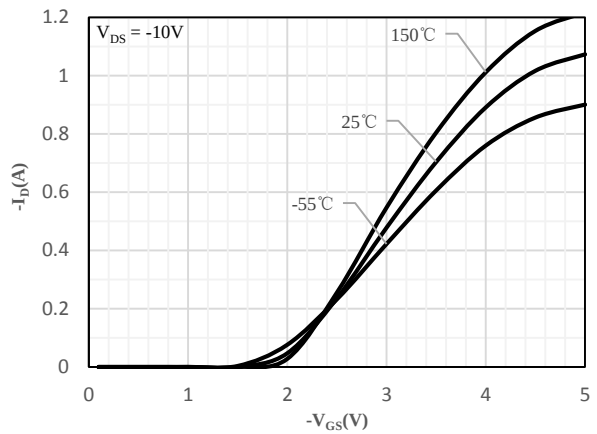


Fig 8 Transfer Characteristics

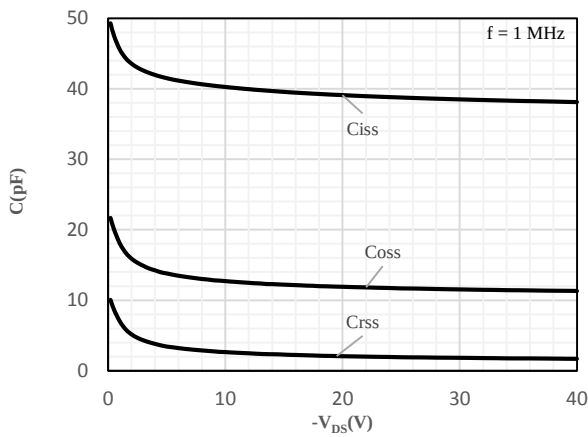


Fig 9 Capacitance Characteristics

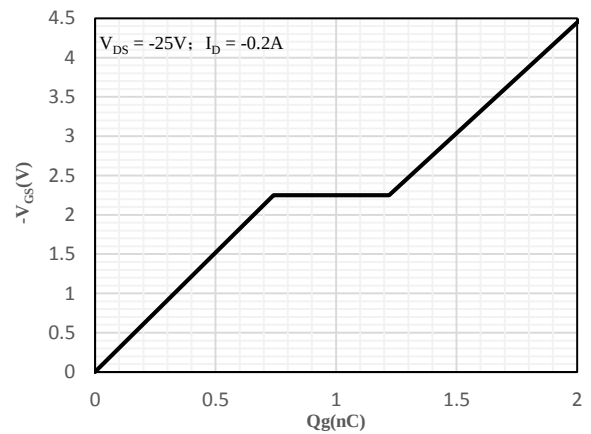


Fig 10 Gate-Charge Characteristics

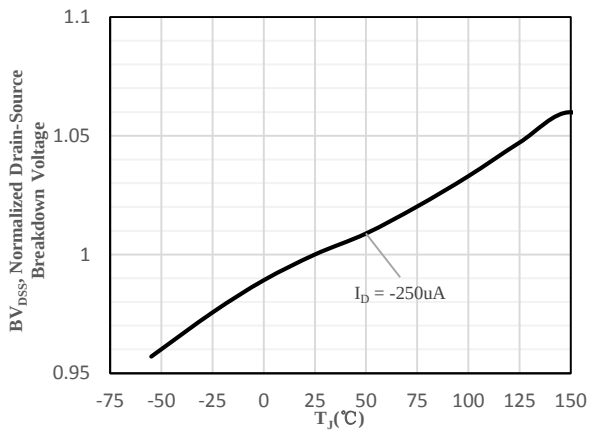


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

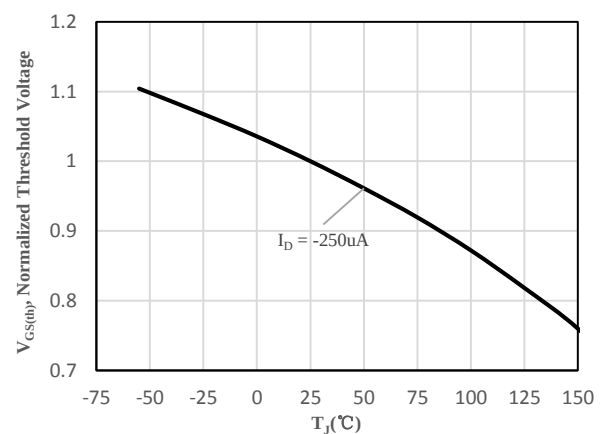
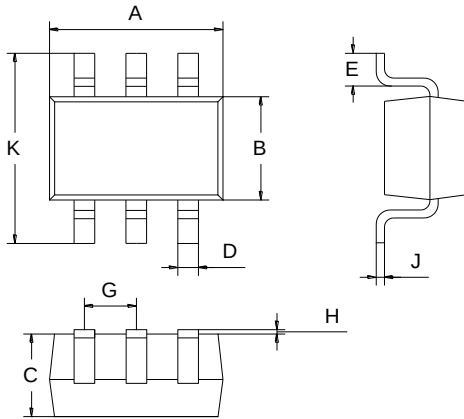


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

Package Outline Dimensions (Unit: mm)



SOT-23-6L		
Dimension	Min.	Max.
A	2.80	3.00
B	1.50	1.70
C	1.00	1.20
D	0.35	0.45
E	0.35	0.55
G	0.90	1.00
H	0.02	0.10
J	0.10	0.20
K	2.60	3.00

Package Outline Dimensions (Unit: mm)

SOT-23-6L

