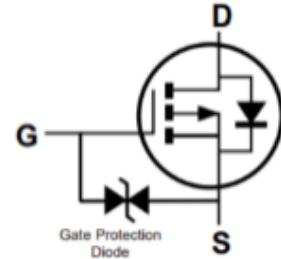




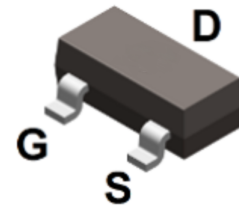
Features

- Low on-resistance
- High-speed switching
- Drive circuits can be simple
- Parallel use is easy
- ESD protected gate up to 1kV HBM



Typical Applications

- P-channel enhancement mode effect transistor
- Switching application



Mechanical Data

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

SOT-23

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
2N7001K	SOT-23	3000 pcs / Tape & Reel	7001K

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	-60	V
Gate -Source Voltage	V _{GSS}	±20	V
Continuous Drain Current (T _C = 25°C)	I _D	-0.3	A
Continuous Drain Current (T _A = 25°C) ^{*1}		-0.2	A
Continuous Drain Current (T _A = 70°C) ^{*1}		-0.16	A
Pulsed Drain Current (t _p = 10μs, T _A = 25°C)	I _{DM}	-1	A
Single Pulse Avalanche Energy ^{*3}	E _{AS}	0.3	mJ
Power Dissipation (T _A = 25°C) ^{*1}	P _D	0.36	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-Air ^{*1}	R _{θJA}	-	330	347	°C/W
Thermal Resistance Junction-to-Case ^{*1}	R _{θJC}	-	185	208	°C/W
Thermal Resistance Junction-to-Lead ^{*1}	R _{θJL}	-	145	175	°C/W

Electrical Characteristics (@ 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 V _{DS} = -20V f = 1.0MHz	-	39	-	pF
C _{OSS}	Output Capacitance		-	12	-	
C _{RSS}	Reverse Transfer Capacitance		-	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 V _{GS} = -4.5V I _D = -0.2A	-	2	-	nC
Q _{GS}	Gate to Source Charge		-	0.7	-	
Q _{GD}	Gate to Drain (Miller) Charge		-	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 minimum recommended pad
- The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%
- The E_{AS} data shows Max. rating. The test condition is V_{DD} = -30V, V_{GS} = -10V, L = 0.1mH
- Guaranteed by design, not subject to production



Ratings and Characteristics Curves (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

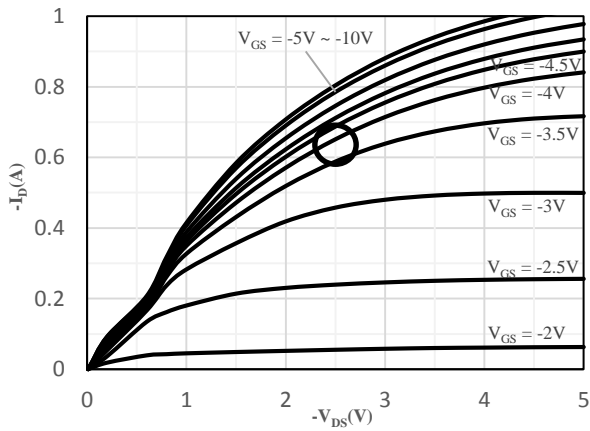


Fig 1 Typical Output Characteristics

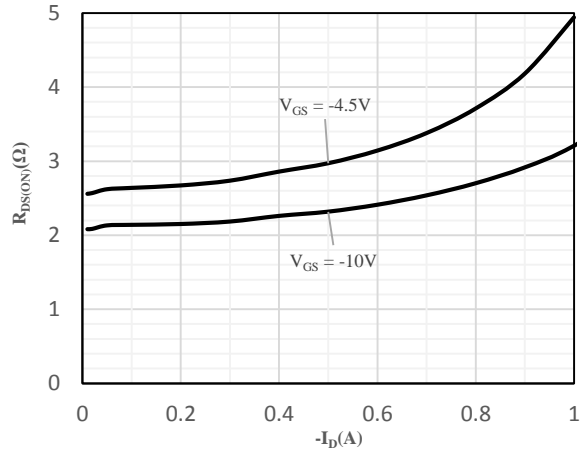


Fig 2 On-Resistance vs. Drain Current and Gate Voltage

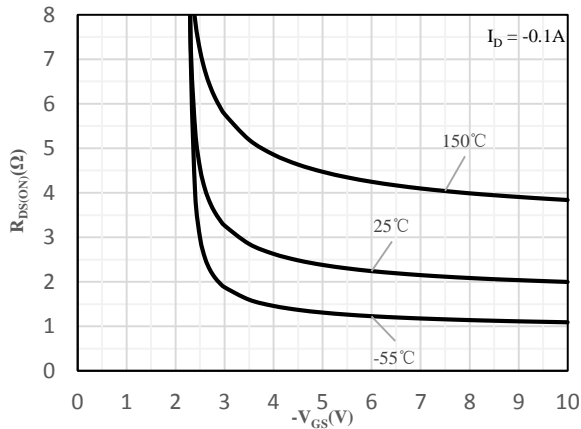


Fig 3 On-Resistance vs. Gate-Source Voltage

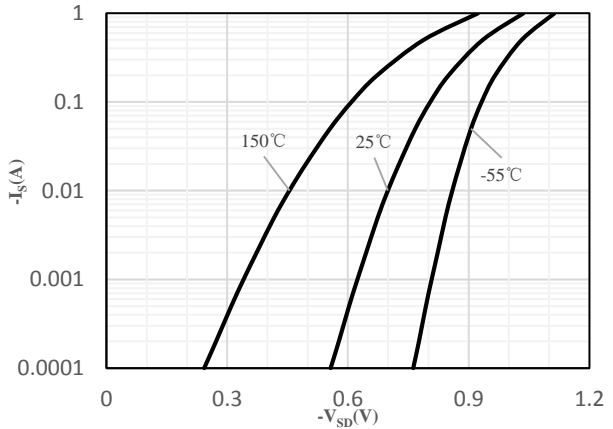


Fig 4 Body-Diode Characteristics

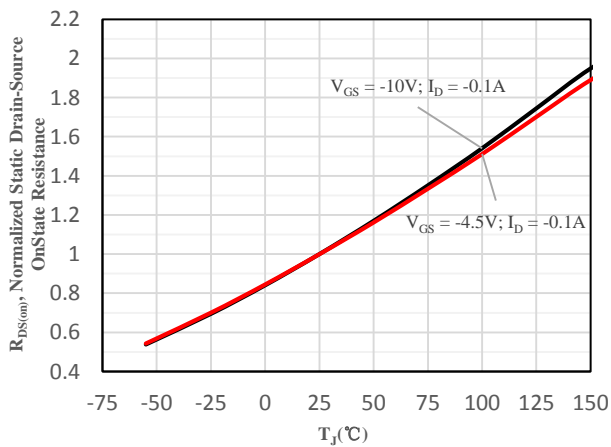


Fig 5 Normalized On-Resistance vs. Junction Temperature

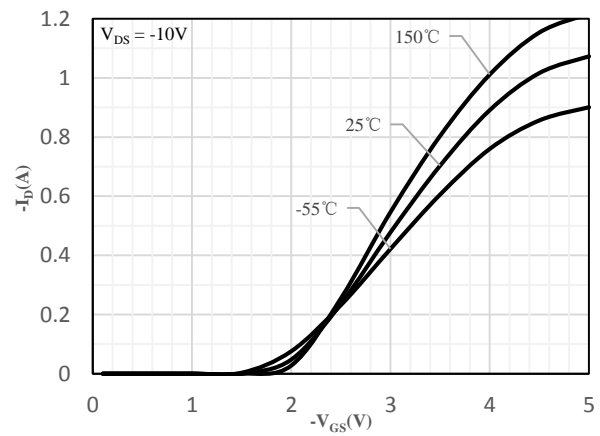


Fig 6 Transfer Characteristics

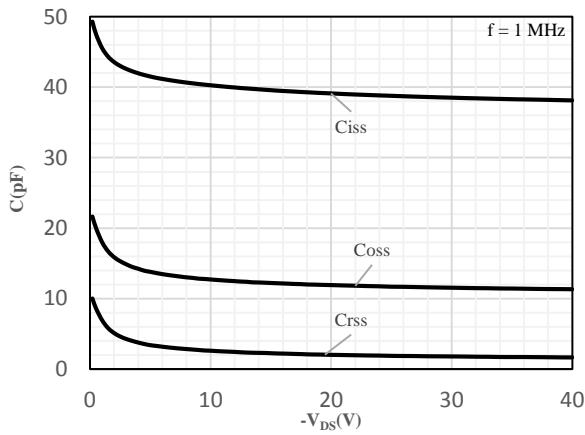


Fig 7 Capacitance Characteristics

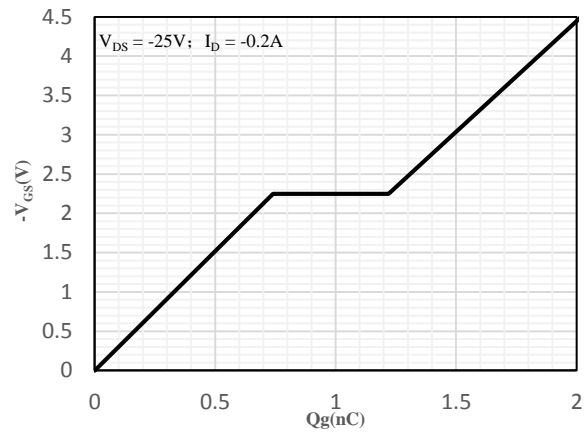


Fig 8 Gate-Charge Characteristics

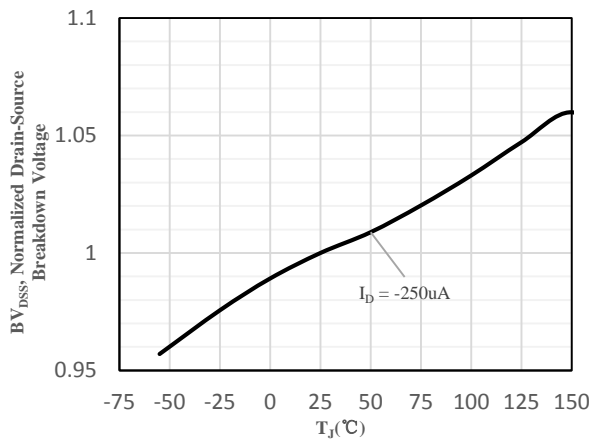


Fig 9 Normalized Breakdown Voltage vs. Junction Temperature

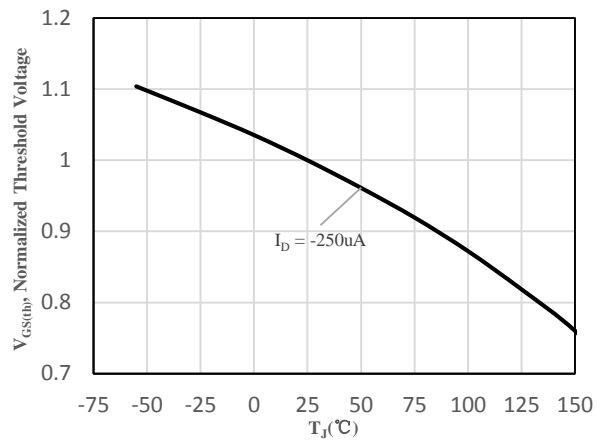


Fig 10 Normalized $V_{GS(th)}$ vs. Junction Temperature

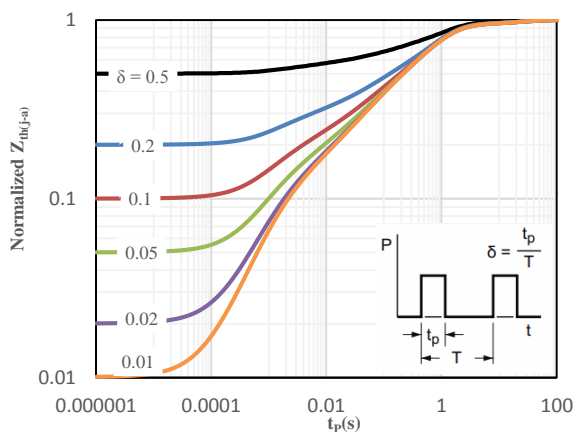
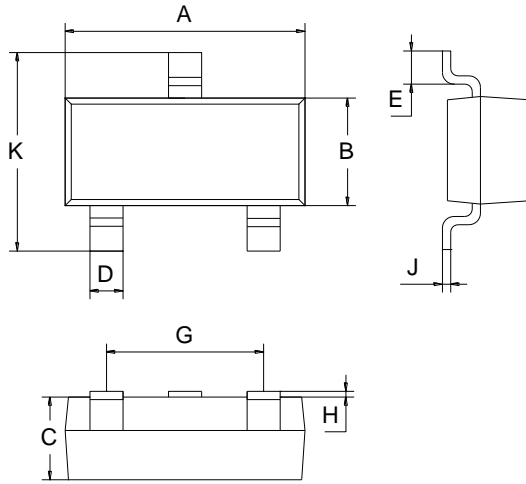


Fig 11 Normalized Maximum transient thermal impedance



Package Outline Dimensions (Unit: mm)

SOT-23



SOT-23		
Dimension	Min.	Max.
A	2.70	3.10
B	1.10	1.50
C	0.90	1.10
D	0.30	0.50
E	0.35	0.48
G	1.80	2.00
H	0.02	0.10
J	0.05	0.15
K	2.20	2.60

Mounting Pad Layout (Unit: mm)

SOT-23

