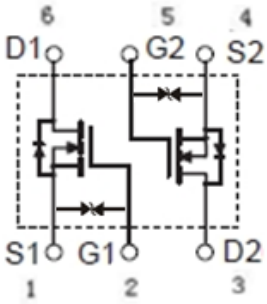
N-Channel Enhancement Mode MOSFET

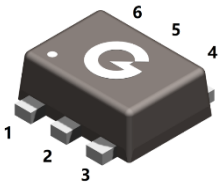
2N7002HV

Features

- Low on-resistance
- ESD protected gate up to 2kV HBM
- High-speed switching
- Drive circuits can be simple
- Parallel use is easy

HF





SOT-563

Typical Applications

- N-channel enhancement mode effect transistor
- Switching application

Mechanical Data

- Case: SOT-563
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte Tin-Plated Leads, Solderability-per MIL-STD-202, Method 208

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
2N7002HV	SOT-563	3000 pcs / Tape & Reel	7002K

Maximum Ratings (@ T_A = 25℃ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	60	V
Gate -Source Voltage	V_{GSS}	±20	V
Continuous Drain Current	I_D	300	mA
Pulsed Drain Current (t_p≤10μs) *4	I_{DM}	800	mA
Power Dissipation *1	P_D	0.25	W

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-to-Air *1	$R_{\theta JA}$	500	°C/W
Thermal Resistance Junction-to-Case *1	$R_{\theta JC}$	342	°C/W
Thermal Resistance Junction-to-Lead *1	$R_{\theta JL}$	280	°C/W
Operating Junction Temperature Range	T_J	-55 ~ +150	°C
Storage Temperature Range	T_{STG}	-55 ~ +150	°C

Electrical Characteristics (@ T_A = 25℃ 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}	Drain to Source Leakage Current	V_{DS} = 60V, V_{GS} = 0V	-	-	1	μA
I_{GSS}	Gate-body Leakage	V_{GS} = ±20V, V_{DS} = 0V	-	-	±10	μA
On Characteristics						
$R_{DS(ON)}$	Drain-Source On-resistance *2	V_{GS} = 5V, I_D = 0.05A	-	1.5	3	Ω
		V_{GS} = 10V, I_D = 0.5A	-	1.45	2.5	
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	1	1.5	2.5	V
Dynamic Characteristics						
C_{ISS}	Input Capacitance	V_{GS} = 0V V_{DS} = 20V f = 1.0MHz	-	47.2	-	pF
C_{OSS}	Output Capacitance		-	7.3	-	
C_{RSS}	Reverse Transfer Capacitance		-	4.7	-	
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time *3	V_{DD} = 30V, I_D = 0.2A V_{GS} = 10V, R_G = 25Ω R_L = 150Ω	-	6	-	ns
t_r	Turn-on Rise Time *3		-	5	-	
$t_{d(off)}$	Turn-Off Delay Time *3		-	25	-	
t_f	Turn-Off Fall Time *3		-	15	-	
Q_G	Total Gate-Charge	V_{DS} = 10V V_{GS} = 4.5V I_D = 0.2A	-	0.44	-	nC
Q_{GS}	Gate to Source Charge		-	0.14	-	nC
Q_{GD}	Gate to Drain (Miller) Charge		-	0.2	-	nC
Source-Drain Diode Characteristics						
V_{SD}	Diode Forward Voltage *2	I_S = 0.3A, V_{GS} = 0V	-	0.85	1.2	V
I_S	Diode Continuous Forward Current	T_C = 25°C	-	-	0.3	A

Notes:

1、 Surface mounted on FR4 board, t ≤ 10 sec

2、 Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%

3、 Guaranteed by design, not subject to production

4、 Pulse width limited by maximum junction temperature

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

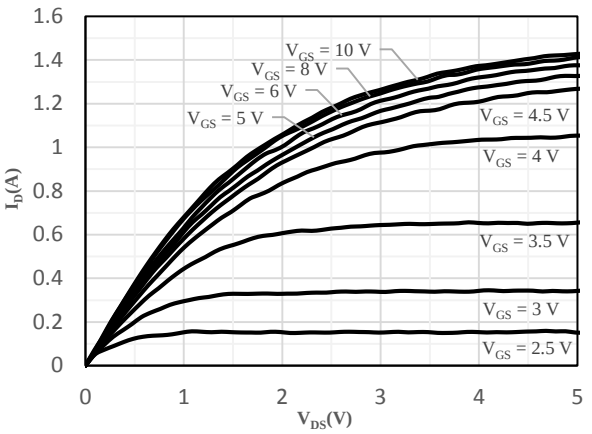


Fig 1 Typical Output Characteristics

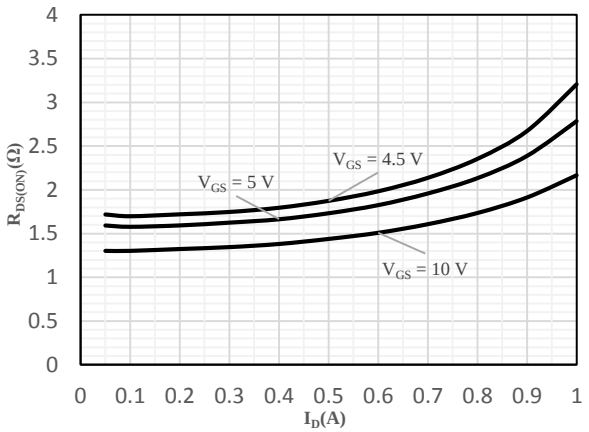


Fig 2 On-Resistance vs. Drain Current and Gate Voltage

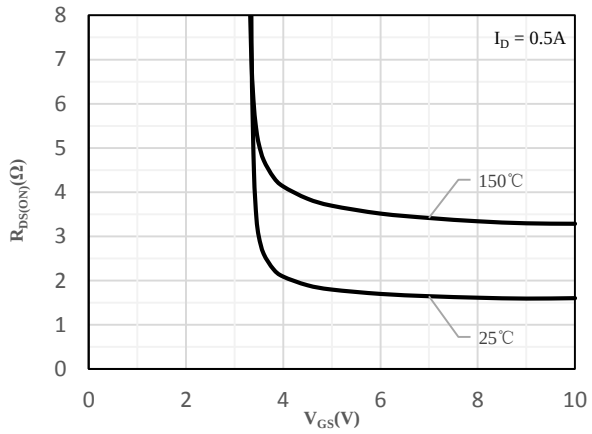


Fig 3 On-Resistance vs. Gate-Source Voltage

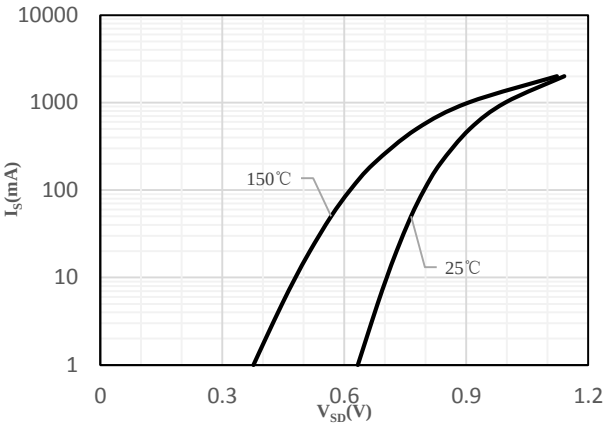


Fig 4 Body-Diode Characteristics

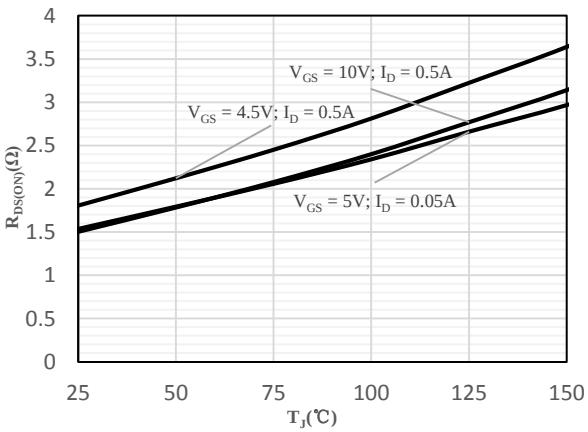


Fig 5 On-Resistance vs. Junction Temperature

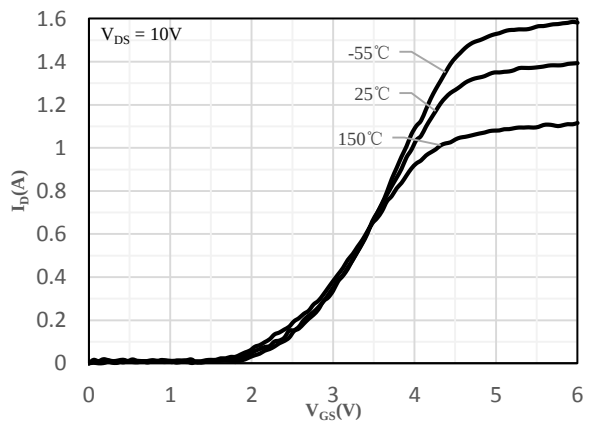


Fig 6 Transfer Characteristics

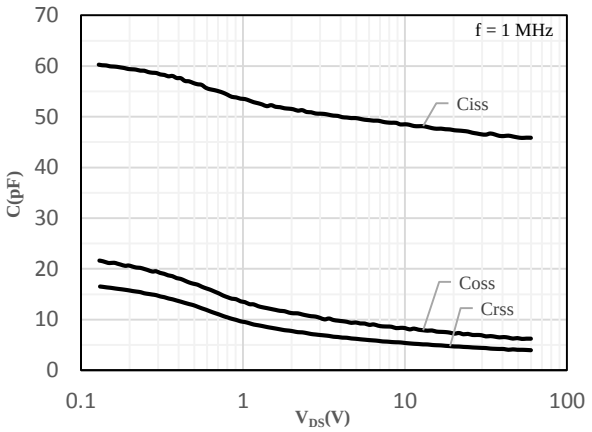


Fig 7 Capacitance Characteristics

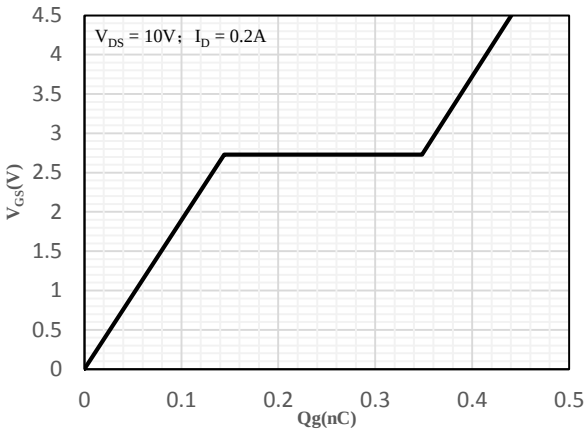


Fig 8 Gate-Charge Characteristics

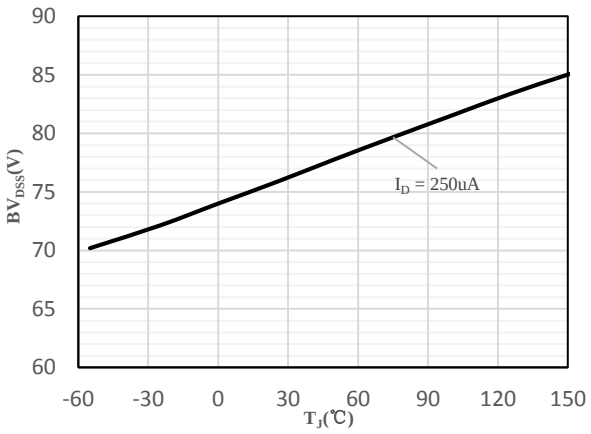


Fig 9 Breakdown Voltage vs. Junction Temperature

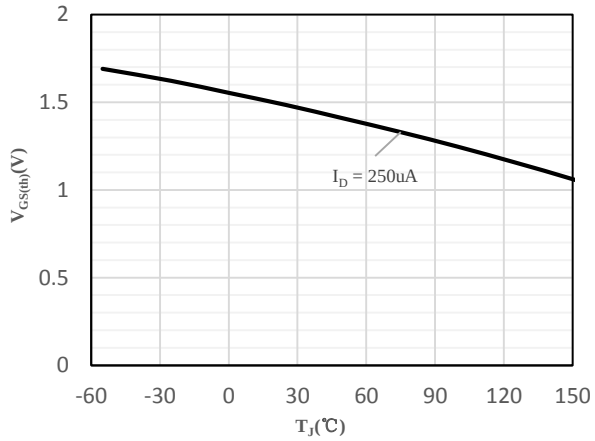
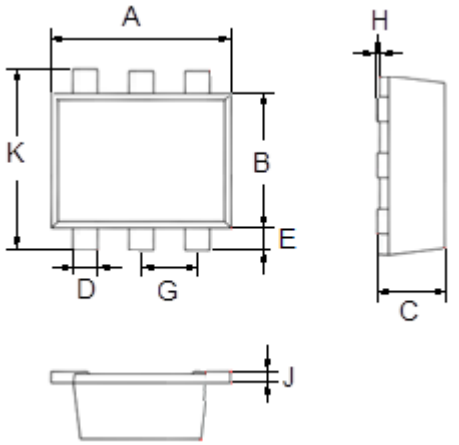


Fig 10 $V_{GS(th)}$ vs. Junction Temperature

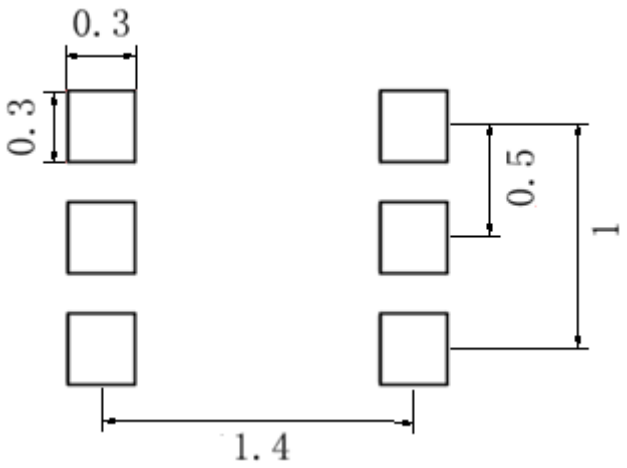
Package Outline Dimensions (Unit: mm)



SOT-563		
Dimension	**Min.**	**Max.**
A	1.500	1.700
B	1.100	1.300
C	0.525	0.600
D	0.170	0.270
E	0.100	0.300
G	0.450	0.550
H	0.000	0.050
J	0.090	0.160
K	1.500	1.700

Mounting Pad Layout (Unit: mm)

SOT-563



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