

### Features

- Low on-resistance
- High-speed switching
- Drive circuits can be simple
- Parallel use is easy
- HBM: JESD22-A114-B: 2

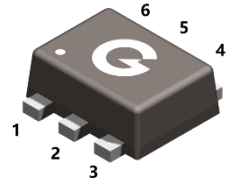
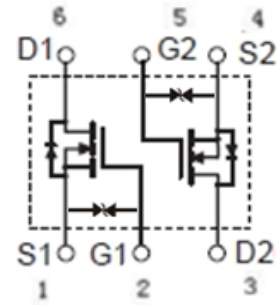
HF

### 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



SOT-563

### Ordering Information

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

### Maximum Ratings (@ T<sub>A</sub> = 25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DSS</sub>	60	V
Gate -Source Voltage	V <sub>GSS</sub>	±20	V
Continuous Drain Current (T <sub>A</sub> = 25°C) <sup>*1</sup>	I <sub>D</sub>	300	mA
Continuous Drain Current (T <sub>A</sub> = 70°C) <sup>*1</sup>		240	mA
Pulsed Drain Current (t <sub>p</sub> = 10μs, T <sub>A</sub> = 25°C)	I <sub>DM</sub>	2000	mA
Single Pulse Avalanche Energy <sup>*3</sup>	E <sub>AS</sub>	0.11	mJ
Power Dissipation (T <sub>A</sub> = 25°C) <sup>*1</sup>	P <sub>D</sub>	0.25	W
Operating Junction Temperature Range	T <sub>J</sub>	-55 ~ +150	°C
Storage Temperature Range	T <sub>STG</sub>	-55 ~ +150	°C

### Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case	R <sub>θJC</sub>	-	-	342	°C/W
Thermal Resistance Junction-to-Air <sup>*1</sup>	R <sub>θJA</sub>	-	-	500	°C/W

### Electrical Characteristics (@ T<sub>A</sub> = 25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
V <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	60	-	-	V
I <sub>DSS</sub>	Drain to Source Leakage Current	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V	-	-	1	μA
I <sub>GSS</sub>	Gate-body Leakage	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	-	-	±10	μA
<b>On Characteristics</b>						
R <sub>DS(ON)</sub>	Drain-Source On-resistance *2	V <sub>GS</sub> = 10V, I <sub>D</sub> = 0.5A	-	1	2.5	Ω
		V <sub>GS</sub> = 5V, I <sub>D</sub> = 0.05A	-	1.1	3	
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 0.5A	-	1.2	4	
V <sub>GS(TH)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	1	1.5	2.5	V
<b>Dynamic Characteristics</b>						
C <sub>ISS</sub>	Input Capacitance	V <sub>GS</sub> = 0V	-	26.7	-	pF
C <sub>OSS</sub>	Output Capacitance	V <sub>DS</sub> = 20V	-	7.1	-	
C <sub>RSS</sub>	Reverse Transfer Capacitance	f = 1.0MHz	-	2.2	-	
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time *4	V <sub>DD</sub> = 30V, I <sub>D</sub> = 0.2A V <sub>GS</sub> = 10V, R <sub>G</sub> = 25Ω R <sub>L</sub> = 150Ω	-	6	-	ns
t <sub>r</sub>	Turn-on Rise Time *4		-	5	-	
t <sub>d(off)</sub>	Turn-Off Delay Time *4		-	25	-	
t <sub>f</sub>	Turn-Off Fall Time *4		-	15	-	
Q <sub>G</sub>	Total Gate-Charge	V <sub>DS</sub> = 10V	-	0.44	-	nC
Q <sub>GS</sub>	Gate to Source Charge	V <sub>GS</sub> = 4.5V	-	0.14	-	nC
Q <sub>GD</sub>	Gate to Drain (Miller) Charge	I <sub>D</sub> = 0.2A	-	0.2	-	nC
<b>Source-Drain Diode Characteristics</b>						
V <sub>SD</sub>	Diode Forward Voltage *2	I <sub>S</sub> = 0.3A, V <sub>GS</sub> = 0V	-	0.85	1.2	V

Notes:

- The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper
- The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%
- The E<sub>AS</sub> data shows Max. rating. The test condition is V<sub>DD</sub> = 30V, V<sub>GS</sub> = 10V, L = 0.1mH
- Guaranteed by design, not subject to production

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

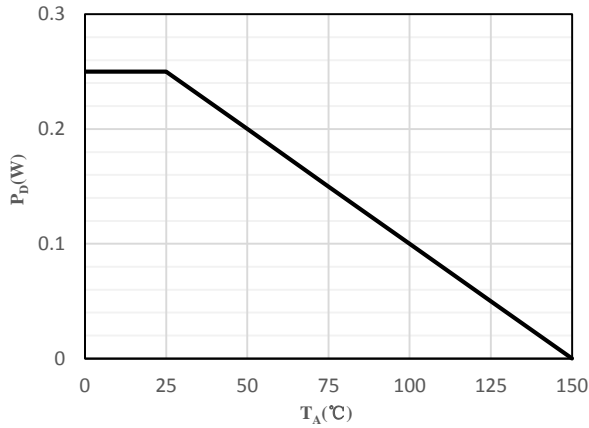


Fig 1 Power Dissipation

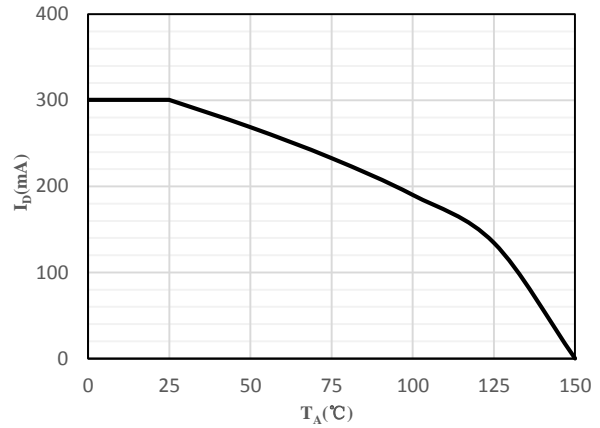


Fig 2 Drain Current

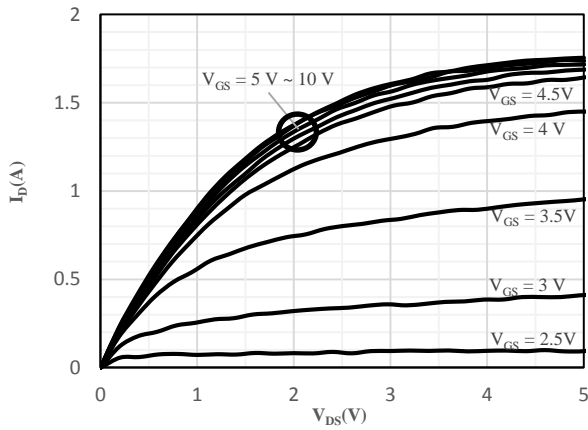


Fig 3 Typical Output Characteristics

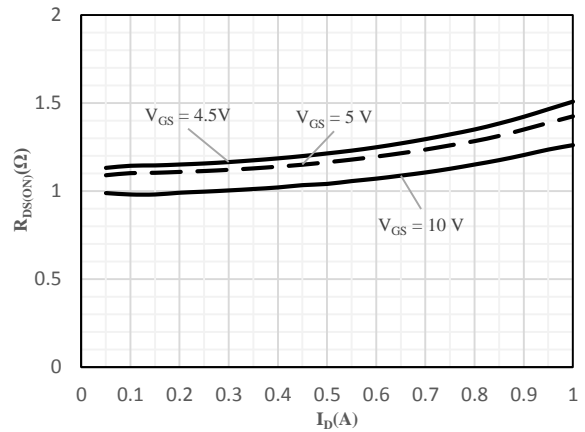


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

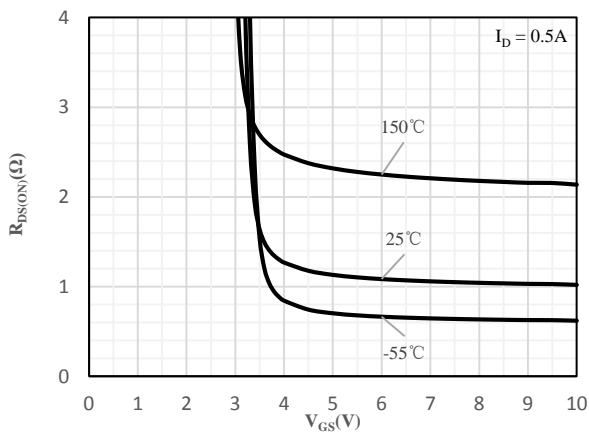


Fig 5 On-Resistance vs. Gate-Source Voltage

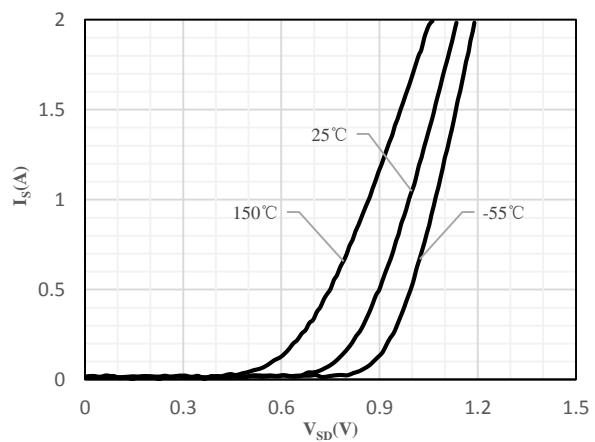


Fig 6 Body-Diode Characteristics

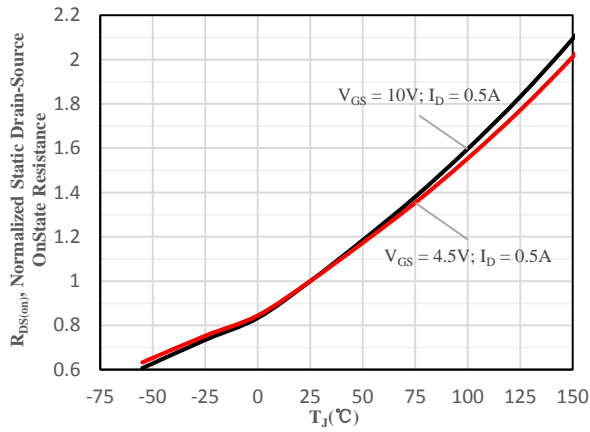


Fig 7 Normalized On-Resistance vs. Junction Temperature

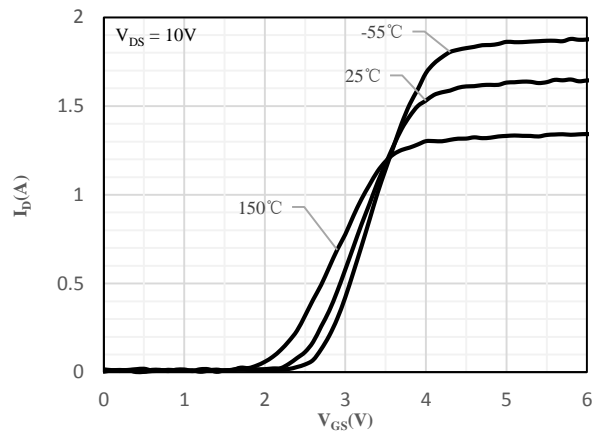


Fig 8 Transfer Characteristics

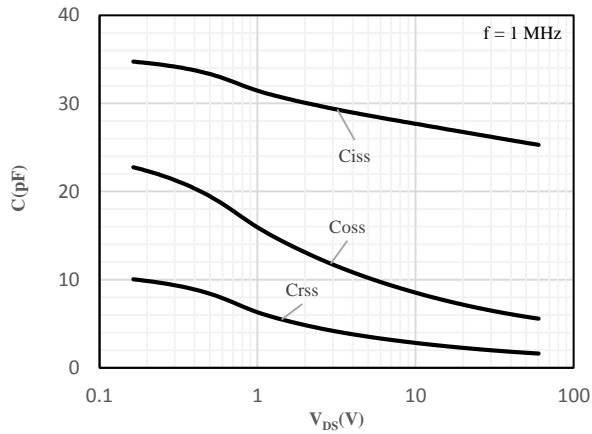


Fig 9 Capacitance Characteristics

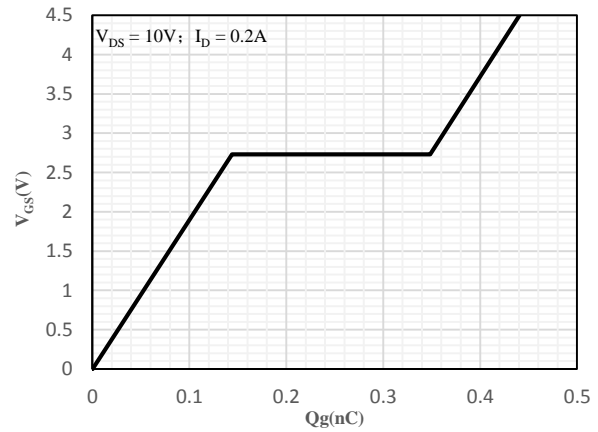


Fig 10 Gate-Charge Characteristics

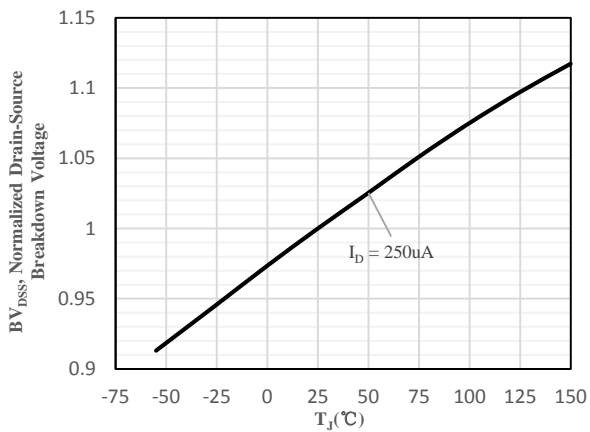


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

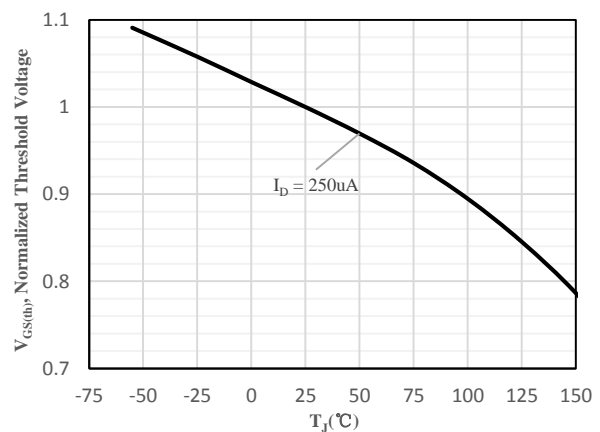


Fig 12 Normalized  $V_{GS(th)}$  vs. Junction Temperature

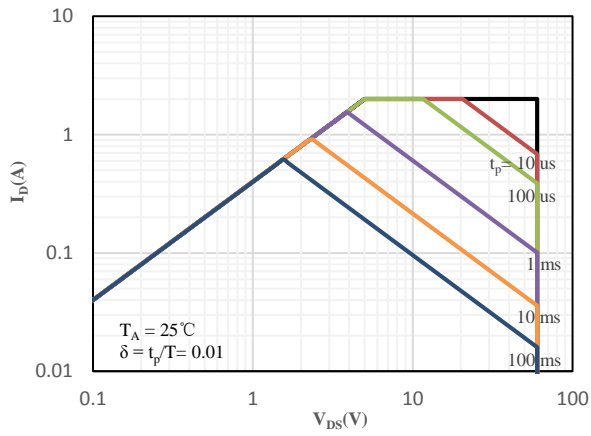


Fig 13 Safe Operating Area

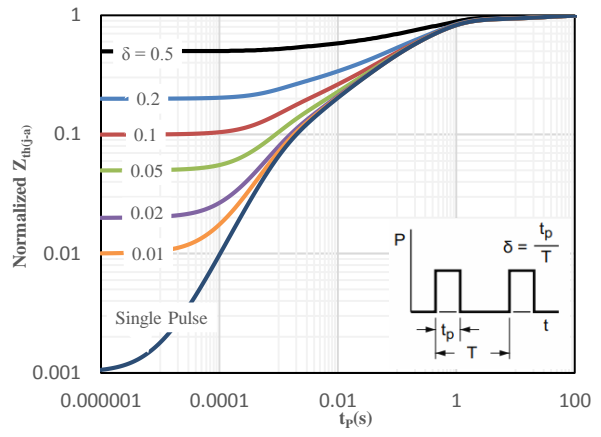
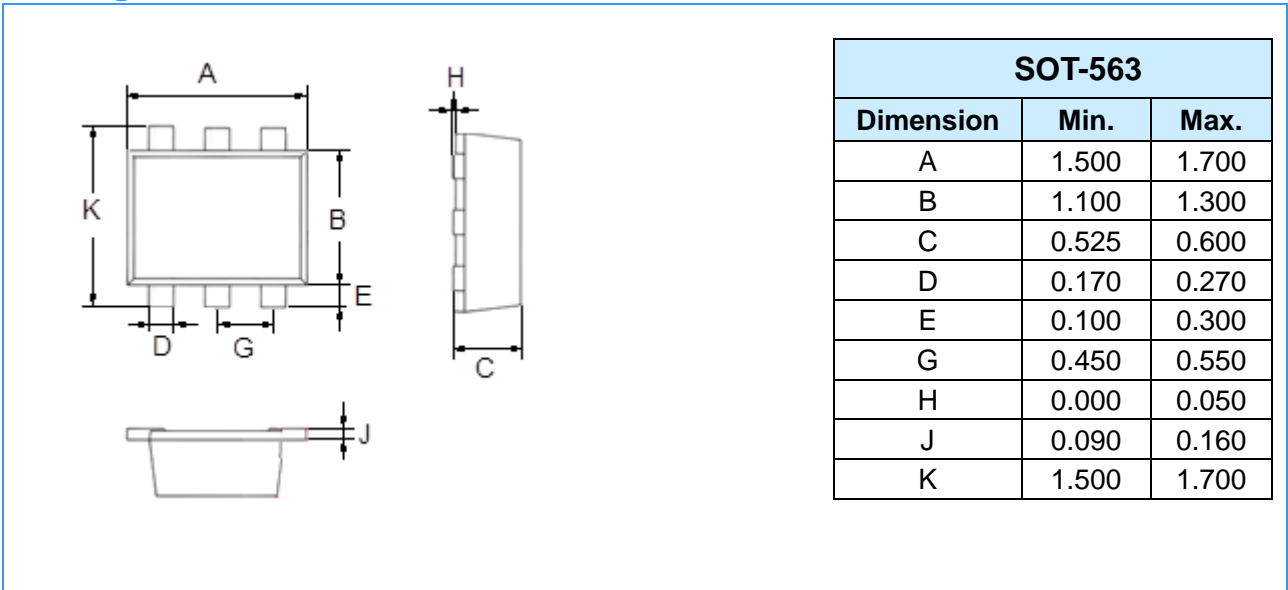
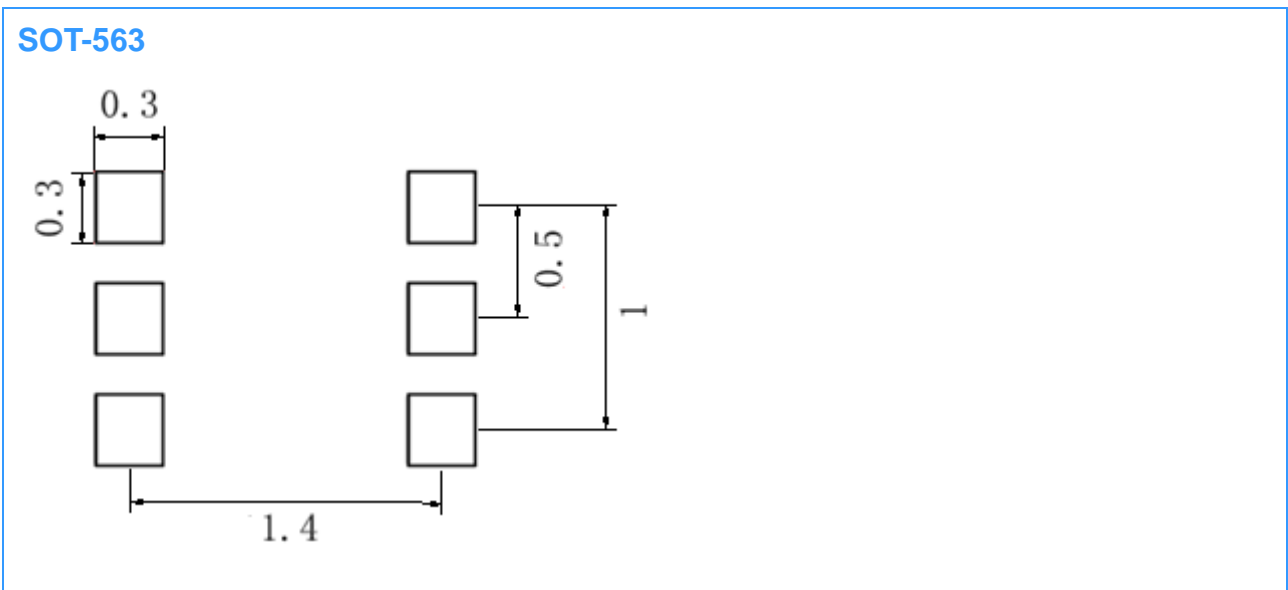


Fig 14 Normalized Maximum transient thermal impedance

**Package Outline Dimensions** (Unit: mm)



**Mounting Pad Layout** (Unit: mm)



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