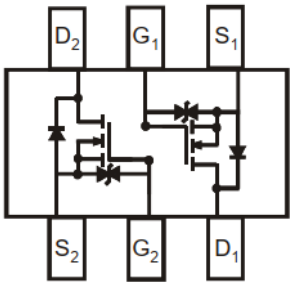
Dual N-Channel Enhancement Mode MOSFET

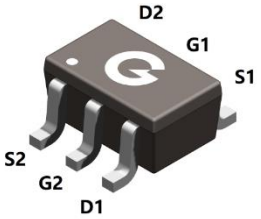
2N5003DW

Features

- Low on-resistance
- High-speed switching
- Drive circuits can be simple
- Parallel use is easy
- JESD22-A114-B: 2
- RoHS compliant with Halogen-free

HF





SOT-363

Typical Applications

- N-channel enhancement mode effect transistor
- Switching application

Mechanical Data

- Case: SOT-363
- 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
2N5003DW	SOT-363	3000 pcs / Tape & Reel	5003

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

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DSS}	50	V
Gate-to-Source Voltage	V_{GSS}	±20	V
Continuous Drain Current *1	I_D	300	mA
Pulsed Drain Current (t_p = 10μs)	I_{DM}	2000	mA
Power Dissipation (T_A = 25°C) *1	P_D	0.31	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	$R_{\theta JA}$	-	-	400	°C/W

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

Symbol	Parameter	Test conditions	MIN	TYP	MAX	UNIT
OFF Characteristics						
V_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0V,I_D = 250μA	50	-	-	V
I_{DSS}	Drain to Source Leakage Current	V_{DS} = 50V, 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} = 10V, I_D = 0.5A	-	1.1	1.5	Ω
		V_{GS} = 4.5V, I_D = 0.2A	-	1.2	2.5	
		V_{GS} = 2.5V, I_D = 0.2A	-	1.6	2.9	
		V_{GS} = 1.8V, I_D = 0.05A	-	2.8	4.0	
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250uA	0.5	0.8	1.0	V
R_G	Gate Resistance	V_{GS} = 0V, f = 1MHz	-	34	-	Ω
Dynamic Characteristics						
C_{ISS}	Input Capacitance	V_{GS} = 0V V_{DS} = 20V f = 1.0MHz	-	44	-	pF
C_{OSS}	Output Capacitance		-	10	-	
C_{RSS}	Reverse Transfer Capacitance		-	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_{DD} = 25V V_{GS} = 10V I_D = 0.2A	-	4.3	-	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 = 0.3A, V_{GS} = 0V	-	0.85	1.2	V

Notes:

1. The data tested by surface mounted on a FR-4 board
2. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%
3. Guaranteed by design, not subject to production

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

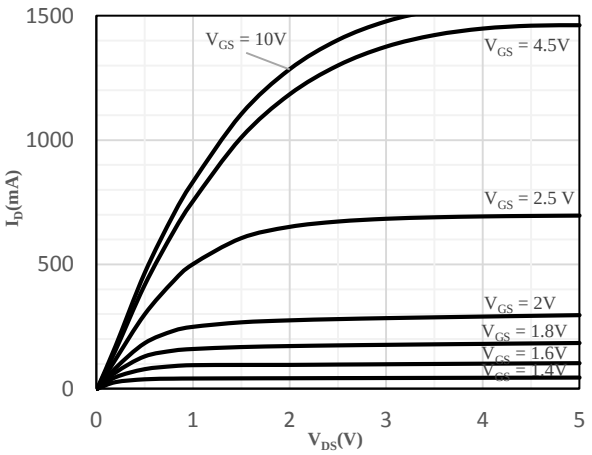


Fig 1 Typical Output Characteristics

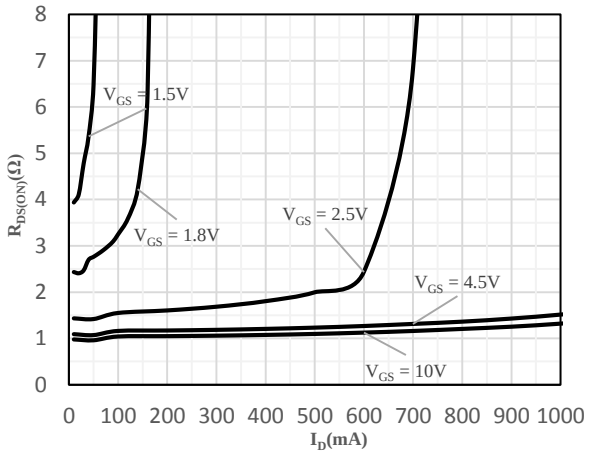


Fig 2 On-Resistance vs. Drain Current and Gate Voltage

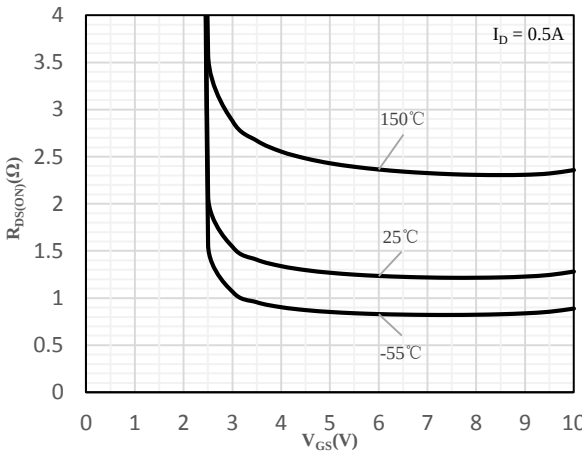


Fig 3 On-Resistance vs. Gate-Source Voltage

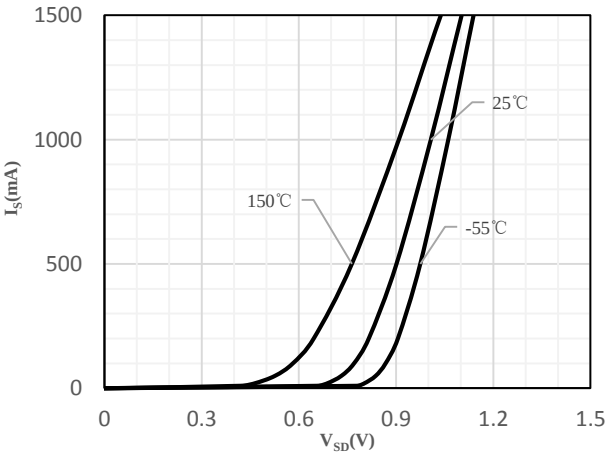


Fig 4 Body-Diode Characteristics

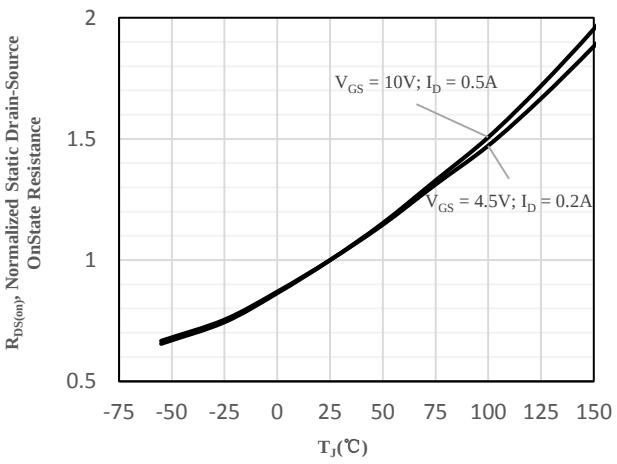


Fig 5 Normalized On-Resistance vs. Junction Temperature

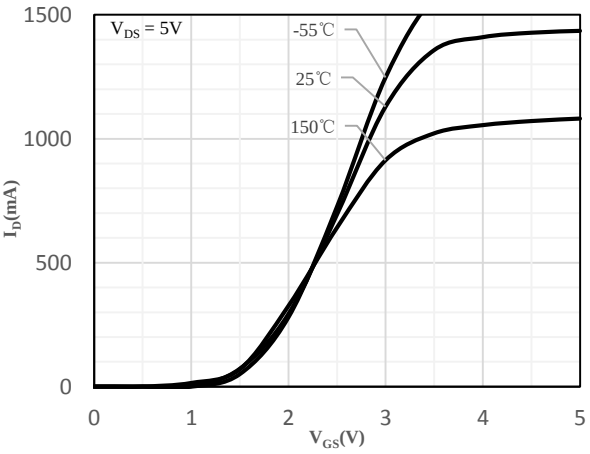


Fig 6 Transfer Characteristics

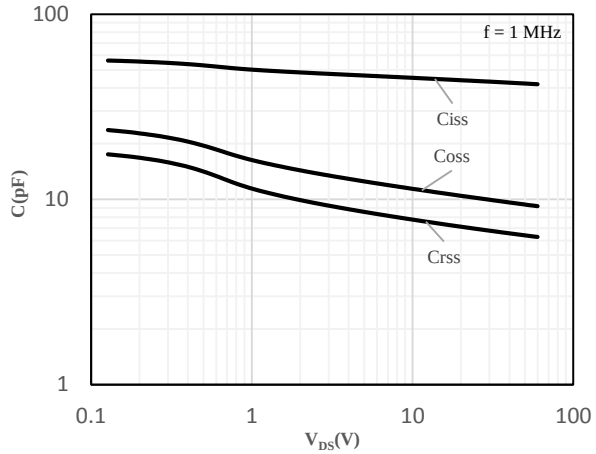


Fig 7 Capacitance Characteristics

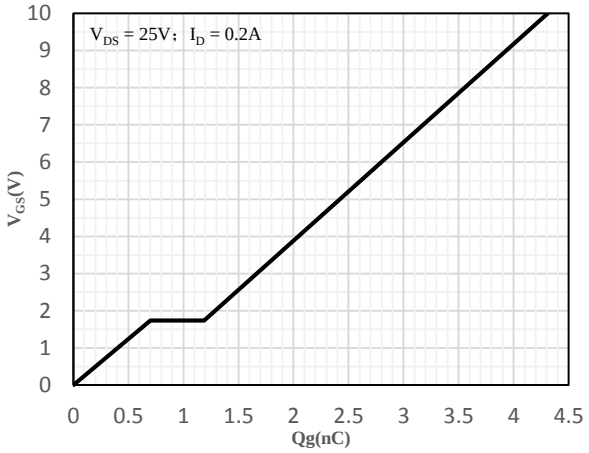


Fig 8 Gate-Charge Characteristics

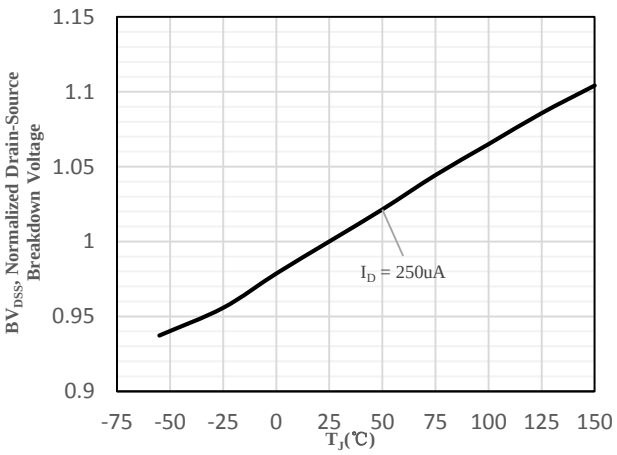


Fig 9 Normalized Breakdown Voltage vs. Junction Temperature

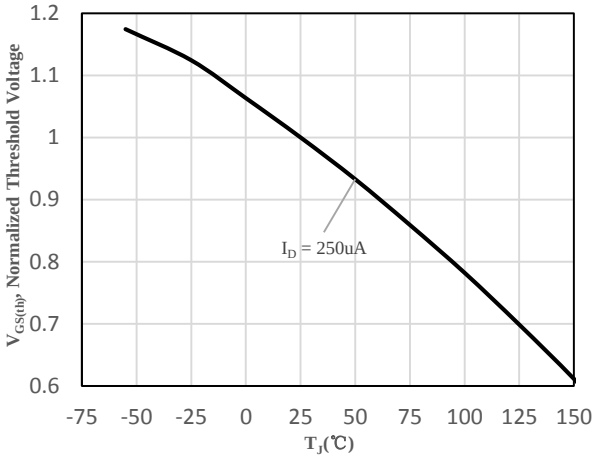


Fig 10 Normalized $V_{GS(th)}$ vs. Junction Temperature

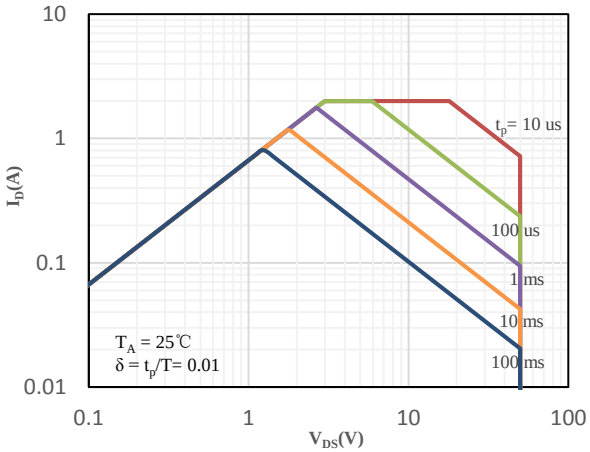


Fig 11 Safe Operation Area

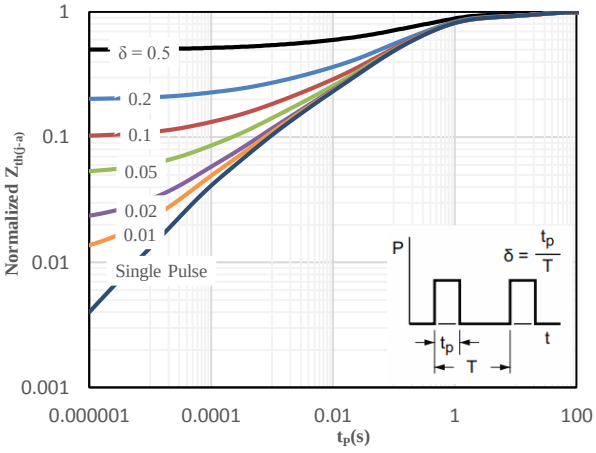
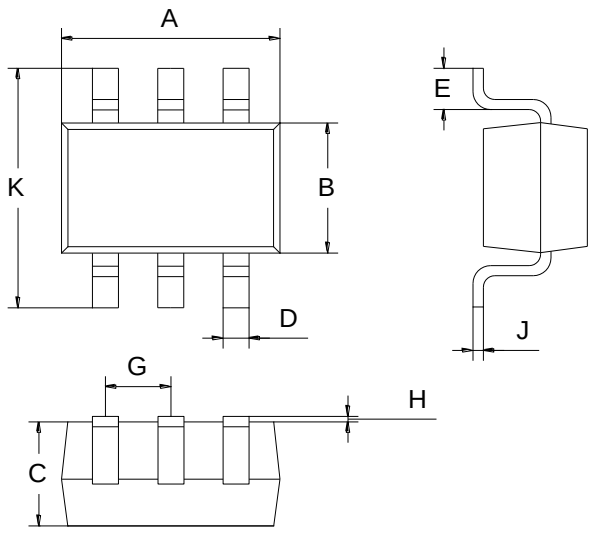


Fig 12 Normalized Maximum transient thermal impedance

Package Outline Dimensions (Unit: mm)



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Dimension	**Min.**	**Max.**
A	2.00	2.20
B	1.15	1.35
C	0.85	1.05
D	0.15	0.35
E	0.25	0.40
G	0.60	0.70
H	0.02	0.10
J	0.05	0.15
K	2.20	2.40

Mounting Pad Layout (Unit: mm)

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