Micro Commercial Components
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2N7002

N-Channel Enhancement-Mode MOSFET

Features

- Advanced Trench Process Technology
- High Input Impedance
- High-Speed Switching
- CMOS Logic Compatible Input
- Marking Code: 7002

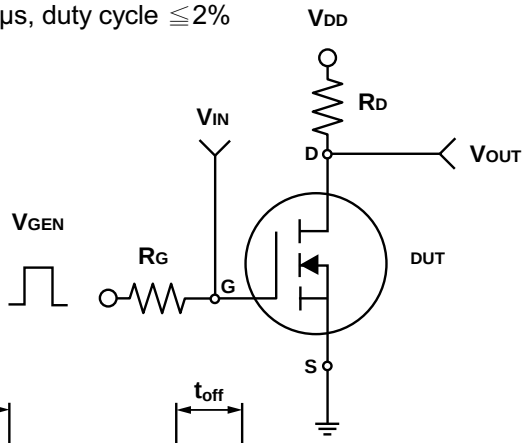
Maximum Ratings

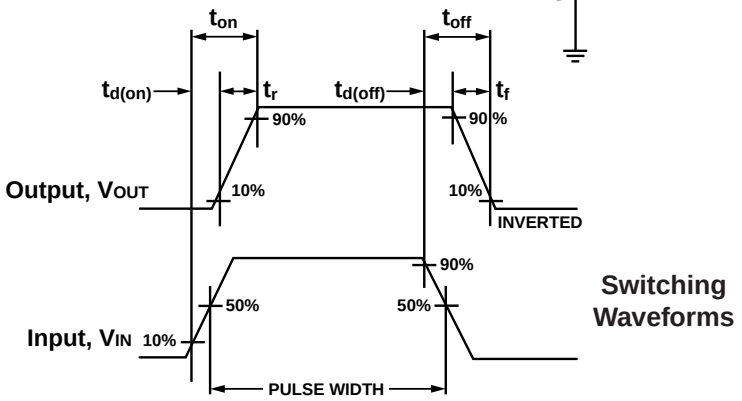
- Operating Temperature: -55°C to +150°C
- Storage Temperature: -55°C to +150°C
- Maximum Thermal Resistance; 417°C/W Junction To Ambient

Parameter	Symbol	Value	Condition
Drain-Source-Voltage	V_{DS}	60V	
Gate-Source-Voltage	V_{GS}	±20V	
Continuous Drain Current T_J = 150°C	I_D	230mA 180mA	T_A=25°C T_A=70°C
Pulsed Drain Current	I_{DM}	1300mA	
Maximum Power Dissipation	P_D	300mW 192mW	T_A=25°C T_A=70°C

Note: Pulse width ≦300μs, duty cycle ≦2%

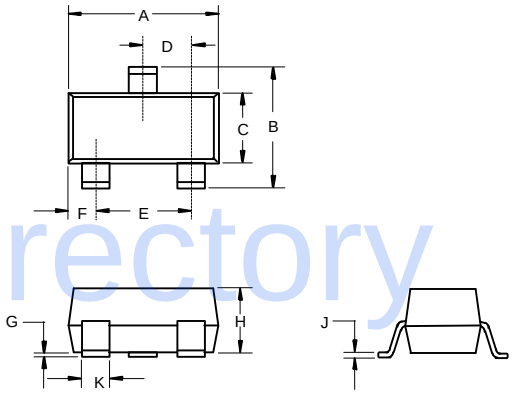
Switching Test Circuit





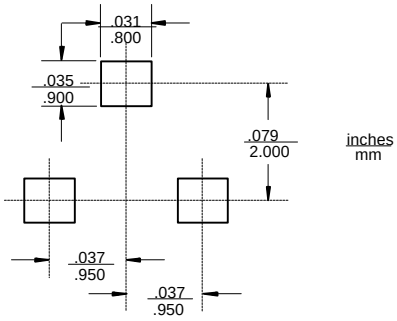
Switching Waveforms

SOT-23



DIMENSIONS					
	INCHES		MM		
DIM	MIN	MAX	MIN	MAX	NOTE
A	.110	.120	2.80	3.04	
B	.083	.098	2.10	2.64	
C	.047	.055	1.20	1.40	
D	.035	.041	.89	1.03	
E	.070	.081	1.78	2.05	
F	.018	.024	.45	.60	
G	.0005	.0039	.013	.100	
H	.035	.044	.89	1.12	
J	.003	.007	.085	.180	
K	.015	.020	.37	.51	

Suggested Solder Pad Layout



Electrical Characteristics (T_J = 25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 10µA	60	70	—	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250µA	1.0	2.0	2.5	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	—	—	±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60V, V_{GS} = 0V	—	—	1	µA
		V_{DS} = 60V, V_{GS} = 0V, T_C = 125°C	—	—	500	
On-State Drain Current[1]	$I_{D(on)}$	V_{DS} ≥ 7.5V, V_{GS} = 10V	800	1500	—	mA
Drain-Source On-State Resistance[1]	$R_{DS(on)}$	V_{GS} = 10V, I_D = 500mA	—	1.7	3.0	Ω
		V_{GS} = 5V, I_D = 50mA	—	2.5	4.0	
Forward Transconductance[1]	g_{fs}	V_{DS} = 10V, I_D = 200mA	—	250	—	mS
Dynamic						
Turn-On Time	t_{on}	V_{DD} = 30V, R_L = 150Ω I_D = 200mA, V_{GEN} = 10V R_G = 25Ω	—	7	20	ns
Turn-Off Time	t_{off}		—	12	20	
Input Capacitance	C_{iss}	V_{GS} = 0V	—	33	50	pF
Output Capacitance	C_{oss}	V_{DS} = 25V	—	4.3	25	
Reverse Transfer Capacitance	C_{rss}	f = 1.0MHz	—	1.6	5	
Source-Drain Diode						
Diode Forward Voltage[1]	V_{SD}	I_S = 230mA, V_{GS} = 0V	—	0.85	1.5	V

Notes:
(1) Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%

Fig. 1 – On-Resistance vs. Gate-to-Source Voltage

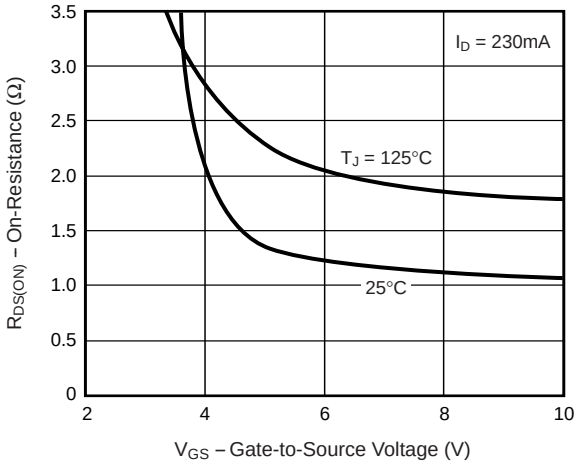


Fig. 2 – Source-Drain Diode Forward Voltage

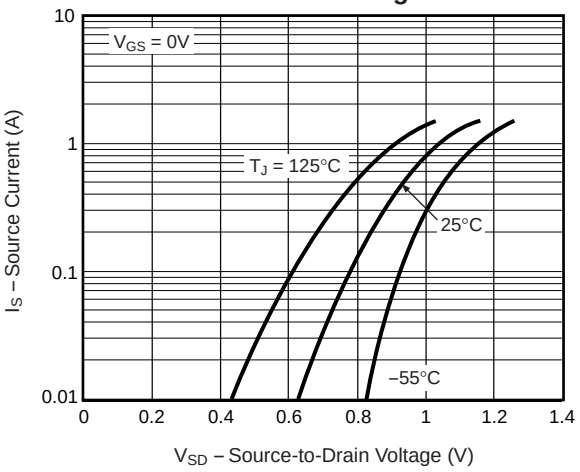


Fig. 3 – Output Characteristics

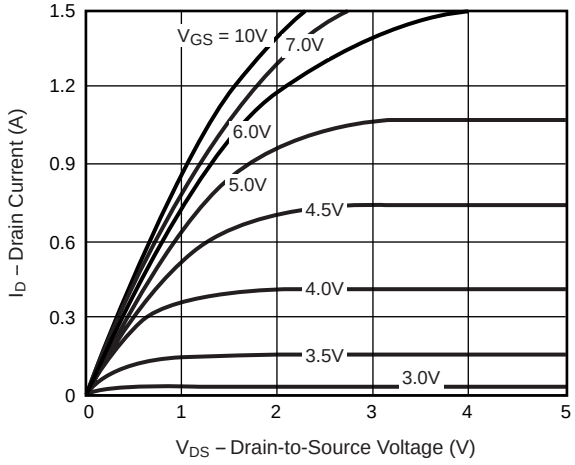


Fig. 4 – Transfer Characteristics

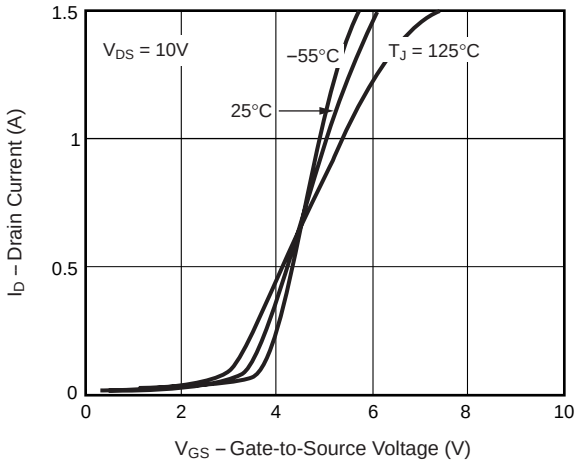


Fig. 5 – Capacitance

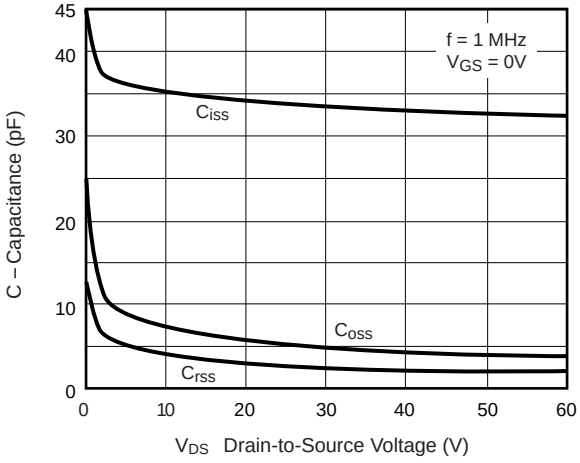


Fig. 6 – On-Resistance vs. Drain Current

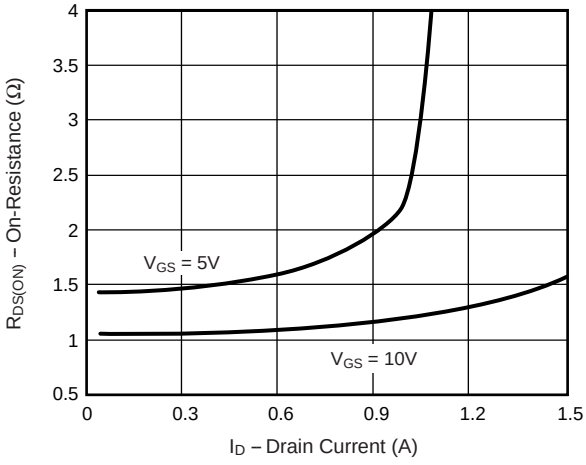


Fig. 7 – Gate Charge

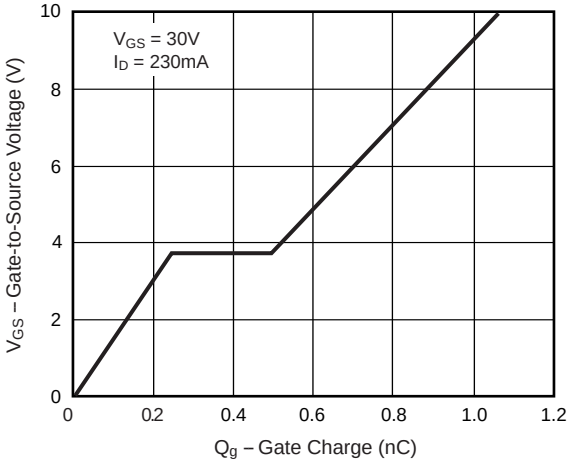


Fig. 8 – Breakdown Voltage vs. Junction Temperature

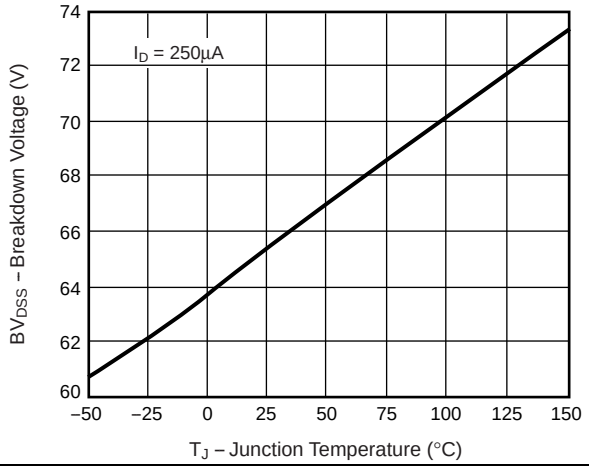


Fig. 9 – Threshold Voltage

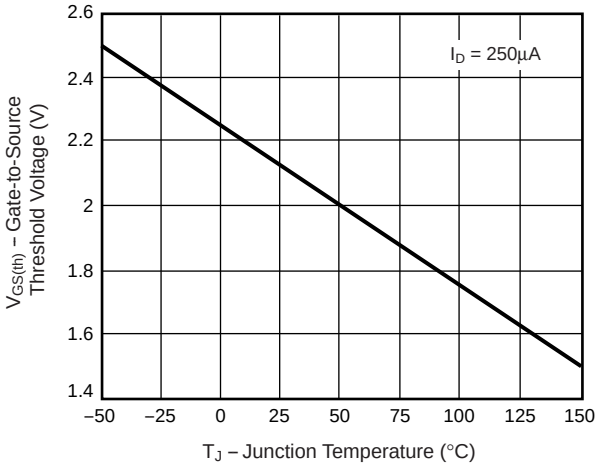


Fig. 10 – On-Resistance vs. Junction Temperature

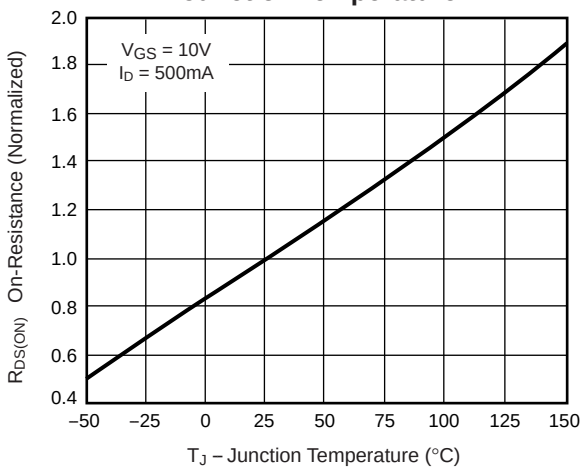


Fig. 11 – Thermal Impedance

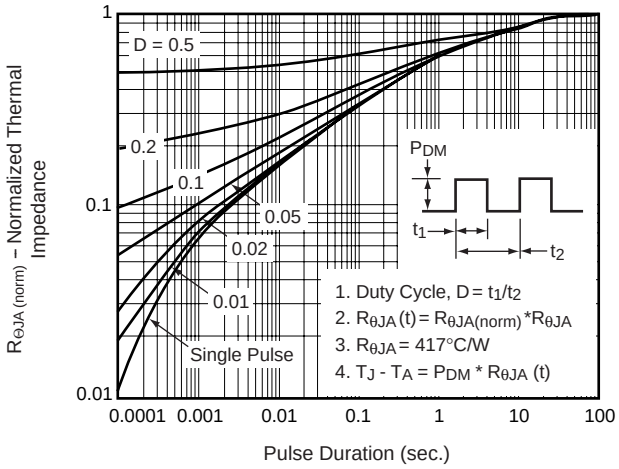


Fig. 12 – Power vs. Pulse Duration

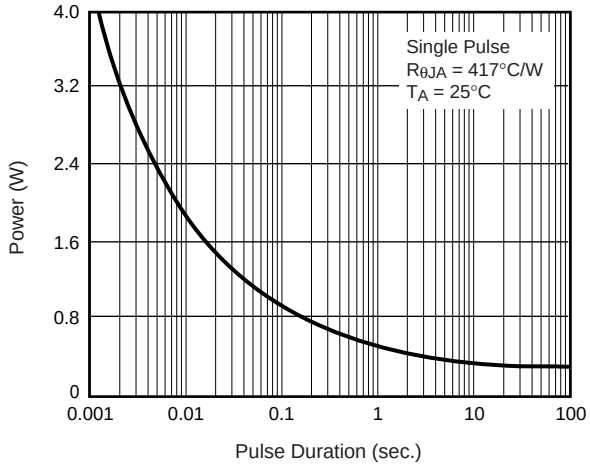


Fig. 13 – Maximum Safe Operating Area