



N-Channel 60-V (D-S) MOSFET

TrenchFET
MOSFETESD Protected
2000 V

PRODUCT SUMMARY

V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (mA)
60	2 @ $V_{GS} = 10$ V	300

FEATURES

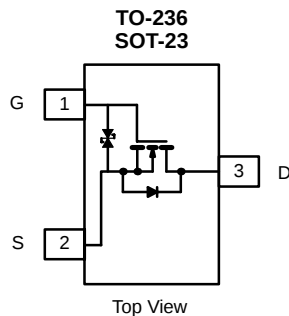
- Low On-Resistance: 2 Ω
- Low Threshold: 2 V (typ)
- Low Input Capacitance: 25 pF
- Fast Switching Speed: 25 ns
- Low Input and Output Leakage

BENEFITS

- Low Offset Voltage
- Low-Voltage Operation
- Easily Driven Without Buffer
- High-Speed Circuits
- Low Error Voltage

APPLICATIONS

- Direct Logic-Level Interface: TTL/CMOS
- Drivers: Relays, Solenoids, Lamps, Hammers, Display, Memories, Transistors, etc.
- Battery Operated Systems
- Solid-State Relays

2N7002 (7K)*
*Marking CodeABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^b	I_D	300	mA
		190	
Pulsed Drain Current ^a	I_{DM}	800	
Power Dissipation ^b	P_D	0.35	W
		0.14	
Maximum Junction-to-Ambient ^b	R_{thJA}	350	$^\circ\text{C/W}$
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150	$^\circ\text{C}$

Notes

- a. Pulse width limited by maximum junction temperature.
b. Surface mounted on FR4 board.

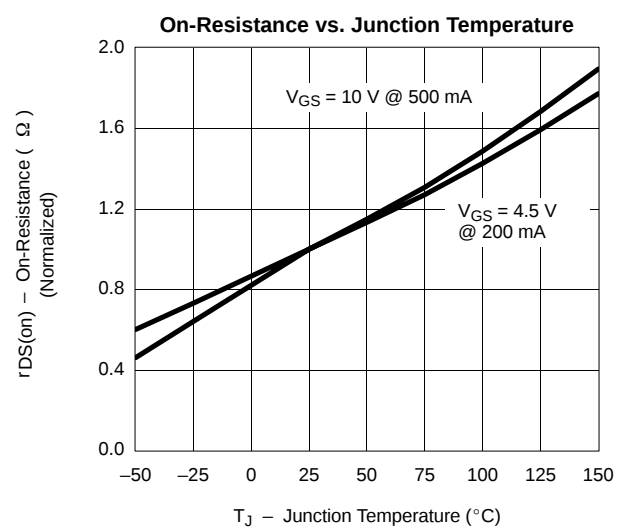
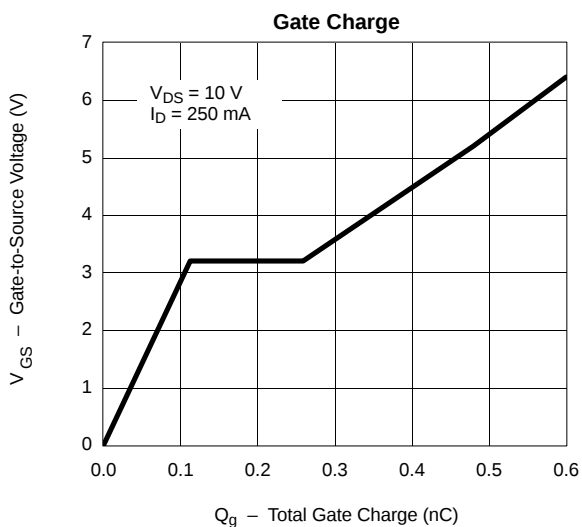
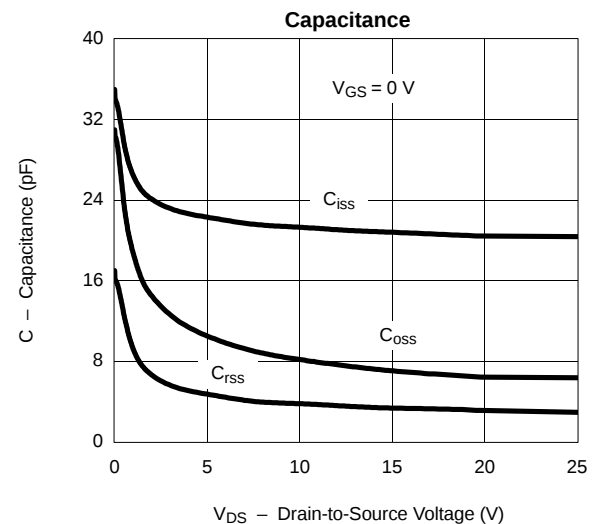
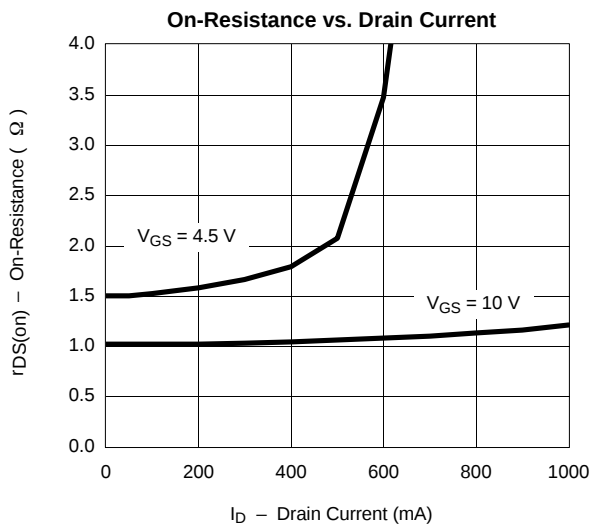
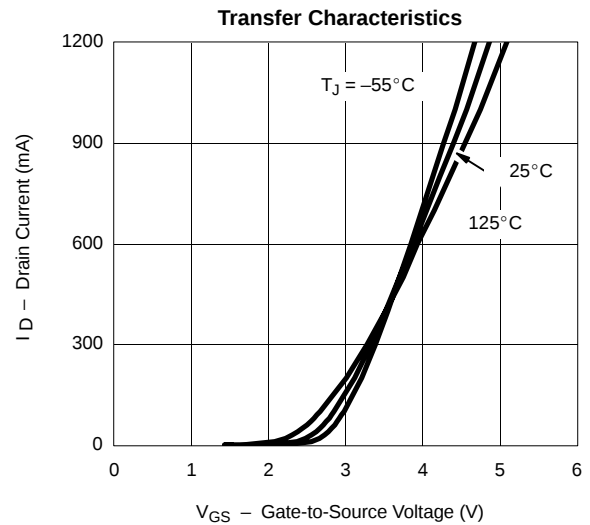
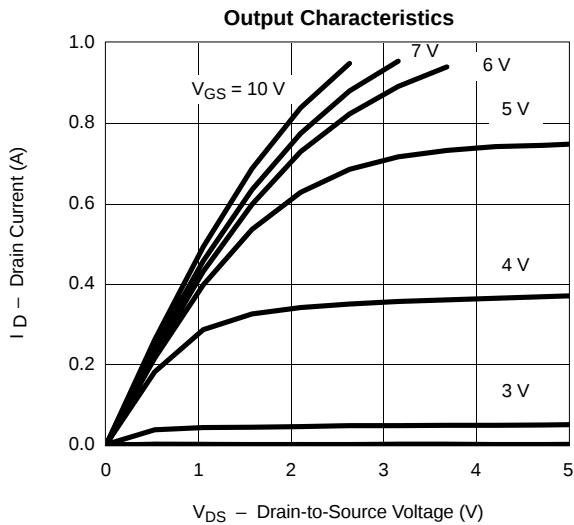


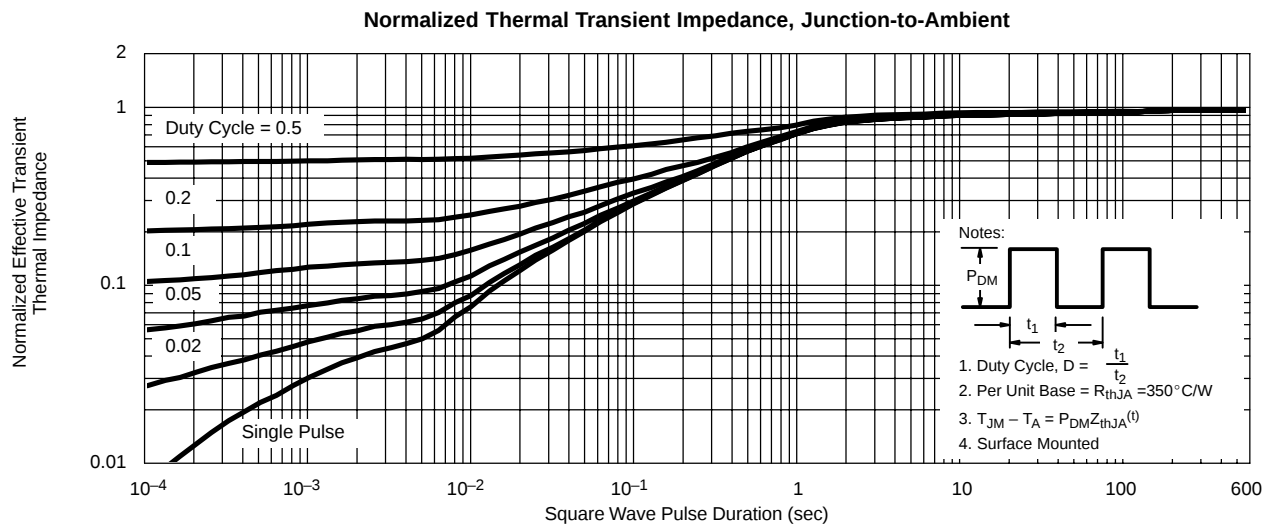
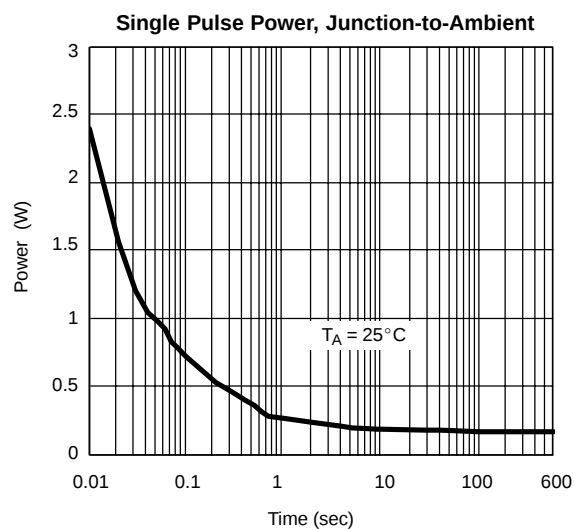
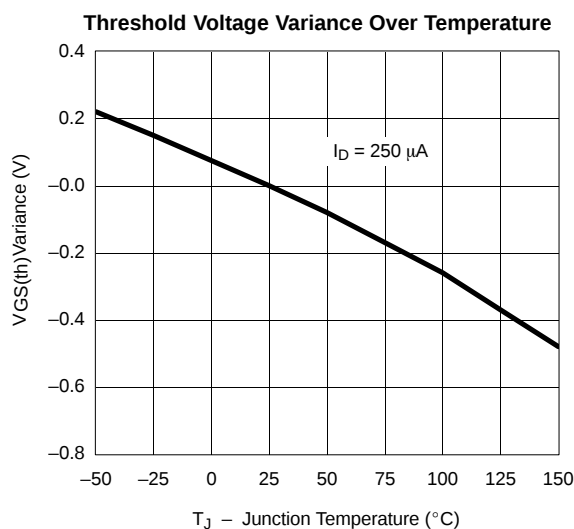
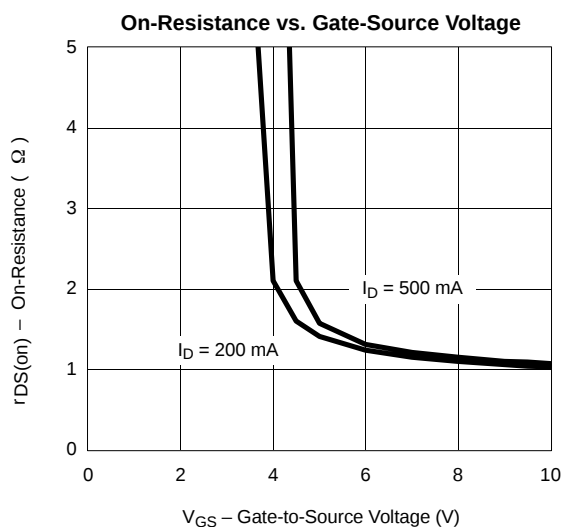
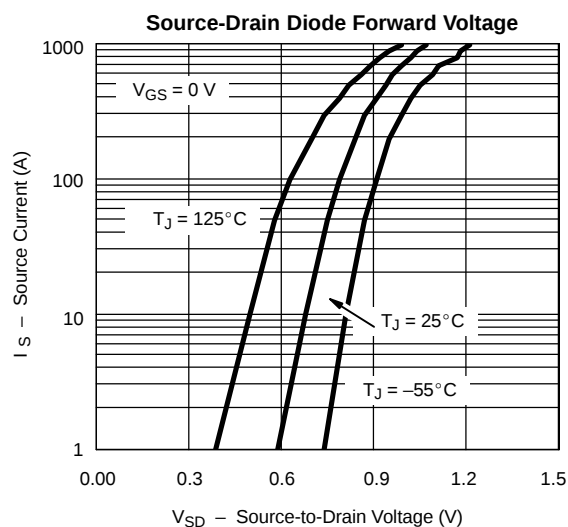
SPECIFICATIONS ^a							
Parameter	Symbol	Test Conditions	Limits			Unit	
			Min	Typ ^b	Max		
Static							
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 10 μA	60			V	
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1		2.5		
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±10	μA	
		V _{DS} = 0 V, V _{GS} = ±10 V			±150		
		V _{DS} = 0 V, V _{GS} = ±10 V, T _J = 85°C			±1000		
		V _{DS} = 0 V, V _{GS} = ±5 V			±100		
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 50 V, V _{GS} = 0 V			10	nA	
		V _{DS} = 50 V, V _{GS} = 0 V, T _J = 85°C			100		
		V _{DS} = 60 V, V _{GS} = 0 V			1		μA
		V _{DS} = 60 V, V _{GS} = 0 V, T _J = 125°C			500		
On-State Drain Current ^c	I _{D(on)}	V _{GS} = 10 V, V _{DS} = 7.5 V	800			mA	
		V _{GS} = 4.5 V, V _{DS} = 10 V	500				
Drain-Source On-Resistance ^c	r _{DS(on)}	V _{GS} = 10 V, I _D = 500 mA			2	Ω	
		V _{GS} = 4.5 V, I _D = 200 mA			4		
Forward Transconductance ^c	g _{fs}	V _{DS} = 10 V, I _D = 200 mA	100			mS	
Diode Forward Voltage	V _{SD}	I _S = 200 mA, V _{GS} = 0 V			1.3	V	
Dynamic ^b							
Total Gate Charge	Q _g	V _{DS} = 10 V, V _{GS} = 4.5 V I _D ≅ 250 mA		0.4	0.6	nC	
Input Capacitance	C _{iss}	V _{DS} = 25 V, V _{GS} = 0 V, f = 1 MHz		30		pF	
Output Capacitance	C _{oss}			6			
Reverse Transfer Capacitance	C _{rss}			2.5			
Switching ^{b, d}							
Turn-On Time	t _(on)	V _{DD} = 30 V, R _L = 150 Ω I _D ≅ 200 mA, V _{GEN} = 10V R _G = 10 Ω			25	ns	
Turn-Off Time	t _(off)				35		

Notes

- a. $T_A = 25^\circ\text{C}$ unless otherwise noted.
b. For DESIGN AID ONLY, not subject to production testing.
c. Pulse test: $PW \leq 300\text{ }\mu\text{s}$ duty cycle $\leq 2\%$.
d. Switching time is essentially independent of operating temperature.

TNJO60BE

**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

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