

FEATURES

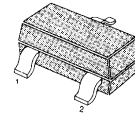
- ❑ Lower $R_{DS(on)}$
- ❑ Improved Inductive Ruggedness
- ❑ Fast Switching Times
- ❑ Lower Input Capacitance
- ❑ Extended Safe Operating Area
- ❑ Improved High Temperature Reliability

$$BV_{DSS} = 60 \text{ V}$$

$$R_{DS(on)} = 5.0 \Omega$$

$$I_D = 200 \text{ mA}$$

SOT-23



1. Gate 2. Source 3. Drain

Product Summary

Part Number	BV_{DSS}	$R_{DS(on)}$	I_D
2N7002	60V	5.0Ω	115mA

Absolute Maximum Ratings

Symbol	Characteristic	Value	Units
V_{DSS}	Drain-to-Source Voltage	60	V
I_D	Continuous Drain Current ($T_C=25^\circ\text{C}$)	115	mA
	Continuous Drain Current ($T_C=100^\circ\text{C}$)	73	
I_{DM}	Drain Current-Pulsed ^①	800	mA
V_{GS}	Gate-to-Source Voltage	± 20	V
P_D	Total Power Dissipation ($T_C=25^\circ\text{C}$)	0.2	W
	Linear Derating Factor	1.6	mW/ $^\circ\text{C}$
T_J, T_{STG}	Operating Junction and Storage Temperature Range	- 55 to +150	$^\circ\text{C}$

Thermal Resistance

Symbol	Characteristic	Typ.	Max.	Units
$R_{\theta JA}$	Junction-to-Ambient	--	625	$^\circ\text{C/W}$

2N7002MTF

N-Channel Small Signal MOSFET

Electrical Characteristics (T_C=25 °C unless otherwise specified)

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
BV _{DSS}	Drain-Source Breakdown Voltage	60	-	-	V	V _{GS} = 0V, I _D = 250μA
V _{GS(th)}	Gate Threshold Voltage	1.2	-	2.5	V	V _{DS} = V _{GS} , I _D = 250μA
I _{GSS}	Gate-Source Leakage, Forward	-	-	100	nA	V _{GS} = 20V
	Gate-Source Leakage, Reverse	-	-	-100		V _{GS} = -20V
I _{DSS}	Drain-to-Source Leakage Current	-	-	1.0	μA	V _{GS} = 40V
		-	-	500		V _{GS} = 40V, T _C = 125 °C
I _{D(ON)}	On-State Drain-Source Current	0.5	-	-	A	V _{DS} = 10V, V _{GS} = 10V
R _{DS(on)}	Static Drain-Source On-State Resistance ②	-	-	5.0	Ω	V _{GS} = 10V, I _D = 0.5A
g _{fs}	Forward Transconductance ②	0.08	-	-	S	V _{DS} = 15V, I _D = 0.2A
C _{iss}	Input Capacitance	-	-	50	pF	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz
C _{oss}	Output Capacitance	-	-	25		
C _{rss}	Reverse Transfer Capacitance	-	-	5		
t _{d(on)}	Turn-On Delay Time	-	-	20	ns	V _{DD} = 30V, I _D = 0.2A R _G = 25Ω ② ③
t _r	Rise Time	-	-	-		
t _{d(off)}	Turn-Off Delay Time	-	-	20		
t _f	Fall Time	-	-	-		

Source-Drain Diode Ratings and Characteristics

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
I _S	Continuous Source Current	-	-	115	mA	Integral reverse pn-diode in the MOSFET
I _{SD}	Pulse Source Current ①	-	-	800	mA	
V _{SD}	Diode Forward Voltage ②	-	-	1.5	V	T _A = 25 °C, I _S = 115mA V _{GS} = 0V

Notes ;

- ① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature
- ② Pulse Test : Pulse Width = 250μs, Duty Cycle ≤ 2%
- ③ Essentially Independent of Operating Temperature

Fig 1. Output Characteristics

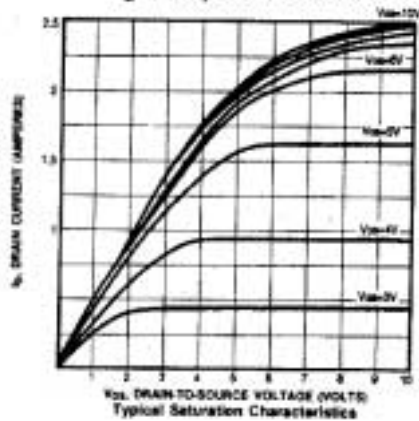


Fig 2. Transfer Characteristics

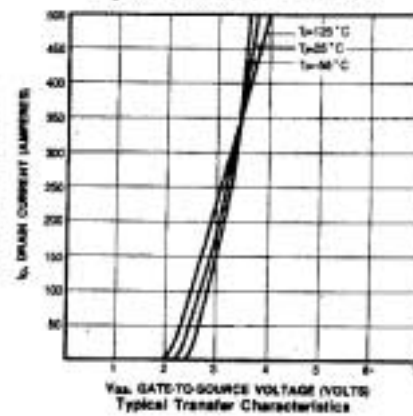


Fig 3. On-Resistance vs. Drain Current

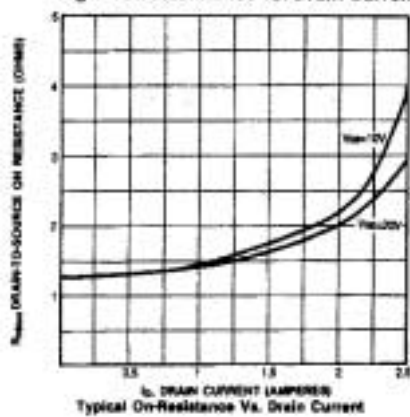


Fig 4. Source-Drain Diode Forward Voltage

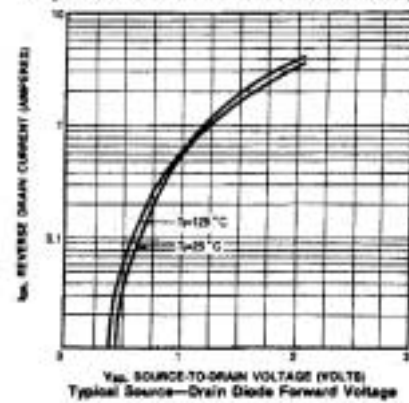


Fig 5. Capacitance vs. Drain-Source Voltage

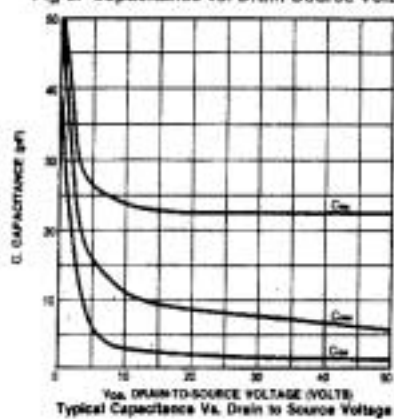
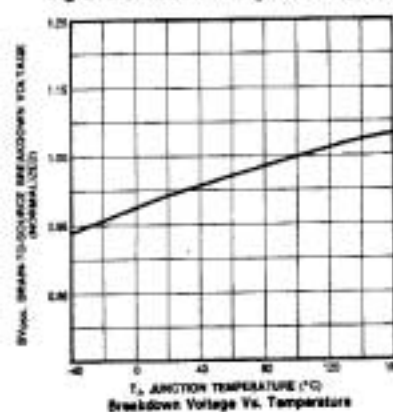
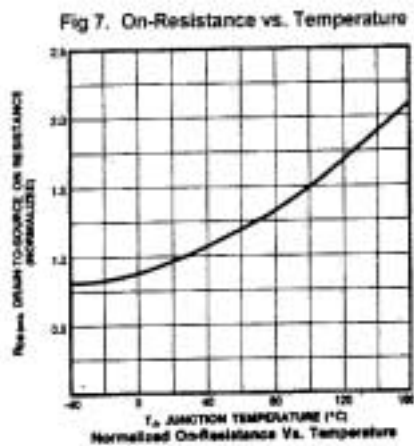


Fig 6. Breakdown Voltage vs. Temperature





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