

FEATURES

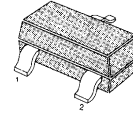
- ❑ Lower $R_{DS(on)}$
- ❑ Improved Inductive Ruggedness
- ❑ Fast Switching Times
- ❑ Lower Input Capacitance
- ❑ Extended Safe Operating Area
- ❑ Improved High Temperature Reliability

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

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

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

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 ($T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
BV_{DSS}	Drain-Source Breakdown Voltage	60	-	-	V	$V_{GS} = 0V, I_D = 250\mu A$
$V_{GS(th)}$	Gate Threshold Voltage	1.2	-	2.5	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
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		$V_{GS} = 40V, T_C = 125^\circ\text{C}$
$I_{D(ON)}$	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	$V_{DD} = 30V, I_D = 0.2A$ $R_G = 25\Omega$ 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	$T_A = 25^\circ\text{C}, I_S = 115mA$ $V_{GS} = 0V$

Notes ;

- ① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature
- ② Pulse Test : Pulse Width = $250\mu s$, Duty Cycle $\leq 2\%$
- ③ Essentially Independent of Operating Temperature

Fig 1. Output Characteristics

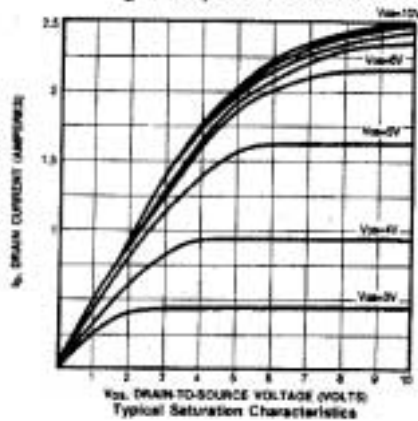


Fig 2. Transfer Characteristics

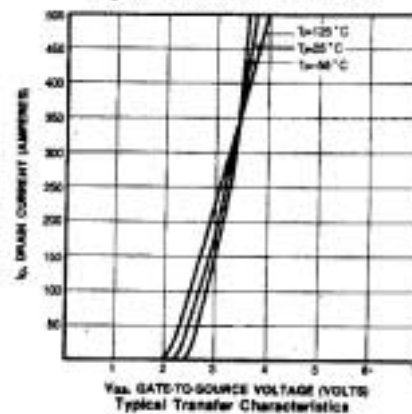


Fig 3. On-Resistance vs. Drain Current

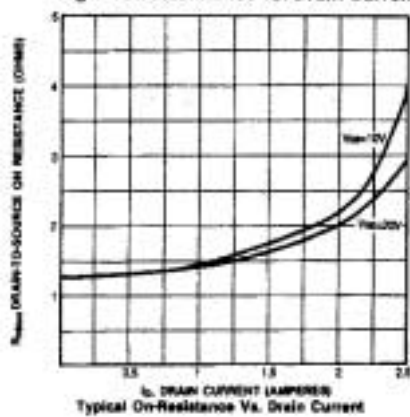


Fig 4. Source-Drain Diode Forward Voltage

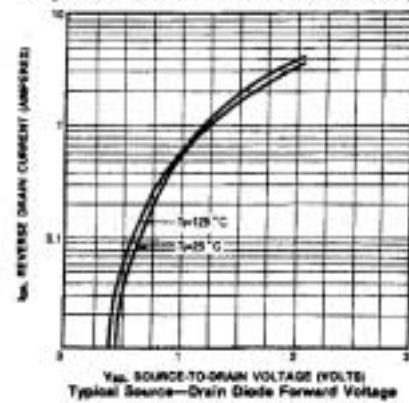


Fig 5. Capacitance vs. Drain-Source Voltage

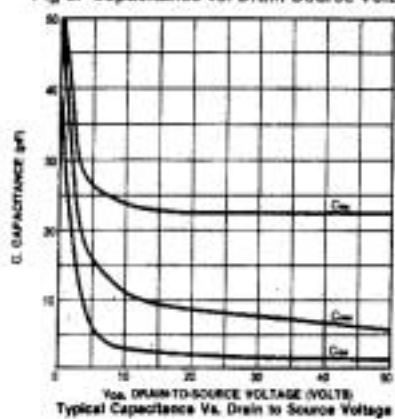
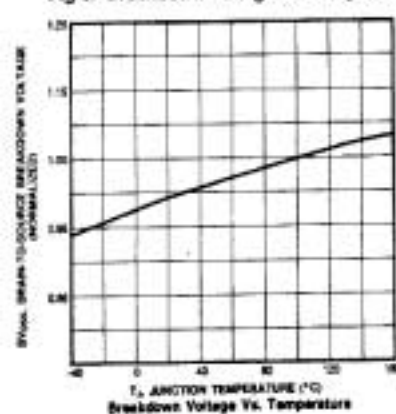
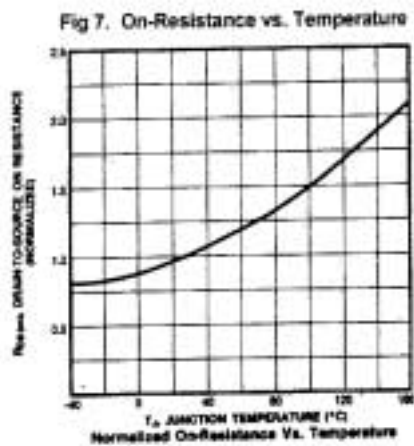


Fig 6. Breakdown Voltage vs. Temperature





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