

## Advanced Small Signal MOSFET

## 2N7002MTF

### FEATURES

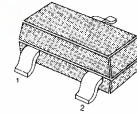
- Lower  $R_{DS(on)}$
- Improved Inductive Ruggedness
- Fast Switching Times
- Lower Input Capacitance
- Extended Safe Operating Area
- Improved High Temperature Reliability

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

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

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

### SOT-23



1. Gate 2. Source 3. Drain

### Product Summary

Part Number	$BV_{DSS}$	$R_{DS(on)}$	$I_D$
2N7002	60V	5.0 $\Omega$	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 <sup>①</sup>	800	mA
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$P_D$	Total Power Dissipation ( $T_C=25^\circ\text{C}$ )	0.2	W
	Linear Derating Factor	0.16	
$T_J, T_{STG}$	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	--	62.5	$^\circ\text{C}/\text{W}$

# 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	1.0	-	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	$\mu A$	$V_{GS} = 40V$
		-	-	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	$\Omega$	$V_{GS} = 10V, I_D = 0.5A$
$g_{fs}$	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

**N-CHANNEL**  
Small Signal MOSFET

**2N7002MTF**

Fig 1. Output Characteristics

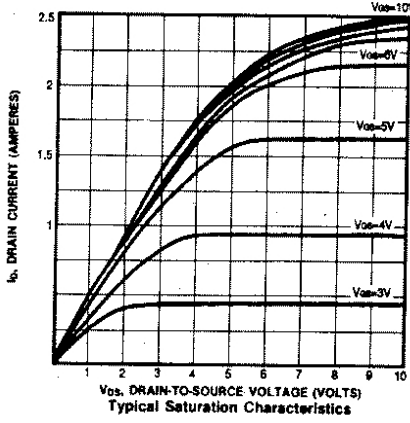


Fig 2. Transfer Characteristics

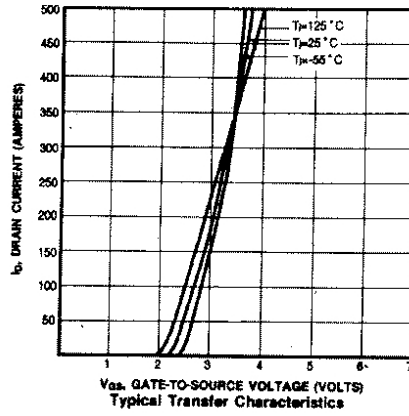


Fig 3. On-Resistance vs. Drain Current

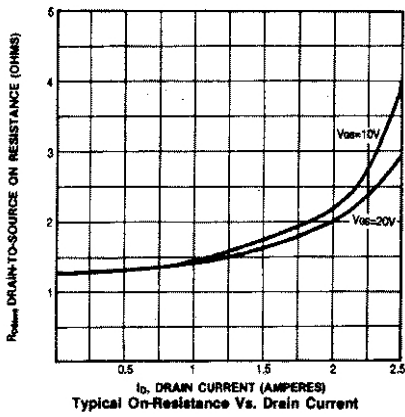


Fig 4. Source-Drain Diode Forward Voltage

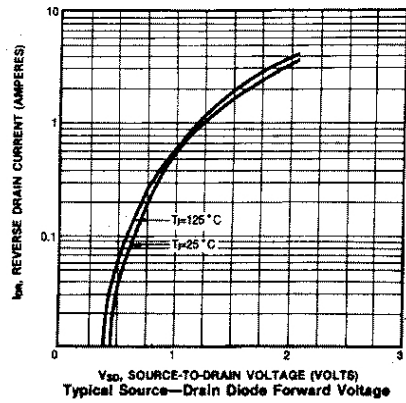


Fig 5. Capacitance vs. Drain-Source Voltage

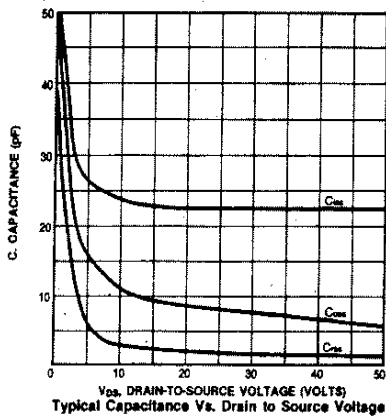


Fig 6. Breakdown Voltage vs. Temperature

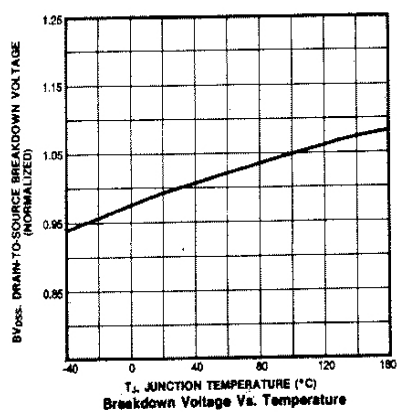


Fig 7. On-Resistance vs. Temperature

