N-Channel Small Signal MOSFET 2N7002MTF

FEATURES

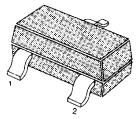
- ❑ Lower $R_{DS(on)}$
- ❑ Improved Inductive Ruggedness
- ❑ Fast Switching Times
- ❑ Lower Input Capacitance
- ❑ Extended Safe Operating Area
- ❑ Improved High Temperature Reliability

BV_{DSS} = 60 V

$R_{DS(on)}$ = 5.0 Ω

I_D = 200 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℃)	115	mA
	Continuous Drain Current (T_C=100℃)	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℃)	0.2	W
	Linear Derating Factor	1.6	mW/℃
T_J , T_{STG}	Operating Junction and Storage Temperature Range	- 55 to +150	℃

Thermal Resistance

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

Electrical Characteristics (T_C=25℃ 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℃
$I_{D(ON)}$	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 ②③
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 ℃, I_S = 115mA V_{GS} = 0V

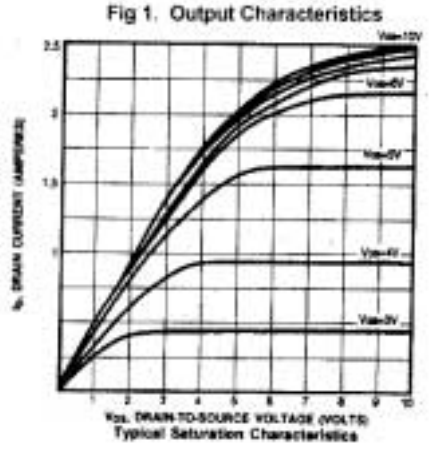
Notes ;

① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature

② Pulse Test : Pulse Width = 250μs, Duty Cycle ≤ 2%

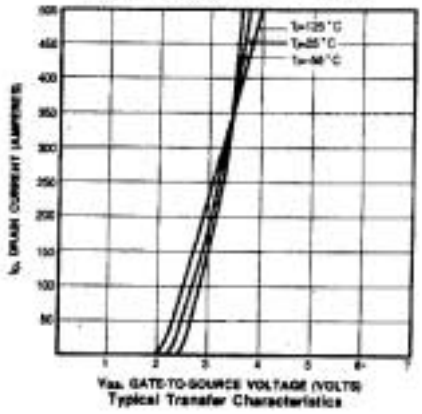
③ Essentially Independent of Operating Temperature

Fig 1. Output Characteristics



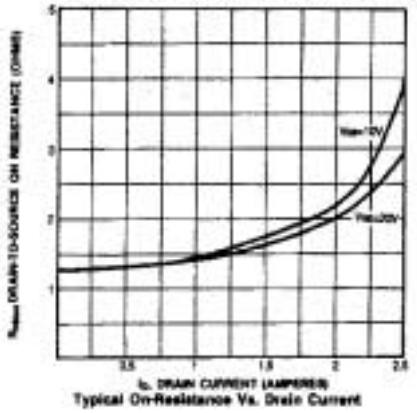
Typical Saturation Characteristics

Fig 2. Transfer Characteristics



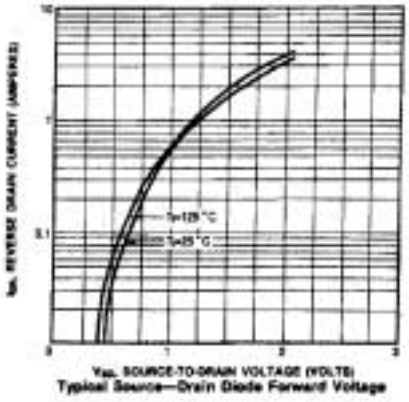
Typical Transfer Characteristics

Fig 3. On-Resistance vs. Drain Current



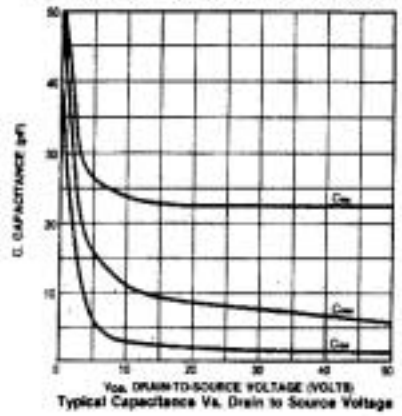
Typical On-Resistance Vs. Drain Current

Fig 4. Source-Drain Diode Forward Voltage



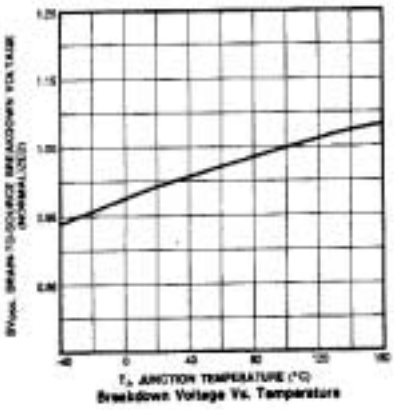
Typical Source—Drain Diode Forward Voltage

Fig 5. Capacitance vs. Drain-Source Voltage



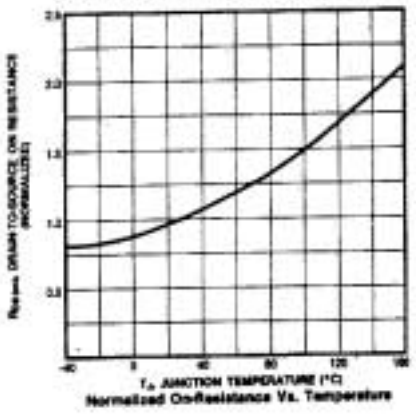
Typical Capacitance Vs. Drain to Source Voltage

Fig 6. Breakdown Voltage vs. Temperature



Breakdown Voltage Vs. Temperature

Fig 7. On-Resistance vs. Temperature



Normalized On-Resistance Vs. Temperature

TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACEx™	FAST®	ISOPLANAR™	Power247™	SuperFET™
ActiveArray™	FASTr™	LittleFET™	PowerSaver™	SuperSOT™-3
Bottomless™	FPS™	MICROCOUPLER™	PowerTrench®	SuperSOT™-6
CoolFET™	FRFET™	MicroFET™	QFET®	SuperSOT™-8
CROSSVOLT™	GlobalOptoisolator™	MicroPak™	QS™	SyncFET™
DOME™	GTO™	MICROWIRE™	QT Optoelectronics™	TinyLogic®
EcoSPARK™	HiSeC™	MSX™	Quiet Series™	TINYOPTO™
E²CMOS™	I²C™	MSXPro™	RapidConfigure™	TruTranslation™
EnSigna™	*i-Lo*™	OCX™	RapidConnect™	UHC™
FACT™	ImpliedDisconnect™	OCXPro™	µSerDes™	UltraFET®
FACT Quiet Series™		OPTOLOGIC®	SILENT SWITCHER®	VCX™
Across the board. Around the world.™		OPTOPLANAR™	SMART START™	
The Power Franchise®		PACMAN™	SPM™	
Programmable Active Droop™		POP™	Stealth™	

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.
As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.

Rev. I11