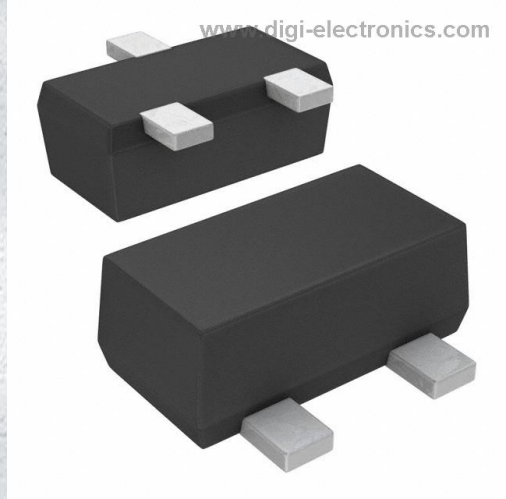
2N7002T Datasheet



https://www.DiGi-Electronics.com

DiGi Electronics Part Number	2N7002T-DG
Manufacturer	onsemi
Manufacturer Product Number	2N7002T
Description	MOSFET N-CH 60V 115MA SOT-523F
Detailed Description	N-Channel 60 V 115mA (Ta) 200mW (Ta) Surface Mount SC-89-3

Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
2N7002T	onsemi
Series:	Product Status:
-	Active
FET Type:	Technology:
N-Channel	MOSFET (Metal Oxide)
Drain to Source Voltage (Vdss):	Current - Continuous Drain (Id) @ 25°C:
60 V	115mA (Ta)
Drive Voltage (Max Rds On, Min Rds On):	Rds On (Max) @ Id, Vgs:
5V, 10V	7.5Ohm @ 50mA, 5V
Vgs(th) (Max) @ Id:	Vgs (Max):
2V @ 250µA	±20V
Input Capacitance (Ciss) (Max) @ Vds:	FET Feature:
50 pF @ 25 V	-
Power Dissipation (Max):	Operating Temperature:
200mW (Ta)	150°C (TJ)
Mounting Type:	Supplier Device Package:
Surface Mount	SC-89-3
Package / Case:	Base Product Number:
SC-89, SOT-490	2N7002

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8541.21.0095	

onsemi

DATA SHEET
www.onsemi.com

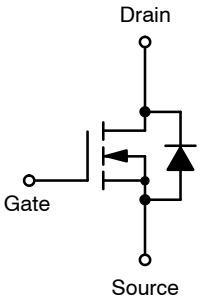
N-Channel Enhancement Mode Field Effect Transistor

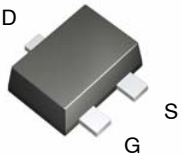
2N7002T

Features

- Low On−Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra−Small Surface Mount Package
- This Device is Pb−Free and are RoHS Compliant

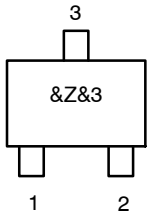
SIMPLIFIED SCHEMATIC





SOT−523FL
CASE 419BG

MARKING DIAGRAM



&Z = Assembly location
&3 = Data code

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain−to−Source Voltage	V_{DSS}	60	V
Drain−Gate Voltage $R_{GS} \le 1.0$ MΩ	V_{DGR}	60	V
Gate−Source Voltage Continuous Pulsed	V_{GSS}	 ±20 ±40	V
Gate−Source Voltage Continuous Continuous at 100°C Pulsed	I_D	 115 73 800	mA
Junction Temperature Range	T_J	150	°C
Storage Temperature Range	T_{STG}	−55 to +150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Parameter	Symbol	Max	Unit
Total Device Dissipation Derating above T_A = 25°C	P_D	200 1.6	mW mW/°C
Thermal Resistance, Junction−to−Ambient (Note 1)	$R_{\theta JA}$	625	°C/W

1. Device mounted on FR−4 PCB, 1 inch × 0.85 inch × 0.062 inch. Minimum land pad size.

ORDERING INFORMATION

Device	Package	Shipping†
2N7002T	SOT−523FL (Pb−Free)	3000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

2N7002T

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
OFF CHARACTERISTICS (Note 2)						
Drain−Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = 10 μA	60	78	–	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 60 V, V_{GS} = 0 V	–	0.001	1.0	μA
		V_{GS} = 60 V, V_{GS} = 0 V T_J = 125°C	–	7	500	μA
Gate−Body Leakage Current	I_{GSS}	V_{GS} = ±20 V, V_{DS} = 0 V	–	0.2	±10	nA
ON CHARACTERISTICS (Note 2)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA	1.0	1.76	2.0	V
Static Drain−Source On−Resistance	$R_{DS(ON)}$	V_{GS} = 5 V, I_D = 0.05 A	–	1.6	7.5	Ω
		V_{GS} = 10 V, I_D = 0.5 A	–	–	2.0	Ω
		V_{GS} = 10 V, I_D = 0.5 A, T_J = 125°C	–	2.53	13.5	Ω
On−State Drain Current	$I_{D(ON)}$	V_{GS} = 10 V, V_{DS} = 7.5 V	0.5	1.43	–	A
Forward Transconductance	g_{FS}	V_{DS} = 10 V, I_D = 0.2 A	80	356.5	–	mS
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	–	37.8	50	pF
Output Capacitance	C_{OSS}		–	12.4	25	
Reverse Transfer Capacitance	C_{RSS}		–	6.5	7.0	
SWITCHING CHARACTERISTICS						
Turn−On Delay Time	$t_{D(ON)}$	V_{DD} = 30 V, I_D = 0.2 A, V_{GEN} = 10 V, R_L = 150 Ω, R_{GEN} = 25 Ω	–	5.85	20	ns
Turn−Off Delay Time	$t_{D(OFF)}$		–	12.5	20	

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

2. Short duration test pulse used to minimize self−heating effect.

2N7002T

TYPICAL PERFORMANCE CHARACTERISTICS

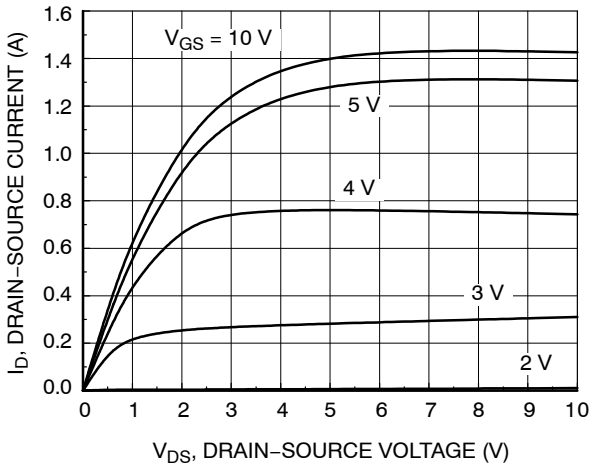


Figure 1. On−Region Characteristics

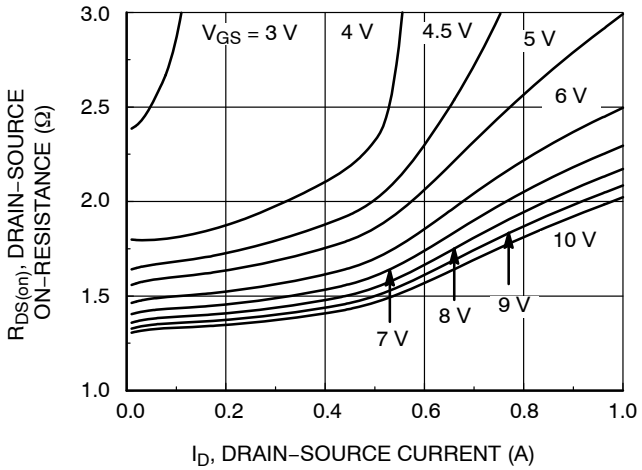


Figure 2. On−Resistance Variation with Gate Voltage and Drain Current

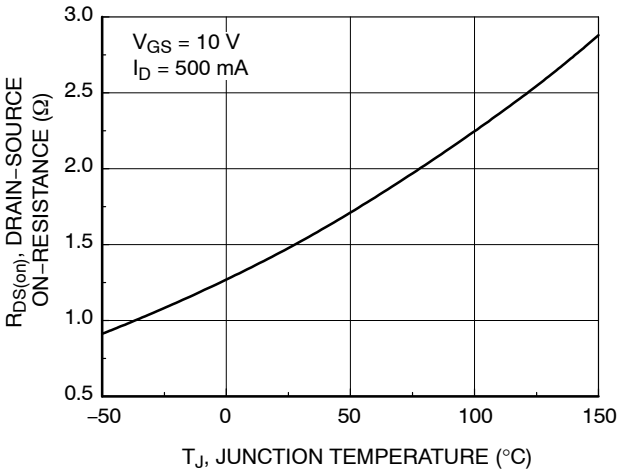


Figure 3. On−Resistance Variation with Temperature

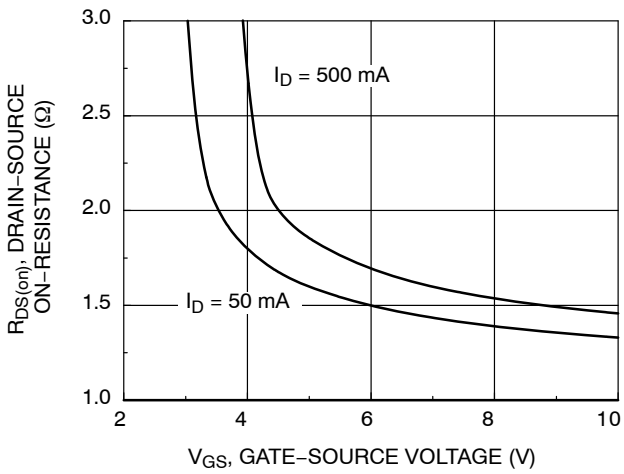


Figure 4. On−Resistance Variation with Gate−Source Voltage

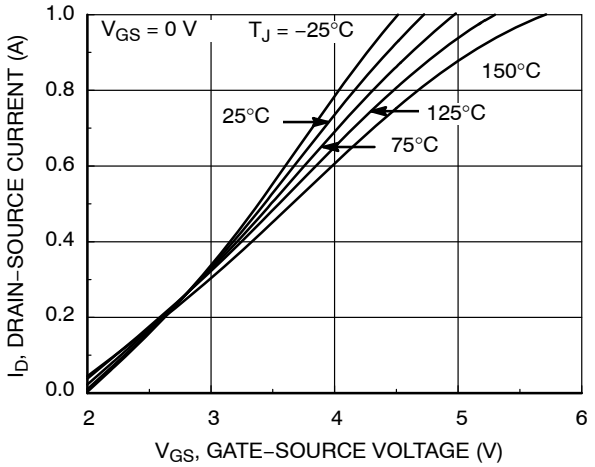


Figure 5. Transfer Characteristics

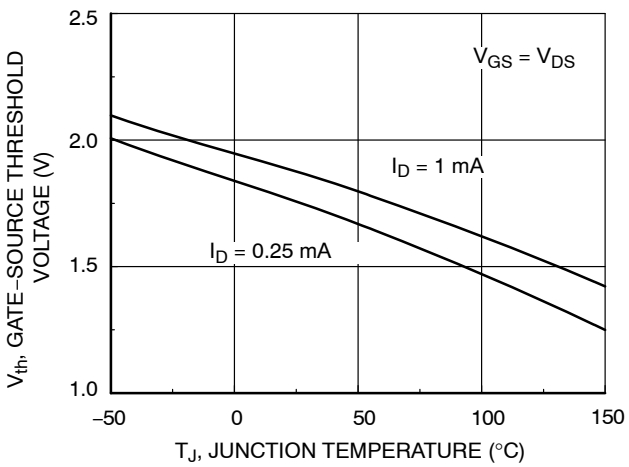


Figure 6. Gate Threshold Variation with Temperature

TYPICAL PERFORMANCE CHARACTERISTICS (CONTINUED)

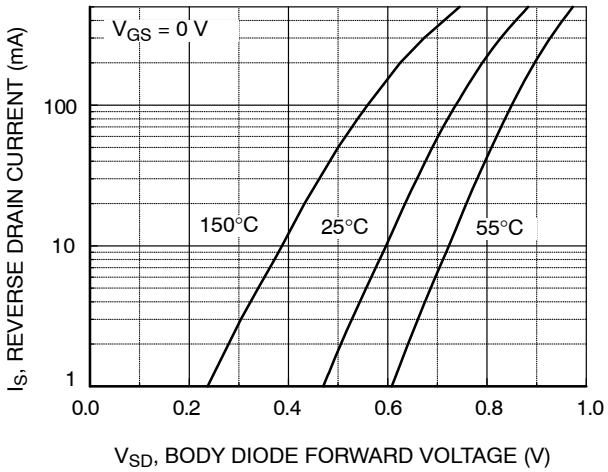


Figure 7. Reverse Drain Current Variation with Diode Forward Voltage and Temperature

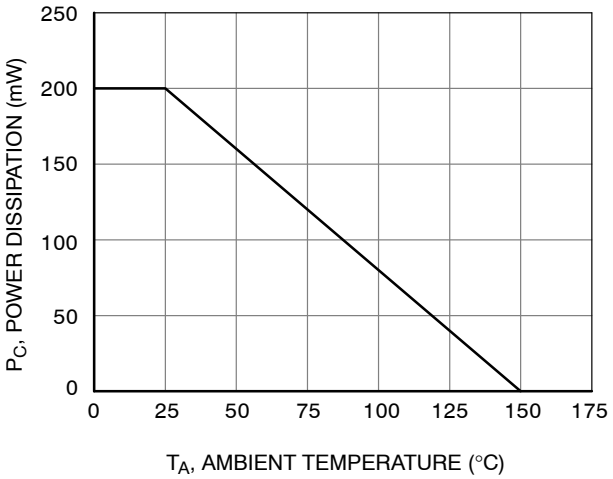
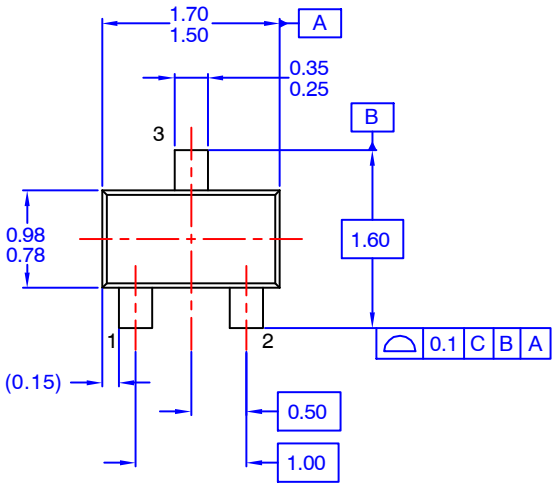


Figure 8. Power Derating

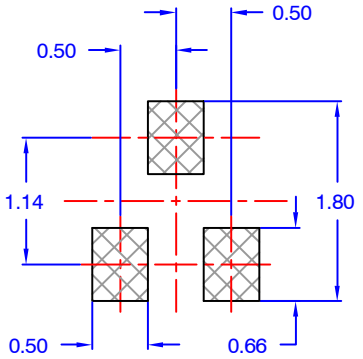
MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

SOT−523FL
CASE 419BG
ISSUE A

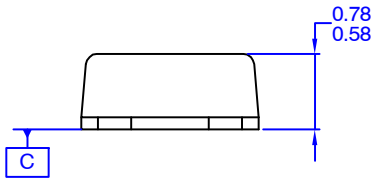
DATE 29 SEP 2017

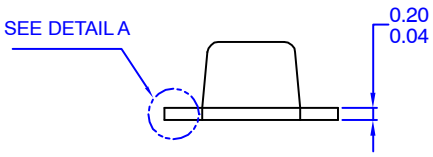


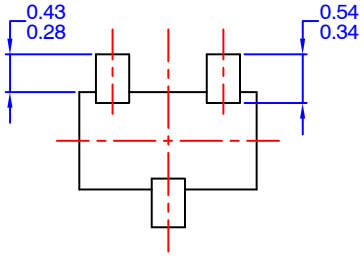
TOP VIEW



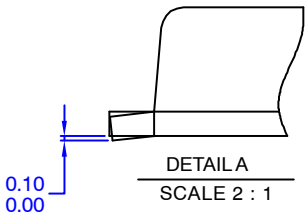
LAND PATTERN RECOMMENDATION







BOTTOM VIEW



DETAIL A
SCALE 2 : 1

NOTES:
A) THIS PACKAGE CONFORMS TO EIAJ SC89 PACKAGING STANDARD.
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DRAWING CONFORMS TO ASME Y14.5M-1994
D) DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.

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DESCRIPTION:	**SOT−523FL**		**PAGE 1 OF 1**

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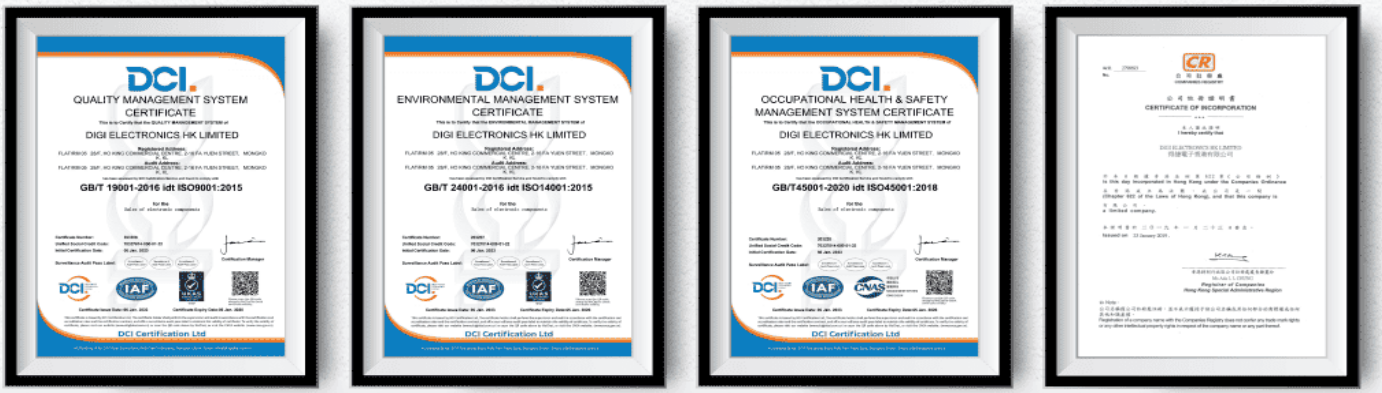

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