2N7002

SURFACE MOUNT SILICON N-CHANNEL ENHANCEMENT-MODE MOSFET

SOT-23 CASE

DESCRIPTION:
The CENTRAL SEMICONDUCTOR 2N7002 type is an N-Channel enhancement-mode MOSFET manufactured by the N-Channel DMOS Process, designed for high speed pulsed amplifier and driver applications.

MARKING CODE: 702

MAXIMUM RATINGS: (T_A=25°C)	**SYMBOL**		**UNITS**
Drain-Source Voltage	V_{DS}	60	V
Drain-Gate Voltage	V_{DG}	60	V
Gate-Source Voltage	V_{GS}	40	V
Continuous Drain Current (T_C=25°C)	I_D	115	mA
Continuous Drain Current (T_C=100°C)	I_D	75	mA
Continuous Source Current (Body Diode)	I_S	115	mA
Maximum Pulsed Drain Current	I_{DM}	800	mA
Maximum Pulsed Source Current	I_{SM}	800	mA
Power Dissipation	P_D	350	mW
Operating and Storage Junction Temperature	T_J, T_{stg}	-65 to +150	°C
Thermal Resistance	Θ_{JA}	357	°C/W

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

SYMBOL	**TEST CONDITIONS**	**MIN**	**TYP**	**MAX**	**UNITS**
I_{GSSF}	V_{GS}=20V			100	nA
I_{GSSR}	V_{GS}=20V			100	nA
I_{DSS}	V_{DS}=60V, V_{GS}=0			1.0	μA
I_{DSS}	V_{DS}=60V, V_{GS}=0, T_A=125°C			500	μA
$I_{D(ON)}$	V_{DS}=10V, V_{GS}=10V	500			mA
BV_{DSS}	I_D=10μA	60	105		V
$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1.0	2.1	2.5	V
$V_{DS(ON)}$	V_{GS}=10V, I_D=500mA			3.75	V
$V_{DS(ON)}$	V_{GS}=5.0V, I_D=50mA			0.375	V
V_{SD}	V_{GS}=0, I_S=11.5mA			1.5	V
$r_{DS(ON)}$	V_{GS}=10V, I_D=500mA		3.7	7.5	Ω
$r_{DS(ON)}$	V_{GS}=10V, I_D=500mA, T_A=100°C			13.5	Ω
$r_{DS(ON)}$	V_{GS}=5.0V, I_D=50mA		6.2	7.5	Ω
$r_{DS(ON)}$	V_{GS}=5.0V, I_D=50mA, T_A=100°C			13.5	Ω
g_{FS}	V_{DS}=10V, I_D=200mA	80			mS

R7 (12-May 2026)

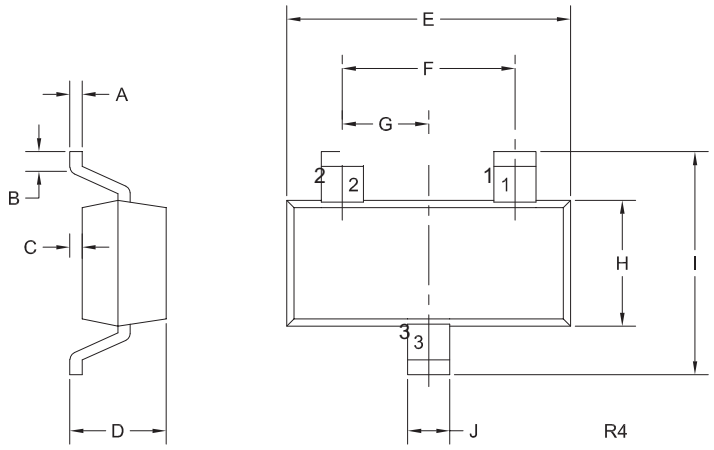
2N7002

SURFACE MOUNT SILICON N-CHANNEL ENHANCEMENT-MODE MOSFET

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

SYMBOL	TEST CONDITIONS	TYP	MAX	UNITS
C_{rss}	V_{DS}=25V, V_{GS}=0, f=1.0MHz		5.0	pF
C_{iss}	V_{DS}=25V, V_{GS}=0, f=1.0MHz		50	pF
C_{oss}	V_{DS}=25V, V_{GS}=0, f=1.0MHz		25	pF
$Q_{g(tot)}$	V_{DS}=30V, V_{GS}=4.5V, I_D=100mA	0.592		nC
Q_{gs}	V_{DS}=30V, V_{GS}=4.5V, I_D=100mA	0.196		nC
Q_{gd}	V_{DS}=30V, V_{GS}=4.5V, I_D=100mA	0.148		nC
t_{on}	V_{DD}=30V, I_D=200mA, R_G=25Ω, R_L=150Ω		20	ns
t_{off}	V_{DD}=30V, I_D=200mA, R_G=25Ω, R_L=150Ω		20	ns

SOT-23 CASE - MECHANICAL OUTLINE



LEAD CODE:
1) Gate
2) Source
3) Drain

MARKING CODE: 702

DIMENSIONS				
	INCHES		MILLIMETERS	
SYMBOL	MIN	MAX	MIN	MAX
A	0.003	0.007	0.08	0.18
B	0.006	-	0.15	-
C	-	0.005	-	0.13
D	0.035	0.044	0.89	1.12
E	0.110	0.120	2.80	3.05
F	0.075		1.90	
G	0.037		0.95	
H	0.047	0.055	1.19	1.40
I	0.083	0.104	2.10	2.64
J	0.014	0.020	0.35	0.50

SOT-23 (REV: R4)

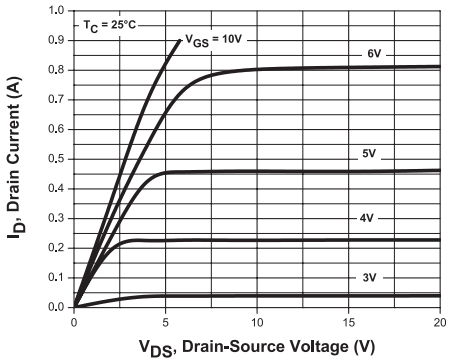
R7 (12-May 2026)

2N7002

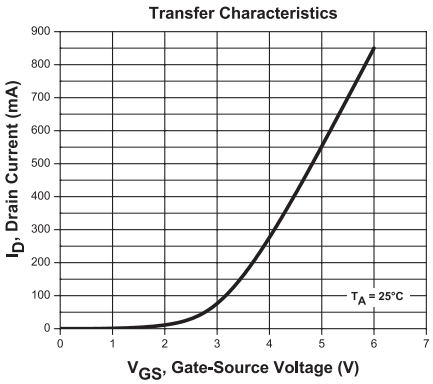
SURFACE MOUNT SILICON N-CHANNEL ENHANCEMENT-MODE MOSFET

TYPICAL ELECTRICAL CHARACTERISTICS

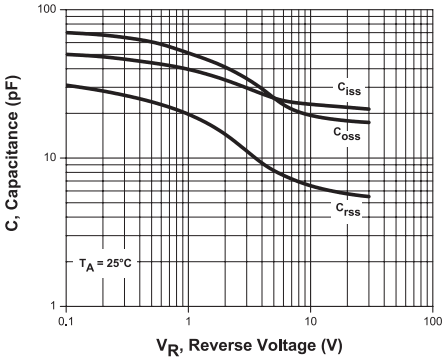
Output Characteristics



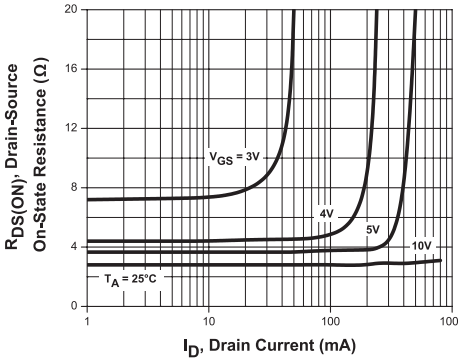
Transfer Characteristics



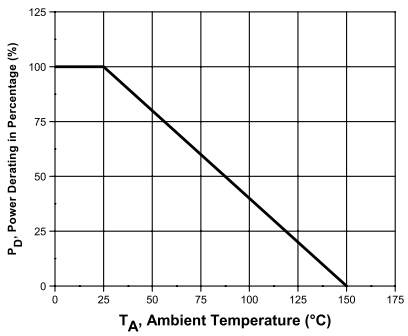
Capacitance



Drain Source On Resistance



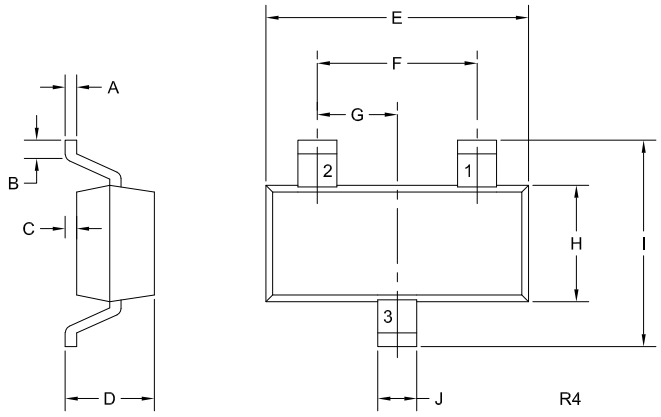
Normalized Power Derating



R7 (12-May 2026)

Package Details
SOT-23 Case

Mechanical Drawing



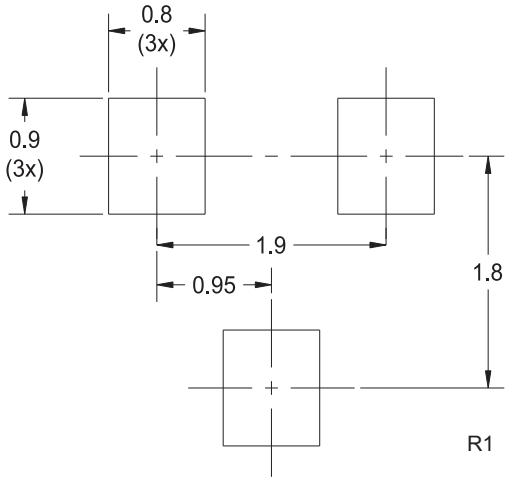
DIMENSIONS				
	INCHES		MILLIMETERS	
SYMBOL	MIN	MAX	MIN	MAX
A	0.003	0.007	0.08	0.18
B	0.006	-	0.15	-
C	-	0.005	-	0.13
D	0.035	0.044	0.89	1.12
E	0.110	0.120	2.80	3.05
F	0.075		1.90	
G	0.037		0.95	
H	0.047	0.055	1.19	1.40
I	0.083	0.104	2.10	2.64
J	0.014	0.020	0.35	0.50

SOT-23 (REV: R4)

Lead Code:
Reference individual device datasheet.

Part Marking: 2-4 Character Alpha/Numeric Code

Mounting Pad Geometry (Dimensions in mm)

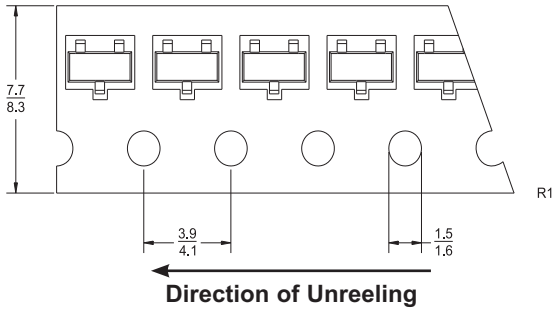


R4 (27-August 2021)

Package Details
SOT-23 Case

Tape Dimensions and Orientation (Dimensions in mm)

Tape Width: 8mm



Devices are taped in accordance with Electronic Industries Association Standard EIA-481-D

Packaging Base

7” Reel = 3,000 pcs.
13” Reel = 10,000 pcs.

Reel Labeling Information

Each reel is labeled with the following information:
Central Part Number, Customer Part Number, Purchase Order Number, Quantity, Lot Number, Date Code, Ship Date and Marking Code.

Reel Packing Information

Reel Size	Reels per Box (Maximum)	Parts per Box (Maximum)	Box Dimensions		Shipping Weight (Max.)	
			INCH	CM	LB	KG
7”	9	27,000	9x9x5	23x23x13	3	2
	18	54,000	9x9x9	23x23x23	6	3
	40	120,000	21x9x9	53x23x23	13	6
	108	324,000	27x9x17	69x23x43	34	16
13”	6	60,000	15x4x15	38x10x38	6	3
	14	140,000	15x15x9	38x38x23	15	7
	26	260,000	15x15x18	38x38x46	28	13

Ordering Information

- For devices taped and reeled on 7” reels, add TR suffix to part number.
- For devices taped and reeled on 13” reels, add TR13 suffix to part number.
- All SMDs are available in small quantities for prototype and manual placement applications.

Material Composition Specification

SOT-23 Case

Device average mass . . . . . **8.5 mg**

Fluctuation margin . . . . . **+/-10%**

Component	Material	Material		Substance	CAS No.	Substance		
		(%wt)	(mg)			(%wt)	(mg)	(ppm)
active device	doped Si	2.71%	0.23	Si	7440-21-3	2.71%	0.23	27,059
bond wire	gold or copper	0.25%	0.021	Au	7440-57-5	0.25%	0.021	2,471
				Cu	7440-50-8			
leadframe	alloy 42	25.4%	2.159	Fe	7439-89-6	14.99%	1.274	149,882
				Ni	7440-02-0	10.41%	0.885	104,118
leadframe plating	silver	0.71%	0.06	Ag	7440-22-4	0.71%	0.06	7,059
encapsulation*	EMC	68.94%	5.86	silica	7631-86-9	46.87%	3.984	468,706
				epoxy resin	29690-82-2	13.79%	1.172	137,882
				phenol resin	9003-35-4	6.89%	0.586	68,941
				Sb_2O_3	1309-64-4	0.69%	0.059	6,941
				Br	7726-95-6	0.69%	0.059	6,941
	EMC GREEN	68.94%	5.86	silica (fused)	60676-86-0	53.08%	4.512	530,824
				epoxy resin	29690-82-2	6.89%	0.586	68,941
				phenol resin	9003-35-4	6.68%	0.568	66,824
				carbon black	1333-86-4	0.21%	0.018	2,118
				metal hydroxide	1309-42-8	2.07%	0.176	20,706
plating**	tin/lead process	2.0%	0.17	Sn	7440-31-5	1.59%	0.135	15,882
				Pb	7439-92-1	0.41%	0.035	4,118
	matte tin	2.0%	0.17	Sn	7440-31-5	2.0%	0.17	20,000

*EMC GREEN molding compound is Halogen-Free.

**For Lead Free plating, add suffix “PB FREE” to part number.
For Tin/Lead plating, add suffix “TIN/LEAD” to part number.
No suffix designation allows for the supply of either lead-free or tin/lead plated product depending on availability.