



CHENMKO ENTERPRISE CO.,LTD

SURFACE MOUNT

N-Channel Enhancement Mode Field Effect Transistor

VOLTAGE 60 Volts CURRENT 115 mAmpere

2N7002GP

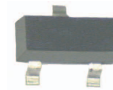
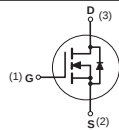
APPLICATION

- * Servo motor control.
- * Power MOSFET gate drivers.
- * Other switching applications.

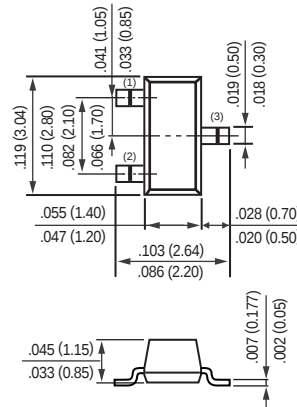
FEATURE

- * Small surface mounting type. (SOT-23)
- * High density cell design for low $R_{DS(ON)}$.
- * Suitable for high packing density.
- * Rugged and reliable.
- * High saturation current capability.
- * Voltage controlled small signal switch.

CIRCUIT



SOT-23



Dimensions in inches and (millimeters)

SOT-23

Absolute Maximum Ratings

$T_A = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	2N7002GP	Units
V_{DS}	Drain-Source Voltage	60	V
V_{DGR}	Drain-Gate Voltage ($R_{GS} = 1\text{ M}\Omega$)	60	V
V_{GSS}	Gate-Source Voltage - Continuous - Non Repetitive ($t_p < 50\mu\text{s}$)	± 20	V
		± 40	
I_D	Maximum Drain Current - Continuous (Note1)	$T_C = 25^\circ\text{C}$	mA
	- Continuous (Note1)	$T_C = 100^\circ\text{C}$	
	- Pulsed (Note2)	$T_C = 25^\circ\text{C}$	
P_D	Maximum Power Dissipation (Note3)	$T_A = 25^\circ\text{C}$	mW
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to 150	$^\circ\text{C}$

Note:

1. The Power Dissipation of the package may result in a lower continuous drain current
2. Pulse Test: Pulse Width $< 300\mu\text{s}$, Duty Cycle $< 2.0\%$.
3. for FR-5 board $1.0 \times 0.75 \times 0.062\text{in}$.

Thermal characteristics

$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	556	$^\circ\text{C/W}$
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2009-09

ELECTRICAL CHARACTERISTIC (2N7002GP)

Electrical Characteristics $T_A = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Units
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OFF CHARACTERISTICS

BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 10\text{ }\mu\text{A}$	60			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$T_J = 125^\circ\text{C}$			0.5	mA
I_{GSSF}	Gate - Body Leakage, Forward	$V_{GS} = 15\text{ V}, V_{DS} = 0\text{ V}$			100	nA
I_{GSSR}	Gate - Body Leakage, Reverse	$V_{GS} = -15\text{ V}, V_{DS} = 0\text{ V}$			-100	nA

ON CHARACTERISTICS (Note 4)

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1.0	1.6	2.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{ V}, I_D = 500\text{ mA}, T_C = 25^\circ\text{C}$		1.4	7.5	Ω
		$V_{GS} = 10\text{ V}, I_D = 500\text{ mA}, T_C = 125^\circ\text{C}$			13.5	
		$V_{GS} = 5\text{ V}, I_D = 50\text{ mA}, T_C = 25^\circ\text{C}$		1.8	7.5	
		$V_{GS} = 5\text{ V}, I_D = 50\text{ mA}, T_C = 125^\circ\text{C}$			13.5	
$V_{DS(on)}$	Drain-Source On-Voltage	$V_{GS} = 10\text{ V}, I_D = 500\text{ mA}$			3.75	V
		$V_{GS} = 5.0\text{ V}, I_D = 50\text{ mA}$			0.375	
$I_{D(on)}$	On-State Drain Current	$V_{GS} = 10\text{ V}, V_{DS} = 2.0\text{ }V_{DS(on)}$	500			mA
g_{FS}	Forward Transconductance	$V_{DS} = 2.0\text{ }V_{DS(on)}, I_D = 200\text{ mA}$	80			mS

DYNAMIC CHARACTERISTICS

C_{iss}	Input Capacitance	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$		17	50	pF
C_{oss}	Output Capacitance			10	25	
C_{rss}	Reverse Transfer Capacitance			2.5	5	
t_{on}	Turn-On Time (Note 4)	$V_{DD} = 25\text{ V}, R_L = 50\text{ }\Omega,$ $I_D = 500\text{ mA}, V_{gen} = 10\text{ V},$ $R_{GEN} = 25\text{ }\Omega$		7.0	20	nS
t_r	Turn-Off Time (Note 4)			11	40	

DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS

I_S	Maximum Continuous Drain-Source Diode Forward Current			115	mA
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current			0.8	A
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 115\text{ mA}$		1.5	V

Note:

4. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2.0\%$.

RATING CHARACTERISTIC CURVES (2N7002GP)

Typical Electrical Characteristics

Figure 1. Output Characteristics

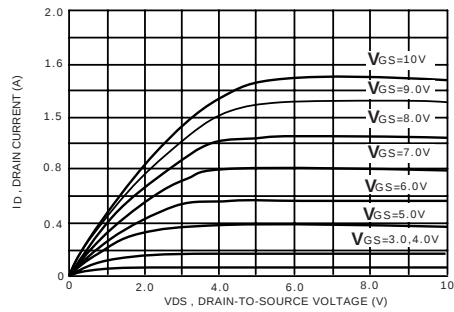


Figure 2. Transfer Characteristics

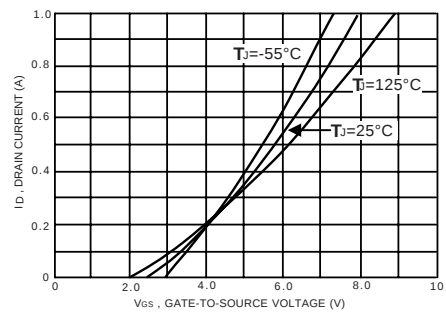


Figure 3. On-Resistance Variation with Temperature

