CHENMKO ENTERPRISE CO.,LTD

Halogens free devices

SURFACE MOUNT

N-Channel Enhancement Mode Field Effect Transistor

VOLTAGE 60 Volts CURRENT 115 mAmpere

2N7002ESGP

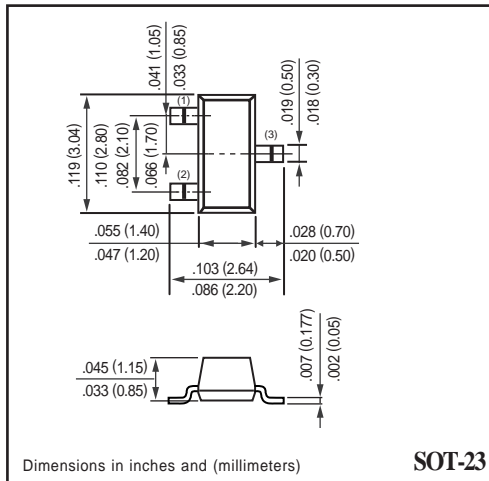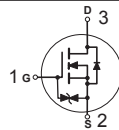## APPLICATION

* Relay driver
* High speed line driver
* Logic level transistor

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.
* ESD protect in input gate 2.0KV

SOT-23

Dimensions in inches and (millimeters)

SOT-23

CIRCUIT

Absolute Maximum Ratings T_A = 25°C unless otherwise noted

Symbol	Parameter	2N7002ESGP	Units
V_{DSS}	Drain-Source Voltage	60	V
V_{GSS}	Gate-Source Voltage	±20	V
I_D	Maximum Drain Current - Continuous	115	mA
	- Pulsed (Note 1)	800	
P_D	Maximum Power Dissipation (Note 2)	225	mW
T_J	Operating Temperature Range	-55 to 150	°C
T_{STG}	Storage Temperature Range	-55 to 150	°C

Note : 1. Pw <= 10uS , Duty <= 1%
2. When mounted on a 1*0.75*0.062 inch glass epoxy board.

2009-09

ELECTRICAL CHARACTERISTIC (2N7002ESGP)

Electrical Characteristics T_A = 25°C unless otherwise noted

Symbol	Parameter	Conditions		Min	Typ	Max	Units
OFF CHARACTERISTICS							
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 10 µA		60			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 60 V, V_{GS} = 0 V				1	µA
			T_J=125°C			0.5	mA
I_{GSSF}	Gate - Body Leakage, Forward	V_{GS} = 20 V, V_{DS} = 0 V				10	uA
I_{GSSR}	Gate - Body Leakage, Reverse	V_{GS} = -20 V, V_{DS} = 0 V				-10	uA
ON CHARACTERISTICS (Note 1)							
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 µA		1.0	1.85	2.5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance (Note 3)	V_{GS} = 5 V, I_D = 50 mA				7.5	Ω
		V_{GS} = 10 V, I_D = 500 mA				7.5	
g_{FS}	Forward Transconductance (Note 3)	V_{DS} = 10 V , I_D = 200 m A		80			mS
DYNAMIC CHARACTERISTICS							
C_{iss}	Input Capacitance	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz			25	50	pF
C_{oss}	Output Capacitance				10	25	
C_{rss}	Reverse Transfer Capacitance				3.0	5	
t_{on}	Turn-On Time (Note 3)	V_{DD} = 30 V, R_L = 150 Ω, I_D = 200 mA, V_{gen} = 10 V, R_{GEN} = 10 Ω			12	20	nS
t_r	Turn-Off Time (Note 3)				20	30	

Note:
 3. Pulse Test: Pulse Width $\leq$ 300µs, Duty Cycle $\leq$ 1.0%.

RATING CHARACTERISTIC CURVES (2N7002ESGP)

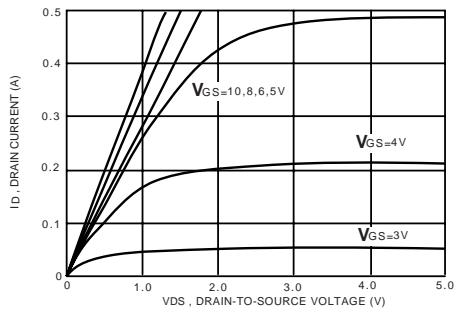**Typical Electrical Characteristics**

Figure 1. Output Characteristics

I_D , DRAIN CURRENT (A)

V_{GS}=10,8,6,5V

V_{GS}=4V

V_{GS}=3V

VDS , DRAIN-TO-SOURCE VOLTAGE (V)

Figure 2. Transfer Characteristics

I_D , DRAIN CURRENT (A)

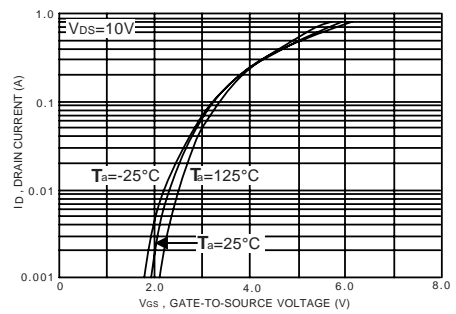V_{DS}=10V

T_a=-25°C T_a=125°C

T_a=25°C

V_{GS} , GATE-TO-SOURCE VOLTAGE (V)

Figure3. On-Resistance Variation with Temperature

$R_{DS(on)}$, NORMALIZED DRAIN-SOURCE ON-RESISTANCE

V_{GS}=10V
I_D=115mA

T_J , JUNCTION TEMPERATURE (°C)