



**CHENMKO ENTERPRISE CO.,LTD**

**2N7002ESPT**

**SURFACE MOUNT**

**N-Channel Enhancement Mode Field Effect Transistor**

VOLTAGE 60 Volts CURRENT 115 mAmpere

Lead free devices

**APPLICATION**

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

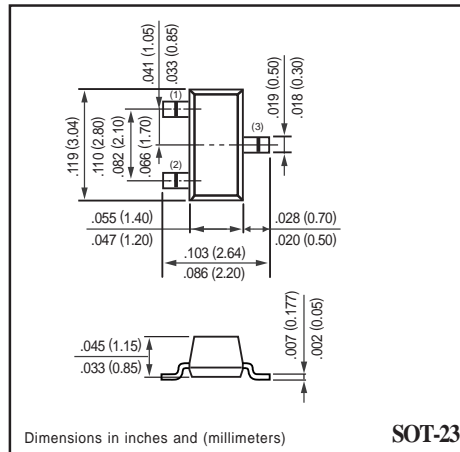
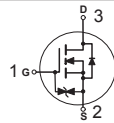
**FEATURE**

- \* Small surface mounting type. (SOT-23)
- \* High density cell design for low R<sub>DS(ON)</sub>.
- \* Suitable for high packing density.
- \* Rugged and reliable.
- \* High saturation current capability.
- \* ESD protect in input gate 2.0KV



SOT-23

**CIRCUIT**



SOT-23

**Absolute Maximum Ratings** T<sub>A</sub> = 25°C unless otherwise noted

Symbol	Parameter	2N7002ESPT	Units
V <sub>DSS</sub>	Drain-Source Voltage	60	V
V <sub>GSS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub>	Maximum Drain Current - Continuous	115	mA
	- Pulsed (Note 1)	800	
P <sub>D</sub>	Maximum Power Dissipation (Note 2)	225	mW
T <sub>J</sub>	Operating Temperature Range	-55 to 150	°C
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C

Note : 1. P<sub>w</sub> <= 10uS , Duty <= 1%  
 2. When mounted on a 1\*0.75\*0.062 inch glass epoxy board.

2009-09

## ELECTRICAL CHARACTERISTIC ( 2N7002ESPT )

**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	$V_{GS} = 0\text{ V}, I_D = 10\ \mu\text{A}$	60			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
			$T_J = 125^\circ\text{C}$			0.5
$I_{GSSF}$	Gate - Body Leakage, Forward	$V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$			10	$\mu\text{A}$
$I_{GSSR}$	Gate - Body Leakage, Reverse	$V_{GS} = -20\text{ V}, V_{DS} = 0\text{ V}$			-10	$\mu\text{A}$

### ON CHARACTERISTICS (Note 1)

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	1.0	1.85	2.5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance (Note 3)	$V_{GS} = 5\text{ V}, I_D = 50\text{ mA}$			7.5	$\Omega$
		$V_{GS} = 10\text{ V}, I_D = 500\text{ mA}$			7.5	
$g_{FS}$	Forward Transconductance (Note 3)	$V_{DS} = 10\text{ V}, I_D = 200\text{ mA}$	80			$\text{mS}$

### DYNAMIC CHARACTERISTICS

$C_{iss}$	Input Capacitance	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$		25	50	$\text{pF}$
$C_{oss}$	Output Capacitance			10	25	
$C_{rss}$	Reverse Transfer Capacitance			3.0	5	
$t_{on}$	Turn-On Time (Note 3)	$V_{DD} = 30\text{ V}, R_L = 150\ \Omega,$ $I_D = 200\text{ mA}, V_{gen} = 10\text{ V},$ $R_{GEN} = 10\ \Omega$		12	20	$\text{nS}$
$t_r$	Turn-Off Time (Note 3)			20	30	

Note:  
3. Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 1.0\%$ .

## RATING CHARACTERISTIC CURVES ( 2N7002ESPT )

### Typical Electrical Characteristics

Figure 1. Output Characteristics

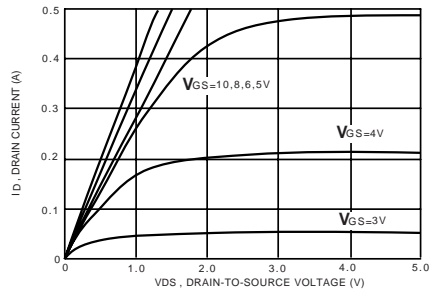


Figure 2. Transfer Characteristics

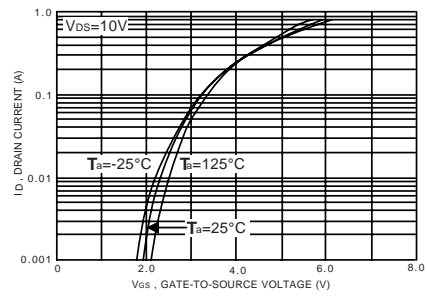


Figure 3. On-Resistance Variation with Temperature

