



CHENMKO ENTERPRISE CO.,LTD

SURFACE MOUNT

N-Channel Enhancement Mode Field Effect Transistor

VOLTAGE 60 Volts CURRENT 500 mAmpere

2N7002ESEPT

Lead free devices

APPLICATION

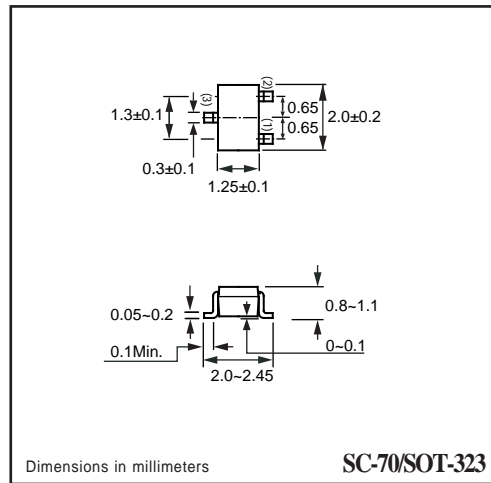
- * Relay driver
- * High speed line driver
- * Logic level transistor

FEATURE

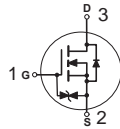
- * Small surface mounting type. (SOT-23)
- * High density cell design for low $R_{DS(ON)}$.
- * Suitable for high packing density.
- * Rugged and reliable.
- * High saturation current capability.
- * ESD protect in input gate 1.5KV

CONSTRUCTION

- * N-Channel Enhancement with ESD protection in input



CIRCUIT



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

Symbol	Parameter	2N7002ESEPT	Units	
V_{DSS}	Drain-Source Voltage	60	V	
V_{DGR}	Drain-Gate Voltage ($R_{GS} \leq 1 \text{ M}\Omega$)	60	V	
V_{GSS}	Gate-Source Voltage - Continuous	± 20	V	
	- Non Repetitive ($t_p < 50\mu\text{s}$)	± 40		
I_D	Maximum Drain Current - Continuous - Pulsed	$T_A = 25^\circ\text{C}$	500	mA
		$T_A = 100^\circ\text{C}$	800	
P_D	Maximum Power Dissipation	400	mW	
T_J, T_{STG}	Operating and Storage Temperature Range	-65 to 150	$^\circ\text{C}$	

Thermal characteristics

$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	350	$^\circ\text{C/W}$
-----------------	-----------------------------------------	-----	--------------------

RATING CHARACTERISTIC CURVES (2N7002ESEP7)

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
--------	-----------	------------	-----	-----	-----	-------

OFF CHARACTERISTICS

BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 10\ \mu\text{A}$	60	75		V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 48\text{ V}, V_{GS} = 0\text{ V}$			1.0	μA
		$T_J = 150^\circ\text{C}$			10	μA
I_{GSSF}	Gate - Body Leakage, Forward	$V_{GS} = 10\text{ V}, V_{DS} = 0\text{ V}$			0.5	μA
I_{GSSR}	Gate - Body Leakage, Reverse	$V_{GS} = -15\text{ V}, V_{DS} = 0\text{ V}$			-0.5	μA

ON CHARACTERISTICS (Note 1)

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 1.0\text{ mA}$	1		2.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{ V}, I_D = 500\text{ mA}$			4.5	Ω
		$V_{GS} = 5.0\text{ V}, I_D = 50\text{ mA}$			5.0	
g_{FS}	Forward Transconductance	$V_{DS} = 10\text{ V}, V_{GS(on)}, I_D = 200\text{ mA}$	100	300		mS

DYNAMIC CHARACTERISTICS

C_{iss}	Input Capacitance	$V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$		13	40	pF
C_{oss}	Output Capacitance			8	30	
C_{rss}	Reverse Transfer Capacitance			4	10	
t_{on}	Turn-On Time	$V_{DD} = 50\text{ V}, R_L = 250\ \Omega,$ $V_{GS} = 10\text{ V}, R_{GEN} = 50\ \Omega$		3	10	nS
t_{off}	Turn-Off Time	$V_{DD} = 50\text{ V}, R_L = 250\ \Omega,$ $V_{GS} = 10\text{ V}, R_{GEN} = 50\ \Omega$		9	15	nS

DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS

I_S	Maximum Continuous Drain-Source Diode Forward Current				300	mA
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current				1.2	A
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 200\text{ mA}$ (Note 1)		0.85	1.5	V
t_{rr}	Reverse Recovery Time	$I_S = 300\text{ mA}, di_S/dt = -100\text{ A}/\mu\text{S}$		30		nS
Q_r	Recovery Charge	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}$		30		nC

Note:

1. Pulse Test: Pulse Width < 300 μs , Duty Cycle < 2.0%.