



# 2N7002E

## Silicon N-channel MOSFET

For switching circuits  
 Panasonic parts No. FK360602

### ■ Features

- Low Drain-source On-state Resistance :  $R_{DS(on)}$  typ =  $1 \Omega$  ( $V_{GS} = 4.5 V$ )
- Halogen-free / RoHS compliant  
 (EU RoHS / UL-94 V-0 / MSL : Level 1 compliant)

### ■ Marking Symbol : GV

### ■ Packaging

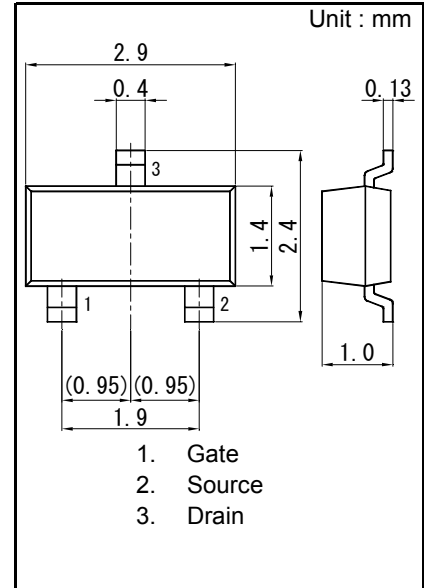
Embossed type (Thermo-compression sealing) : 3 000 pcs / reel (standard)

### ■ Absolute Maximum Ratings $T_a = 25 \text{ }^\circ\text{C}$

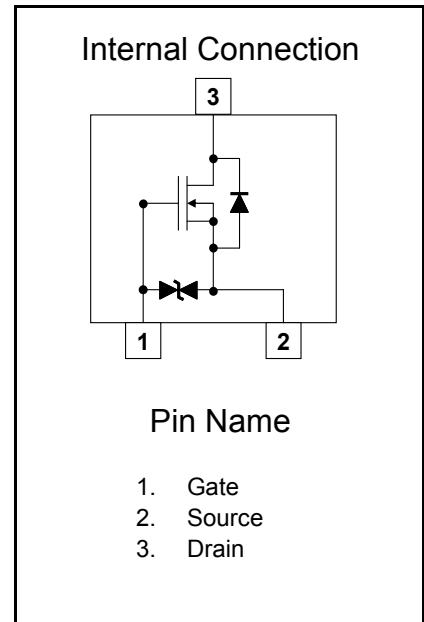
Parameter	Symbol	Rating	Unit
Drain to Source Voltage	$V_{DS}$	60	V
Gate to Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current	$I_D$	300	mA
Drain Current (Pulsed) <sup>*1</sup>	$I_{Dp}$	600	mA
Total Power Dissipation <sup>*2</sup>	PD	350	mW
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-55 to +150	$^\circ\text{C}$

Note \*1 Pulse test: Ensure that the channel temperature does not exceed  $150 \text{ }^\circ\text{C}$

\*2 Mounted on FR4 board ( $25.4\text{mm} \times 25.4\text{mm} \times 0.8\text{mm}$ , Cu area  $> 300\text{mm}^2$ )



Panasonic	NMini3-R1-B
JEITA	SC-59A
Code	TO-236AA/SOT-23



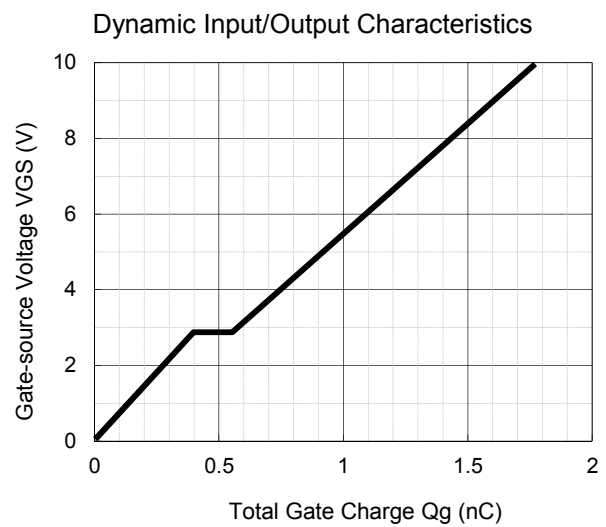
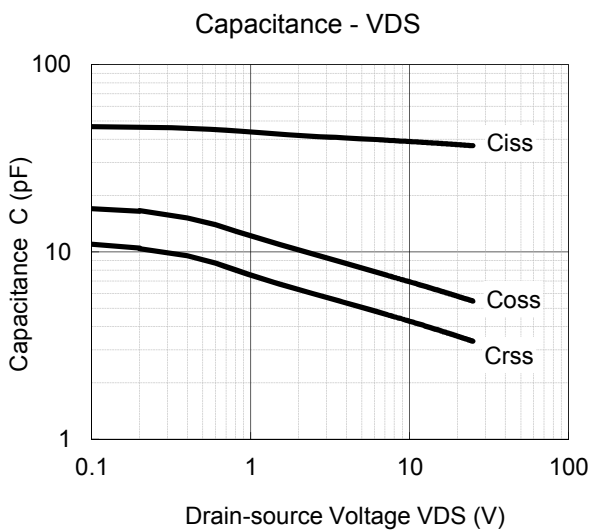
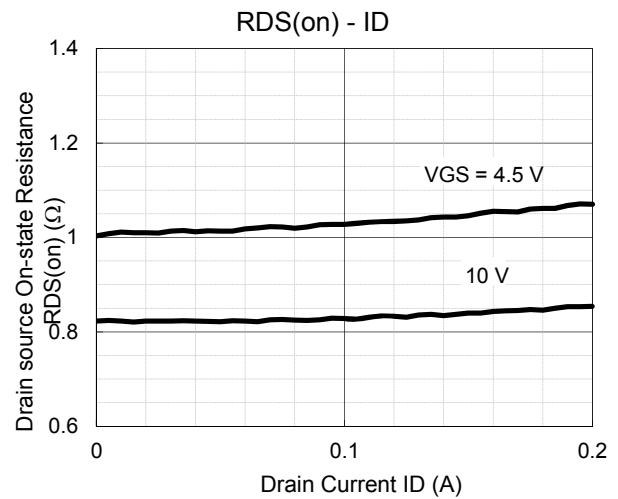
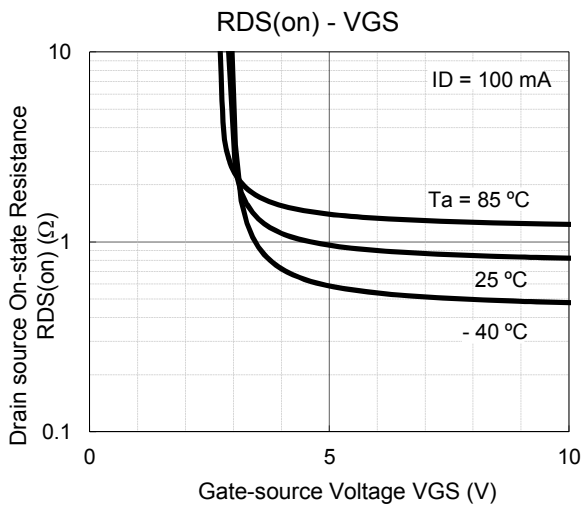
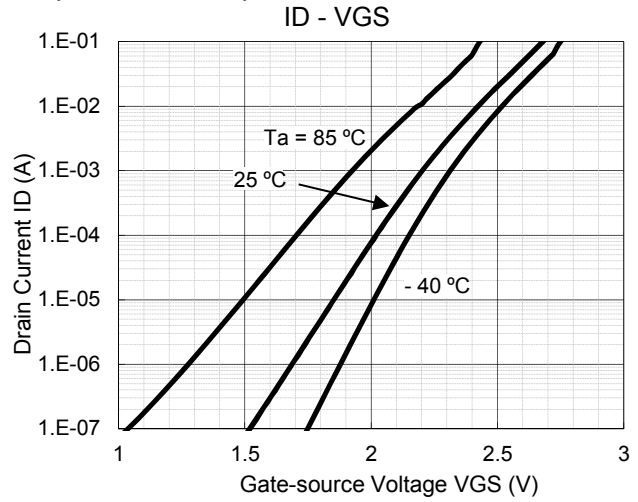
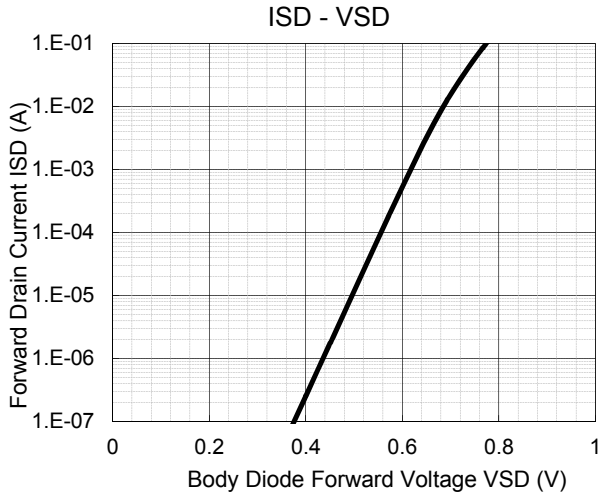
■ Electrical Characteristics Ta = 25 °C ± 3 °C

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-source Breakdown Voltage	VDSS	ID = 250 μA, VGS = 0 V	60			V
Zero Gate Voltage Drain Current	IDSS	VDS = 60 V, VGS = 0 V			1	μA
Gate-source Leakage Current	IGSS	VGS = ±20 V, VDS = 0 V			±10	μA
Gate-source Threshold Voltage	Vth	ID = 250 μA, VDS = 10 V	1		3	V
Drain-source On-state Resistance	RDS(on)1	ID = 100 mA, VGS = 10 V		0.8	3	Ω
	RDS(on)2	ID = 100 mA, VGS = 4.5 V		1	4	
Input Capacitance	Ciss	VDS = 10 V, VGS = 0 V f = 1 MHz		40		pF
Output Capacitance	Coss			7		
Reverse Transfer Capacitance	Crss			4.5		
Total Gate Charge	Qg	VDS = 10 V, VGS = 0 to 4.5 V ID = 200 mA		0.8		nC
Gate to Source Charge	Qgs			0.2		
Gate to Drain Charge	Qgd			0.4		

Note : Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 Measuring methods for transistors.

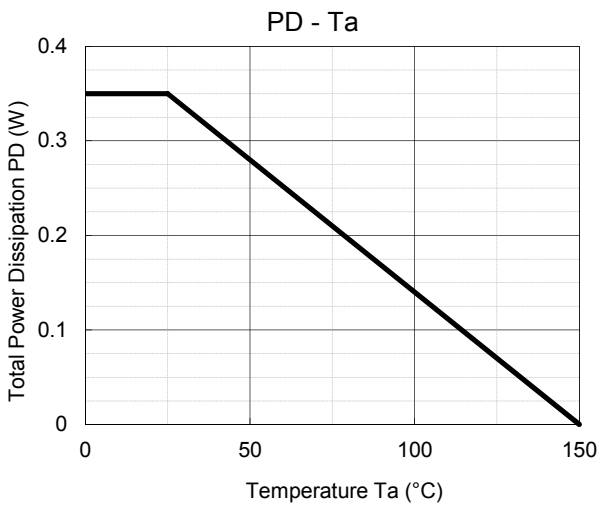
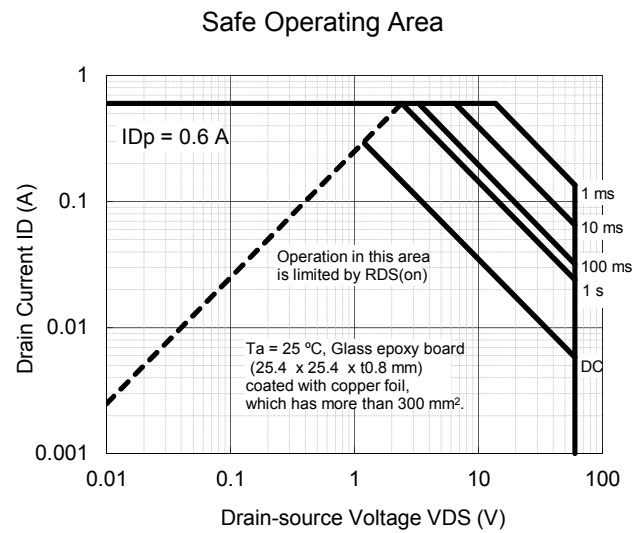
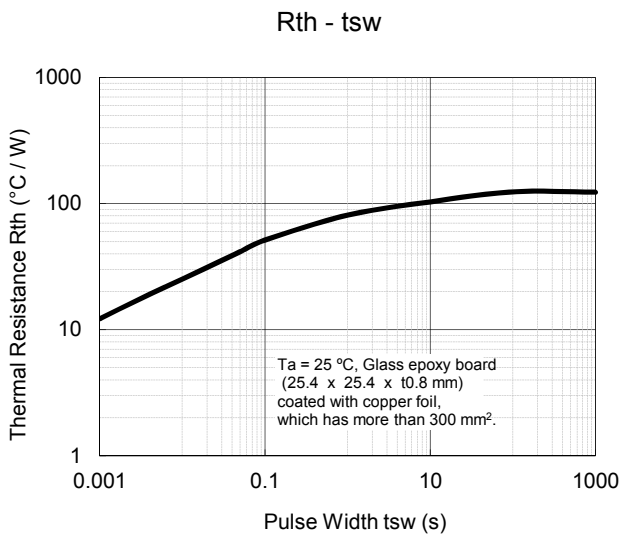
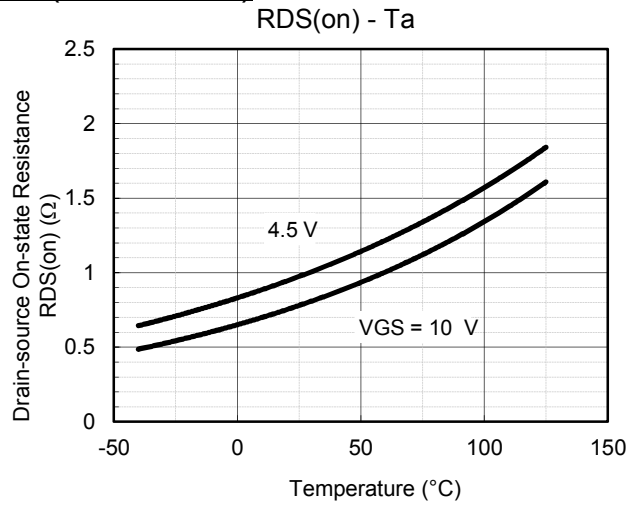
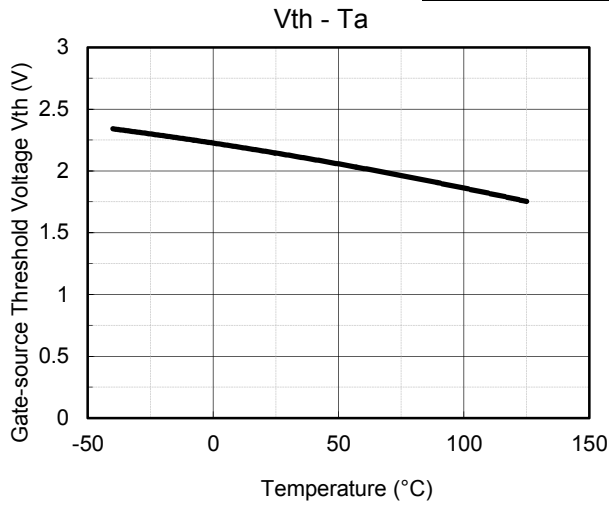


Technical Data ( reference )





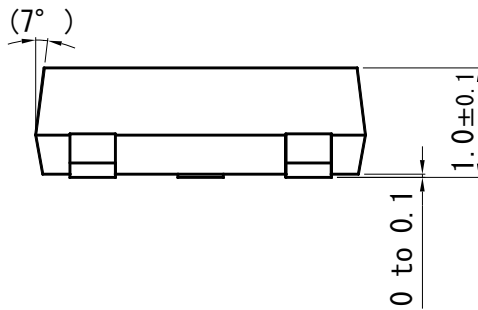
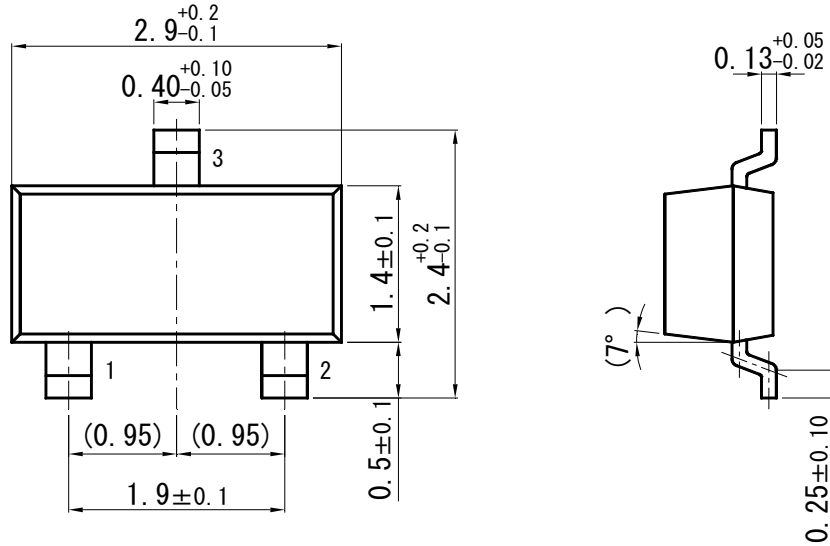
Technical Data ( reference )



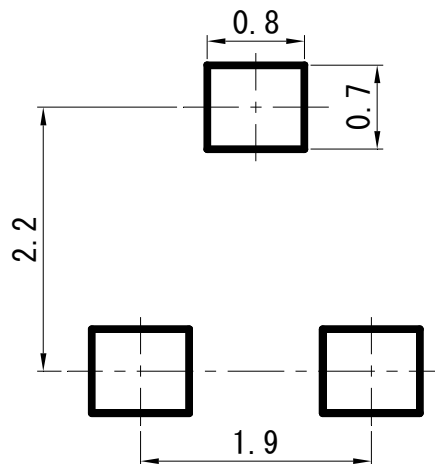


NMini3-R1-B

Unit : mm



■ Land Pattern (Reference) (Unit : mm)



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