



2N7002E

Silicon N-channel MOSFET

For switching circuits
 Panasonic parts No. FK360602

■ Features

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

■ Marking Symbol : GV

■ Packaging

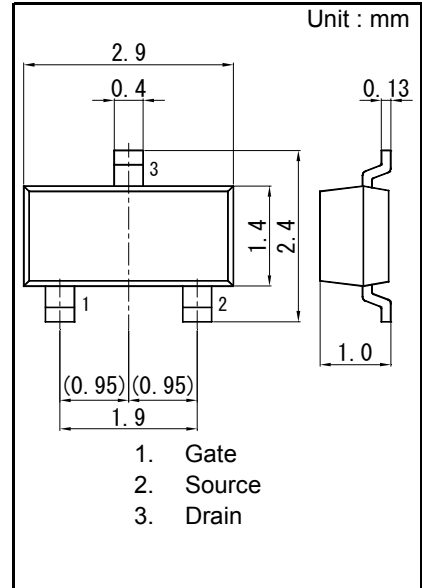
Embossed type (Thermo-compression sealing) : 3 000 pcs / reel (standard)

■ Absolute Maximum Ratings $T_a = 25$ °C

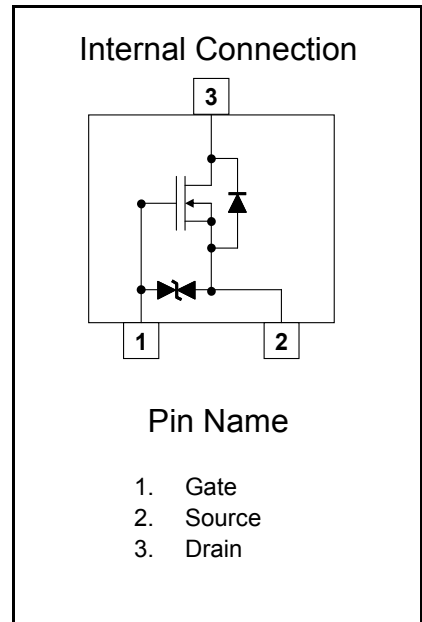
Parameter	Symbol	Rating	Unit
Drain to Source Voltage	V_{DS}	60	V
Gate to Source Voltage	V_{GS}	± 20	V
Drain Current	I_D	300	mA
Drain Current (Pulsed) ^{*1}	I_{Dp}	600	mA
Total Power Dissipation ^{*2}	PD	350	mW
Channel Temperature	T_{ch}	150	°C
Storage Temperature Range	T_{stg}	-55 to +150	°C

Note *1 Pulse test: Ensure that the channel temperature does not exceed 150 °C

*2 Mounted on FR4 board (25.4mm×25.4mm×t0.8mm, Cu area >300mm²)



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



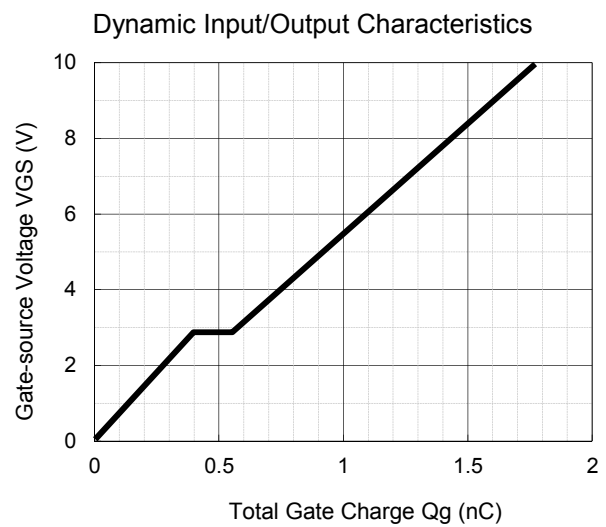
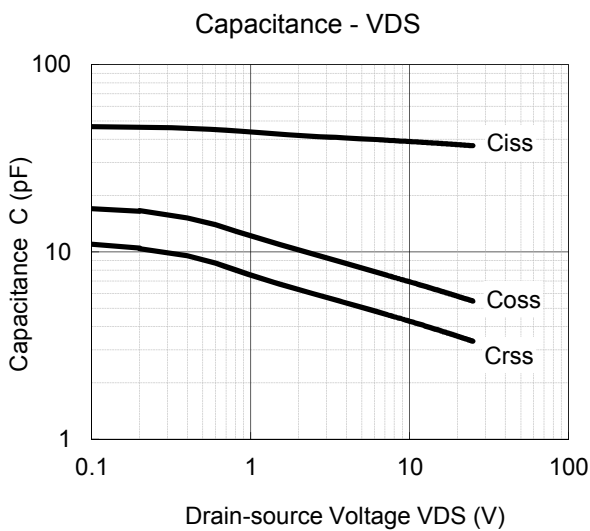
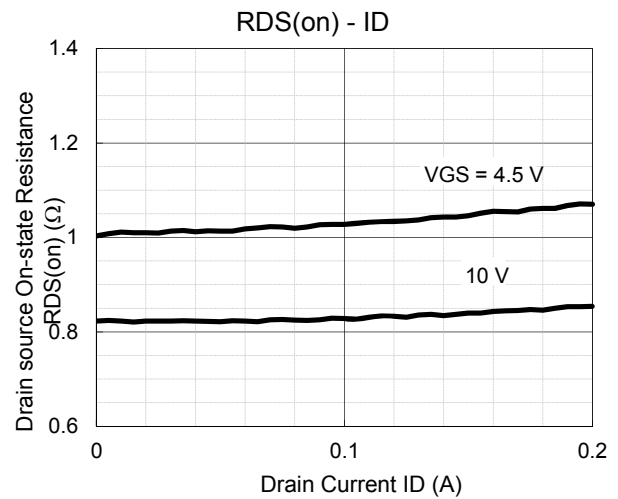
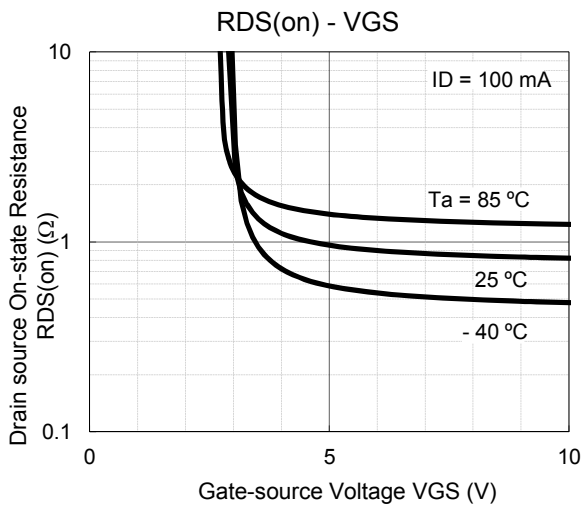
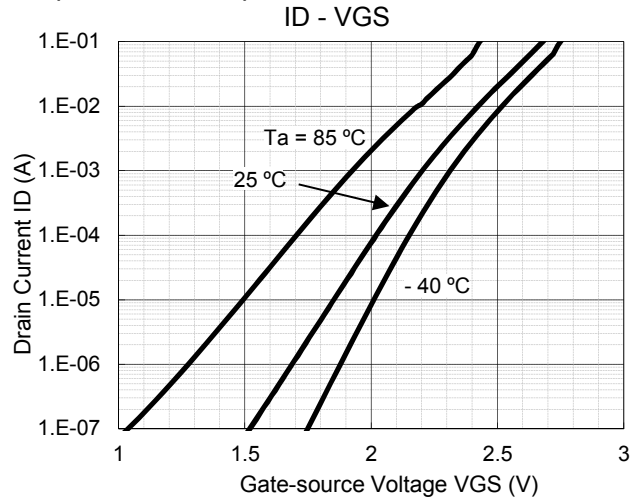
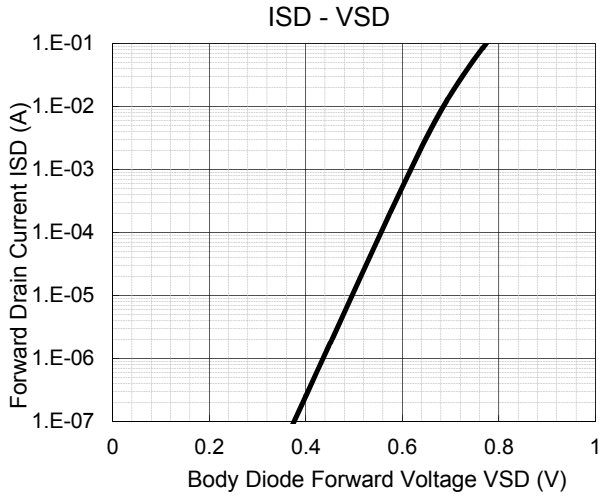


■ Electrical Characteristics Ta = 25 °C ± 3 °C

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		

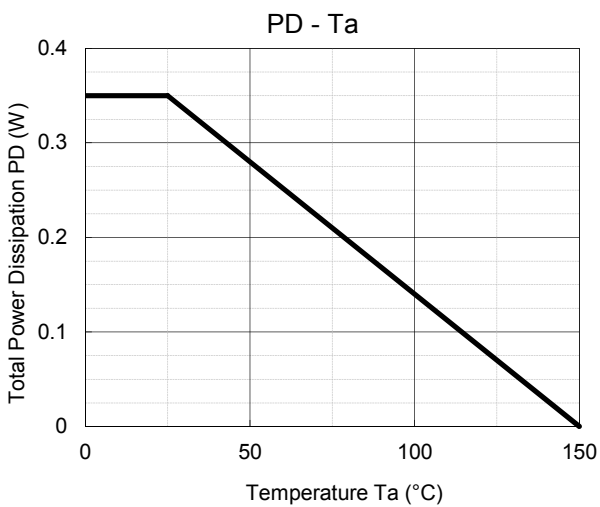
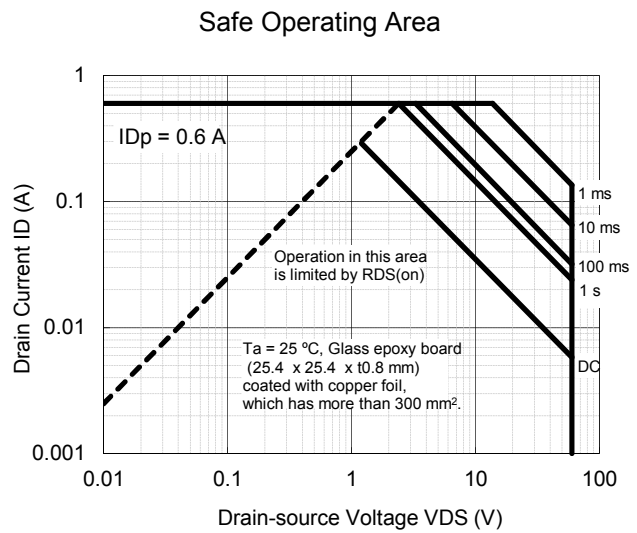
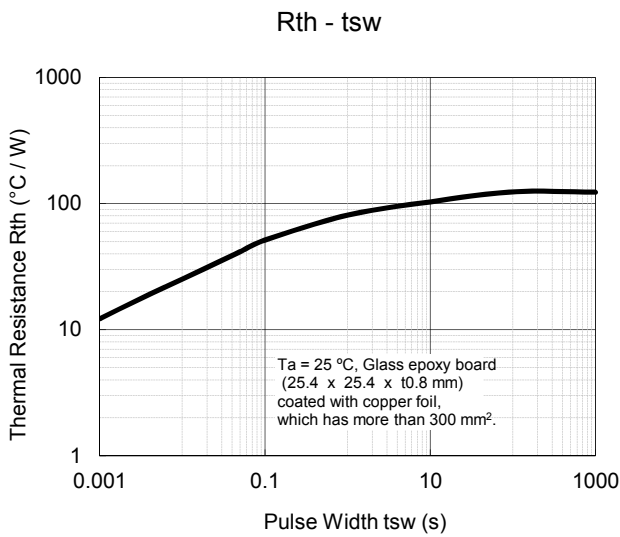
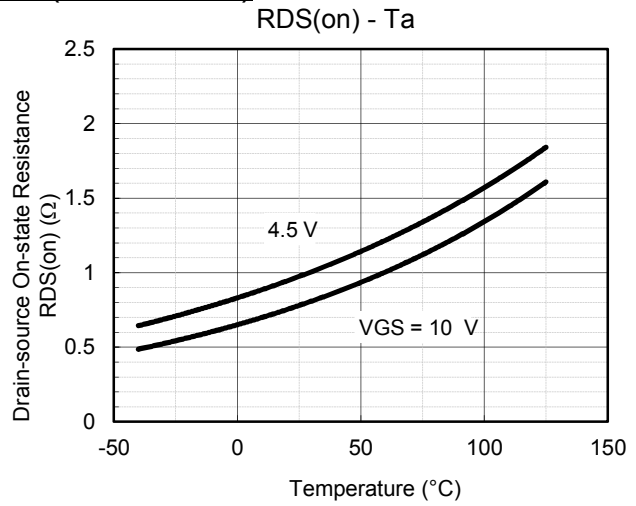
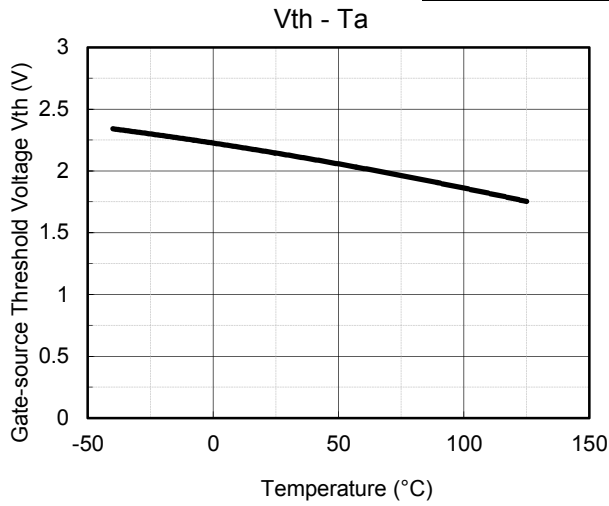
Note : Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 Measuring methods for transistors.

Technical Data (reference)





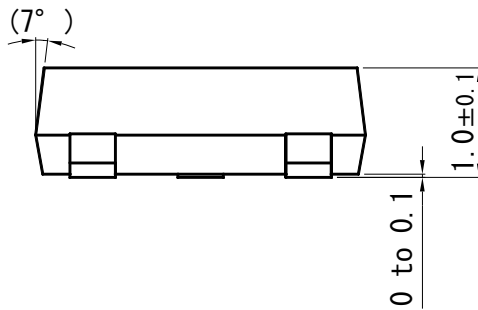
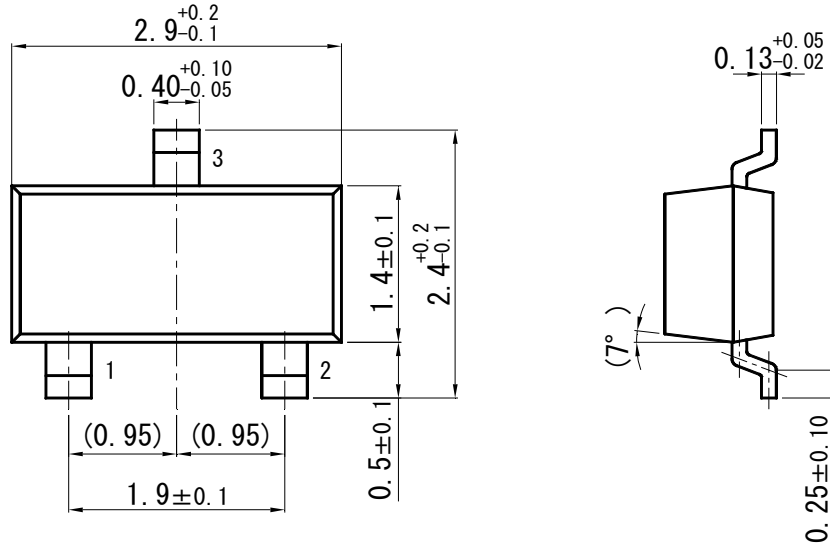
Technical Data (reference)



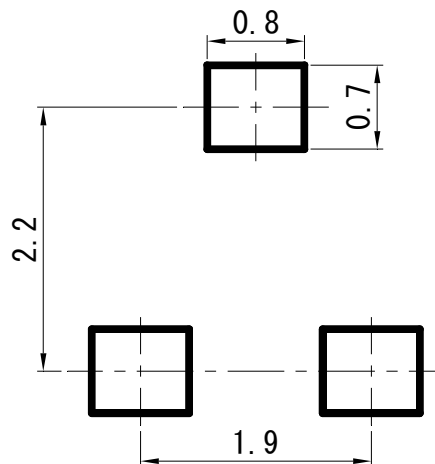


NMini3-R1-B

Unit : mm



■ Land Pattern (Reference) (Unit : mm)



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