■ Features

- High Output Power: Psat=51.0dBm (Typ.)
- High Gain: Gp=10.0dB (Typ.)
- High Power Added Efficiency: PAE=41% (Typ.)
- Broad Band: 8.5 to 9.8GHz
- Impedance Matched Zin/Zout = 50ohm
- Hermetically Sealed Package

■ Description

The SGC8598-100B-R is a high power GaN-HEMT that is internally matched for X-band radar bands to provide optimum power and gain in a 50ohm system.

ABSOLUTE MAXIMUM RATING (Case Temperature T_c=25 deg.C)

Item	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	55	V
Gate-Source Voltage	V_{GS}	-15	V
Storage Temperature	T_{stg}	-55 to +125	deg.C
Channel Temperature	T_{ch}	+250	deg.C

RECOMMENDED OPERATING CONDITION

Item	Symbol	Condition	Limit	Unit
Drain-Source Voltage	V_{DS}		<=50	V
Forward Gate Current	I_{GF}	Rg=100ohm	<=61.7	mA
Reverse Gate Current	I_{GR}	Rg=100ohm	>=-4.5	mA
Channel Temperature	T_{ch}		<+200	deg.C
Output Power	P_{out}		<=P5dB	dBm

ELECTRICAL CHARACTERISTICS (Case Temperature T_c=25 deg.C)

Item	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Pinch-off Voltage	V_p	V_{DS}=50V, I_{DS}=6.5mA	-	-4.5	-	V
Frequency Range	Freq.	V_{DS}=50V-typ. $I_{DS(DC)}$=0.33A-typ. Pulse Width=100µsec. Duty=10%	8.5	-	9.8	GHz
Output Power at Pin=41dBm	P_{sat}		50.0	51.0	-	dBm
Power Gain at Pout=50dBm	G_p		9.0	10.0	-	dB
Drain Current at Pin=41dBm	I_{DSR}		-	5.5	7.4	A
Power Added Efficiency at Pin=41dBm	PAE		-	41	-	%
Gain Flatness	ΔG		-	1.6	-	dB
Thermal Resistance	R_{th}	Channel to Case (P_{diss}=100W,CW)	-	1.4	1.8	deg.C/W

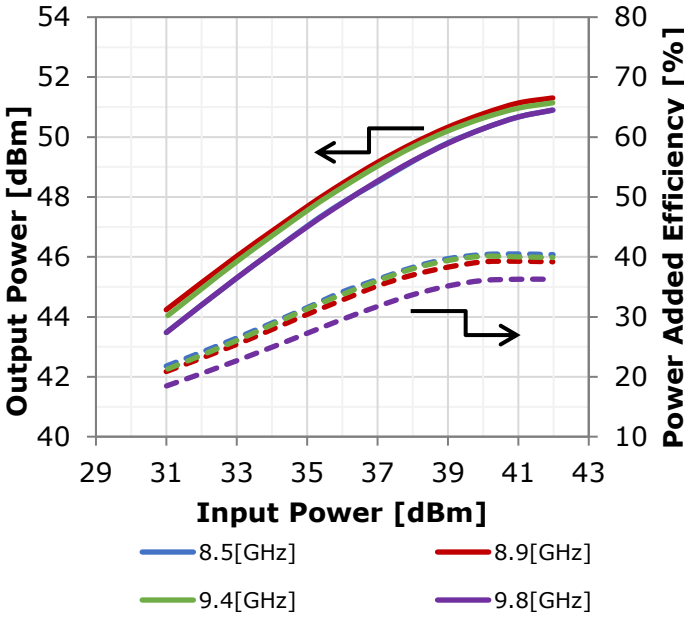
CASE STYLE	IK	
RoHS Compliance	YES	
ESD	Class 2	2000V to <4000V

Note: Based on ANSI/ESDA/JEDEC JS-001-2012(C=100pF, R=1.5kohm)

● RF Characteristics

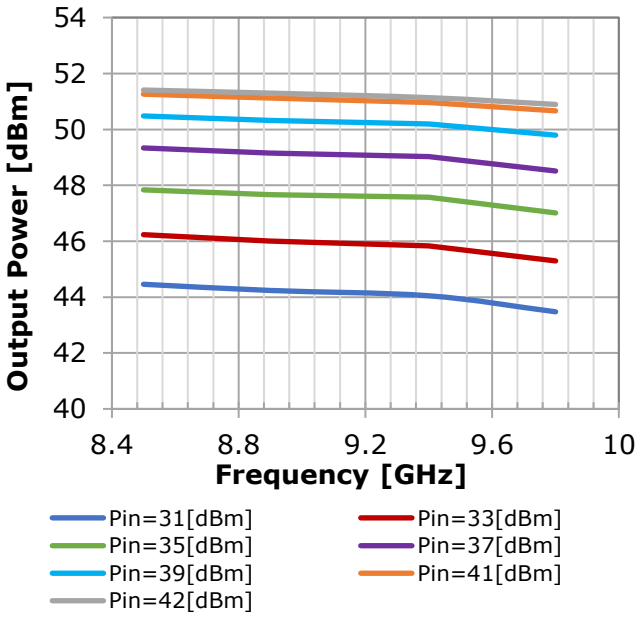
Output Power & Power Added Efficiency vs. Input Power

V_{DS}=50V, $I_{DS(DC)}$=0.33A
PW=100μsec., Duty=10%



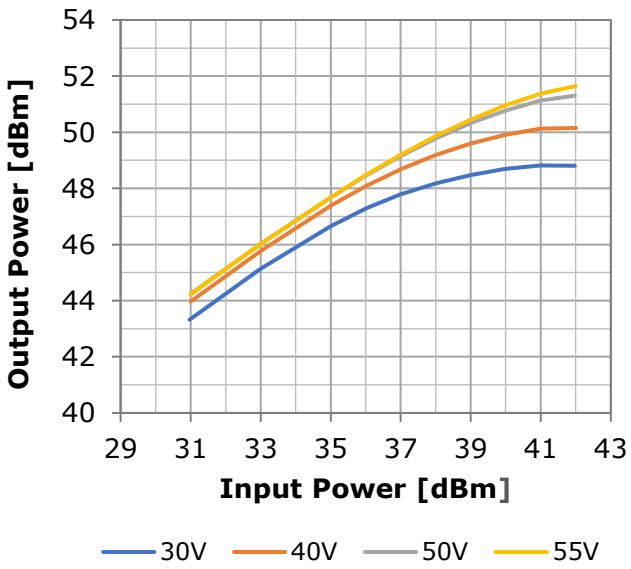
Output Power vs. Frequency

V_{DS}=50V, $I_{DS(DC)}$=0.33A
PW=100μsec., Duty=10%



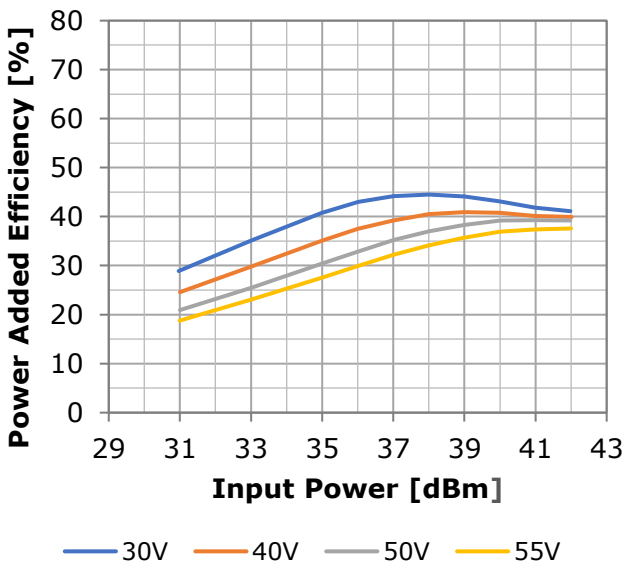
Output Power vs. Input Power by Drain Voltage

f=8.9GHz, $I_{DS(DC)}$=0.33A
PW=100μsec., Duty=10%



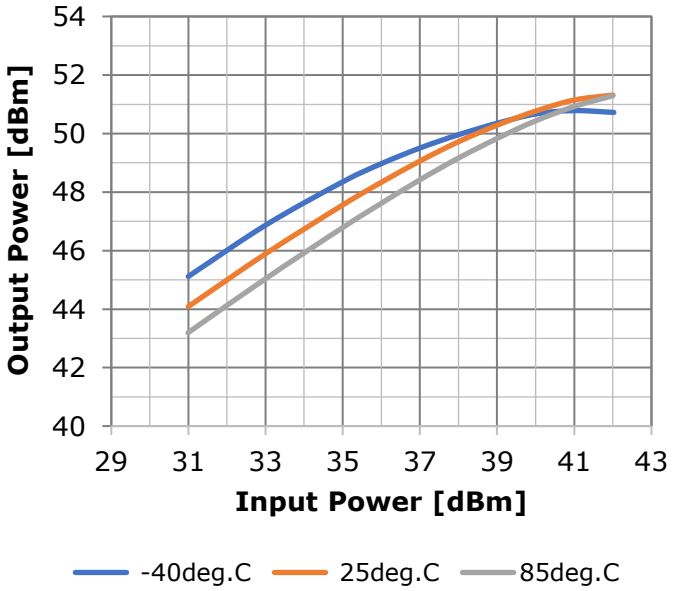
Power Added Efficiency vs. Input Power by Drain Voltage

f=8.9GHz, $I_{DS(DC)}$=0.33A
PW=100μsec., Duty=10%

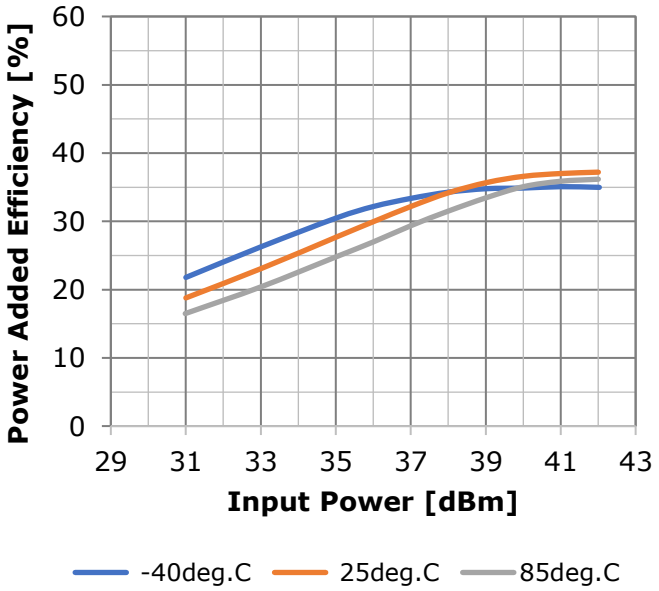


● RF Characteristics

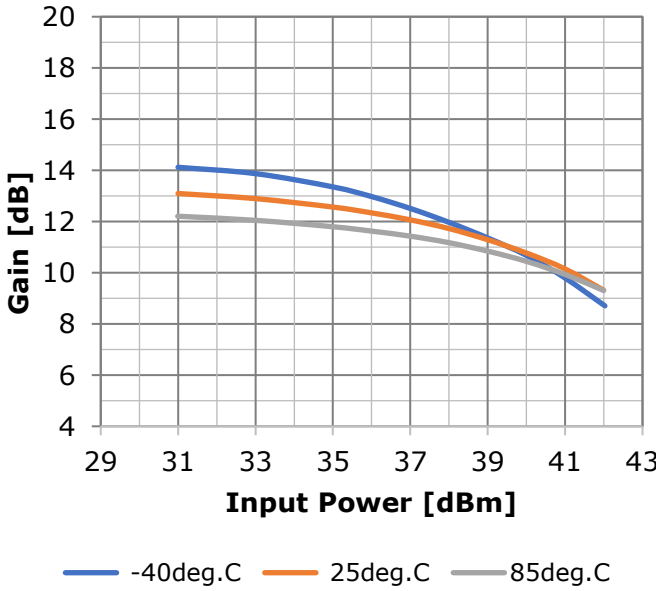
Output Power vs. Input Power
by case temperature
f=8.9GHz, V_{DS}=50V, $I_{DS(DC)}$=0.33A
PW=100μsec., Duty=10%



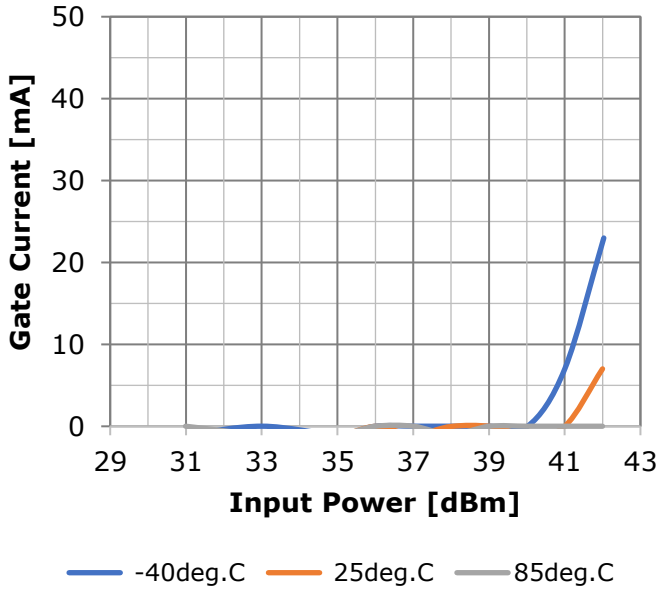
Power Added Efficiency vs. Input Power
by case temperature
f=8.9GHz, V_{DS}=50V, $I_{DS(DC)}$=0.33A
PW=100μsec., Duty=10%



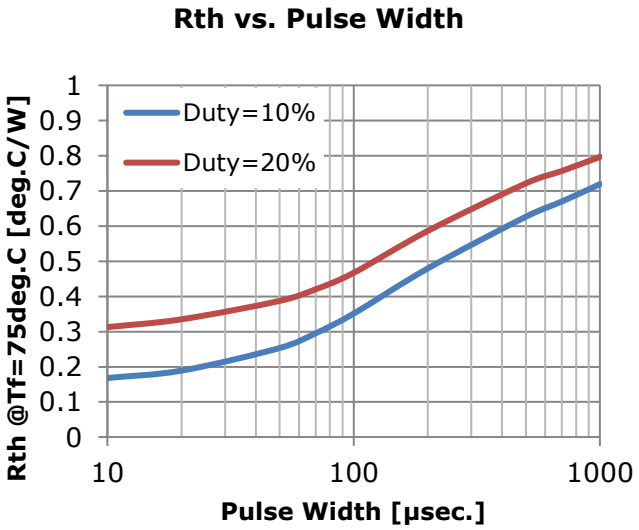
Gain vs. Input Power
by case temperature
f=8.9GHz, V_{DS}=50V, $I_{DS(DC)}$=0.33A
PW=100μsec., Duty=10%



Gate Current vs. Input Power
by case temperature
f=8.9GHz, V_{DS}=50V, $I_{DS(DC)}$=0.33A
PW=100μsec., Duty=10%



Thermal Characteristics In Pulsed Operation



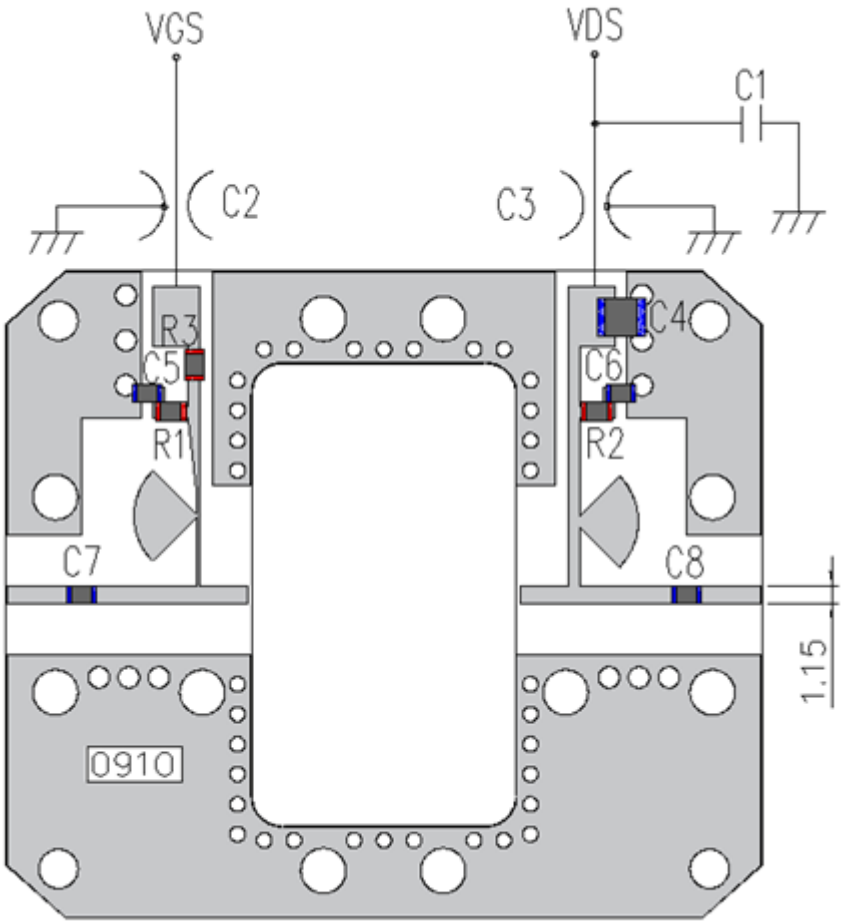
Ordering Information

Part Number	PGS	Phase data	Packing Style
SGC8598-100B-R	No	No	JEDEC Tray
SGC8598-100B-R/001	Yes	Yes	JEDEC Tray
SGC8598-100B-R/002	No	Yes	JEDEC Tray

Notes:

- PGS means a graphite sheet. It is included as an attachment.
- Phase data will be included in the shipping data as a reference value.

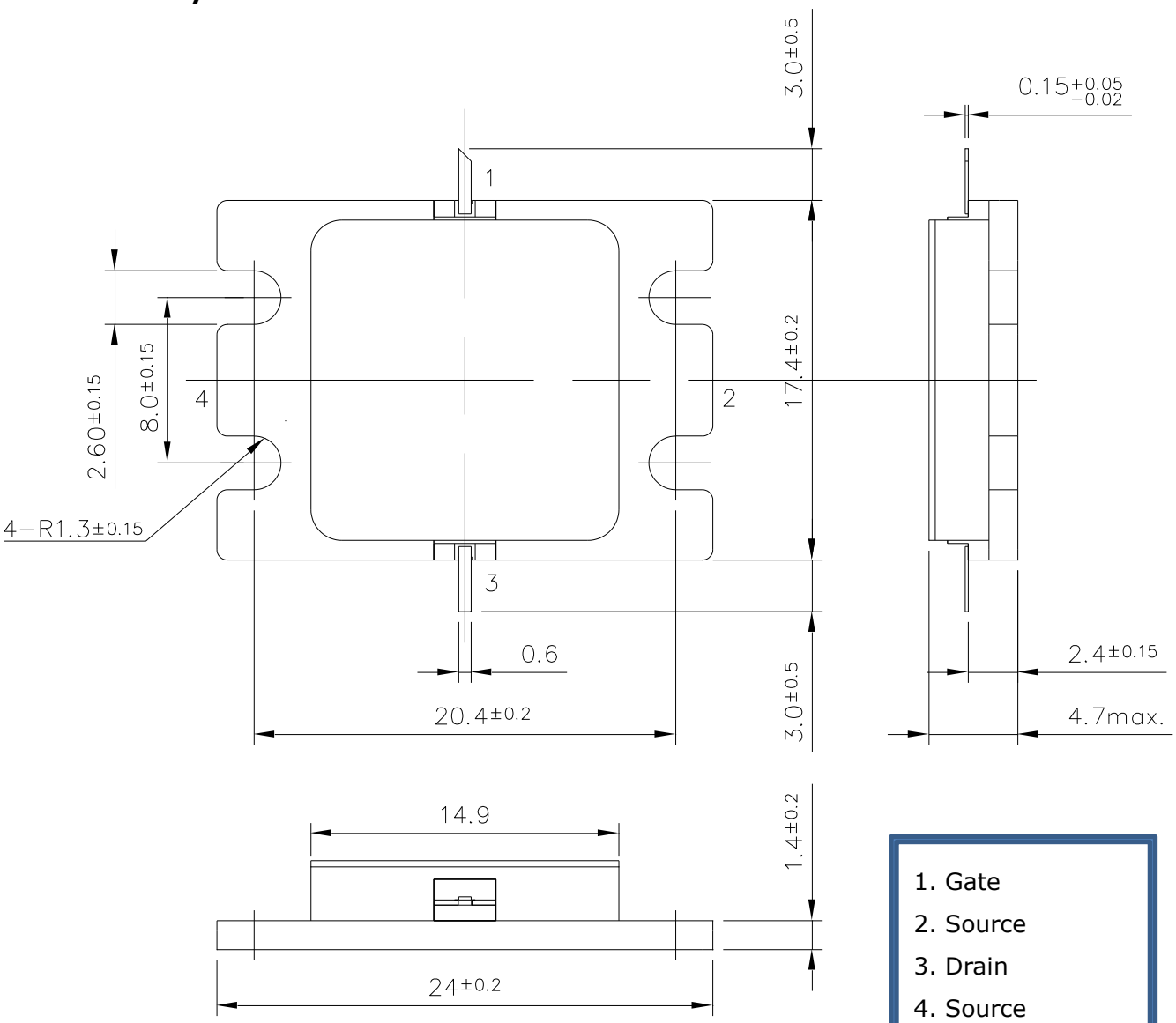
- **Circuit board example**



Part Index	Description
C1	1000uF, AEC
C2, C3	1000pF, feedthrough EMI filter
C4	10uF, MLCC, 3225M
C5, C6	1000pF, MLCC, 2012M
C7, C8	1.5pF, MLCC, 2012M
R1, R2	51ohm, Resistor, 2012M
R3	100ohm, Resistor, 2012M
PCB	Rogers RO4003C, 20mil

● Package Outline

Case Style : IK

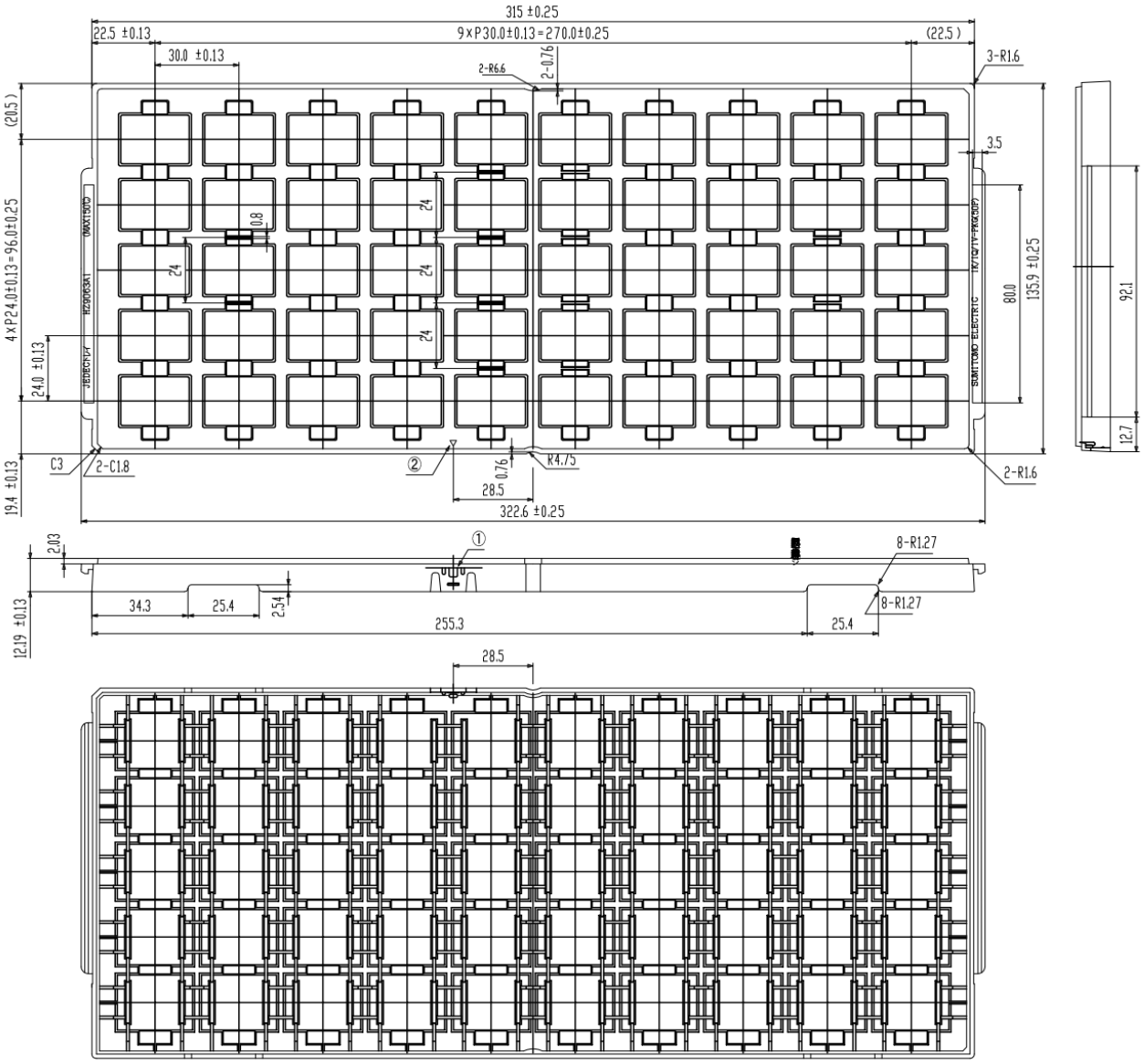


1. Gate
2. Source
3. Drain
4. Source

Unit: mm

Tolerance: ±0.15

- **JEDEC Tray of IK package**



Material : PPE

Unit: mm

- **Products with PGS will come with a graphite sheets.**
  Below is packing example for reference purpose only and subject to change.

Notes:

- The enclosed graphite sheet is “Panasonic, EYGS series, thickness 0.1mm”. Outgoing inspection (RF test) of the products is performed with the same graphite sheet.
- Long-term reliability of Sumitomo Electric's product is confirmed without the graphite sheet.
- Basically, quality of graphite sheet is outside of Sumitomo Electric's warranty. It will be customer’s choice whether the products will be used with or without graphite sheets. Please confirm the necessary reliability according to the customer’s usage condition.

Notes & Disclaimer

- Do not put this product into the mouth.
- Do not alter the form of this product into a gas, powder, or liquid through burning, crushing, or chemical processing as these by-products are dangerous to the human body if inhaled, ingested, or swallowed.
- Respect all applicable laws of the country when discarding this product.
  This product must be disposed in accordance with methods specified by applicable hazardous waste procedures.

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