■ 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.

The shipping items of SGC8598-100B-R/001 and SGC8598-100B-R/002 are different. Refer to the "order information" on page 4.

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

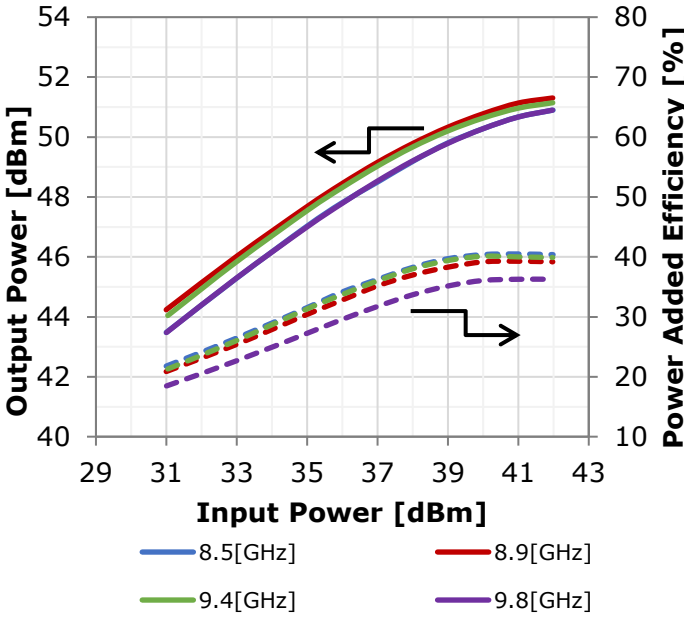
CASE STYLE	IK	
RoHS Compliance	YES	
ESD	Class 2	2000V to <4000V

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

● RF Characteristics

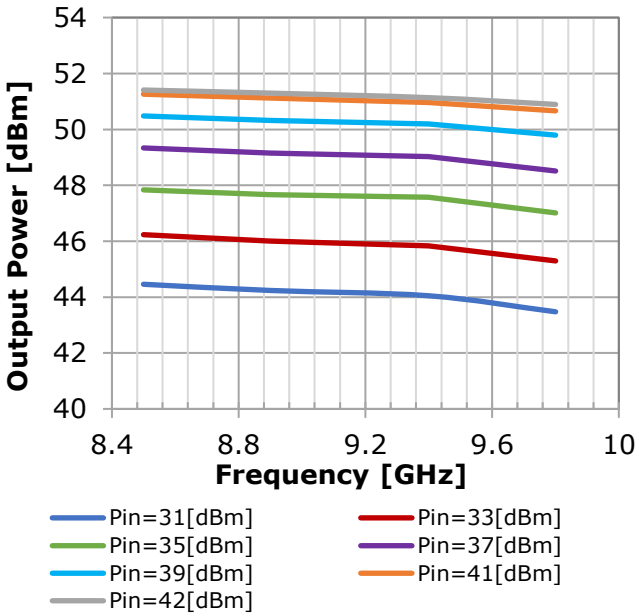
Output Power & Power Added Efficiency vs. Input Power

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



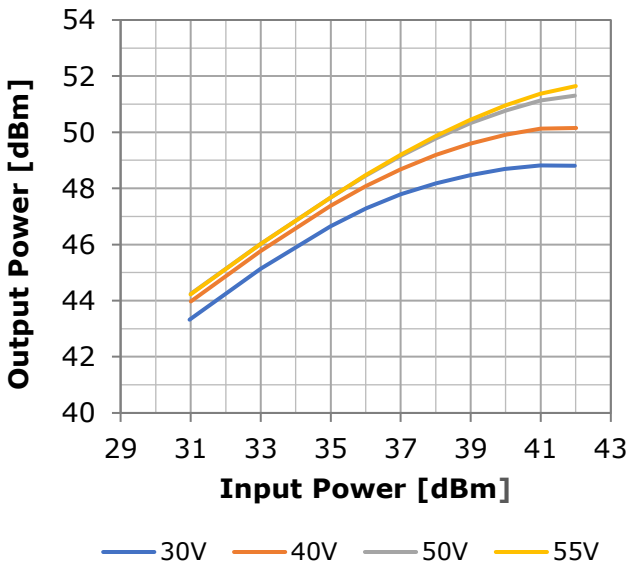
Output Power vs. Frequency

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



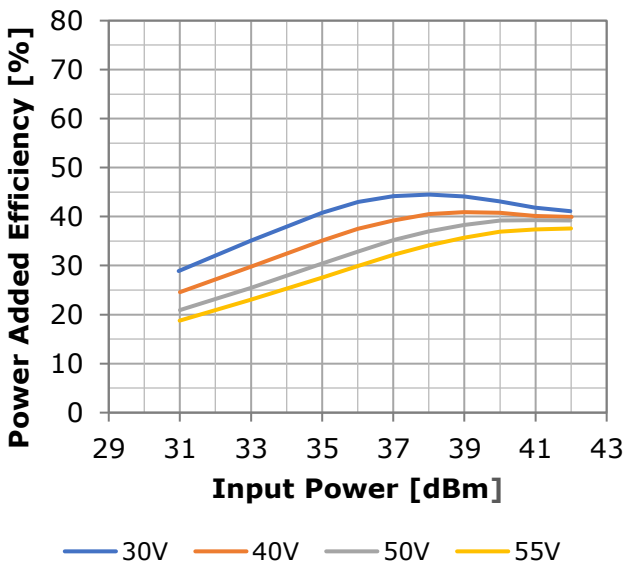
Output Power vs. Input Power by Drain Voltage

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



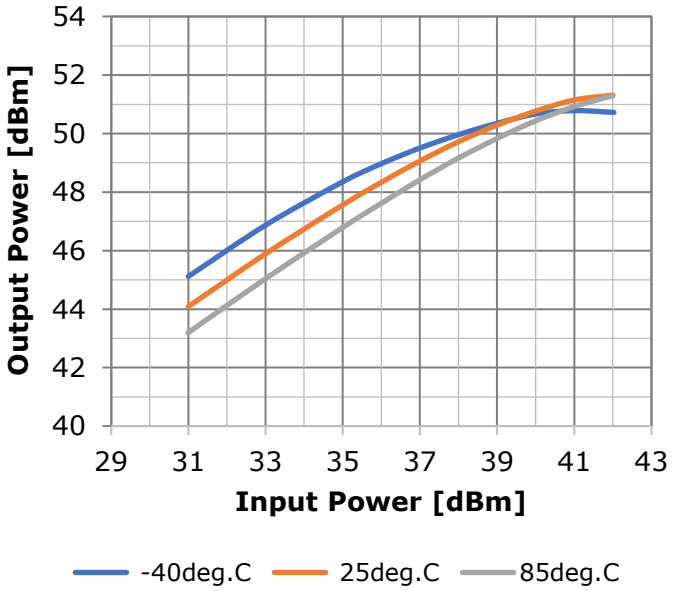
Power Added Efficiency vs. Input Power by Drain Voltage

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

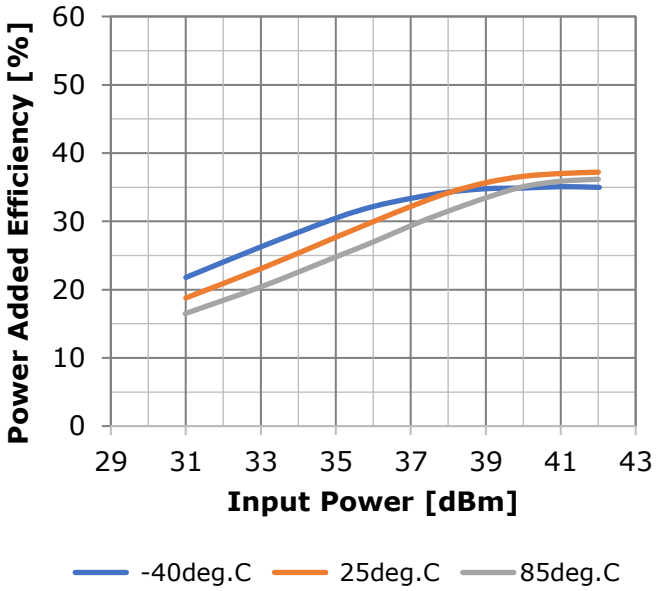


● RF Characteristics

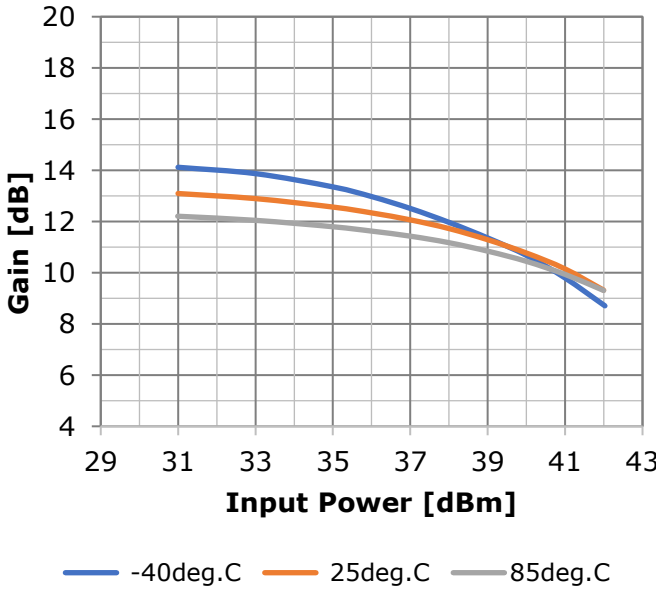
Output Power vs. Input Power
by case temperature
f=8.9GHz, V_{DS}=50V, $I_{DS(DC)}$=0.33A
PW=100μsec., Duty=10%



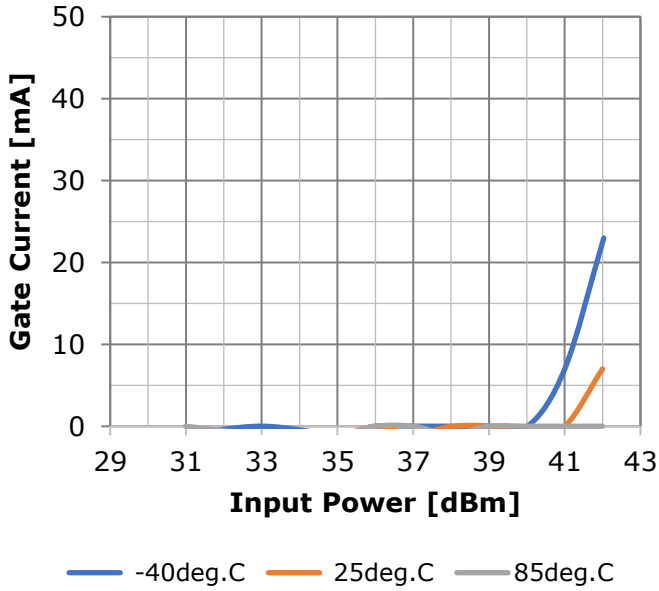
Power Added Efficiency vs. Input Power
by case temperature
f=8.9GHz, V_{DS}=50V, $I_{DS(DC)}$=0.33A
PW=100μsec., Duty=10%



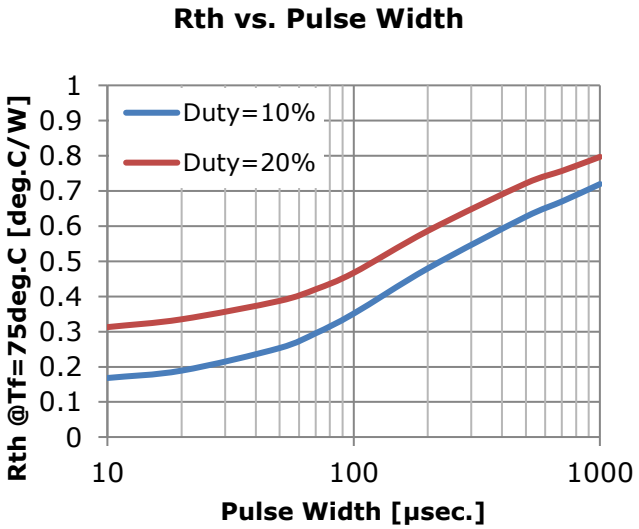
Gain vs. Input Power
by case temperature
f=8.9GHz, V_{DS}=50V, $I_{DS(DC)}$=0.33A
PW=100μsec., Duty=10%



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



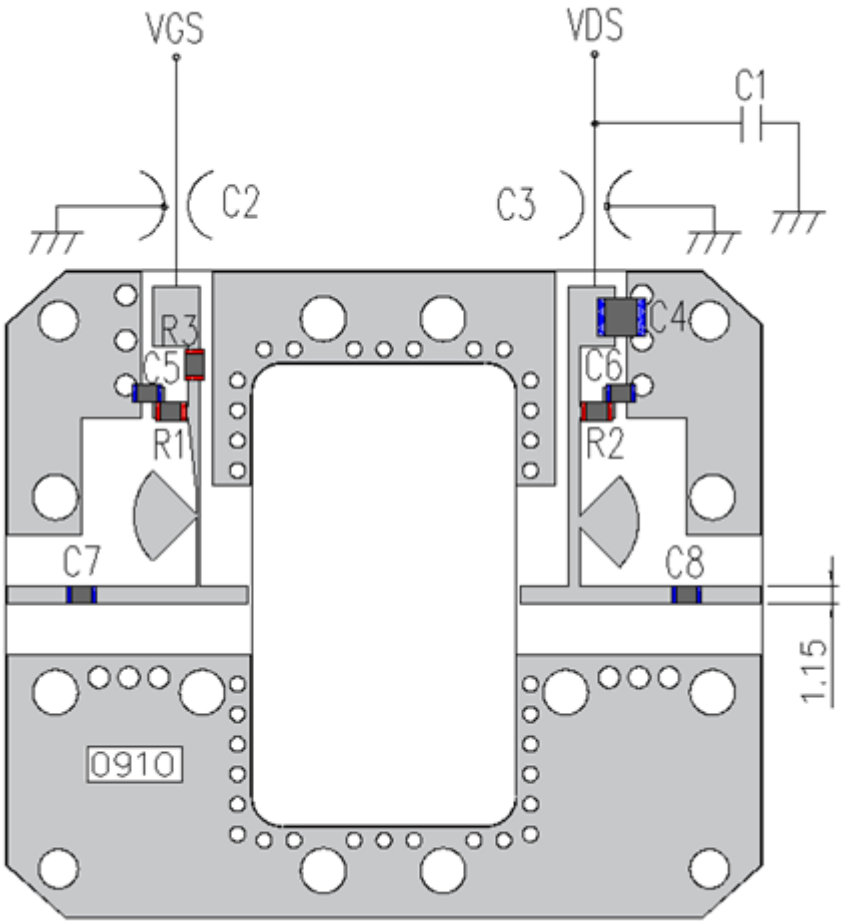
Ordering Information

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.

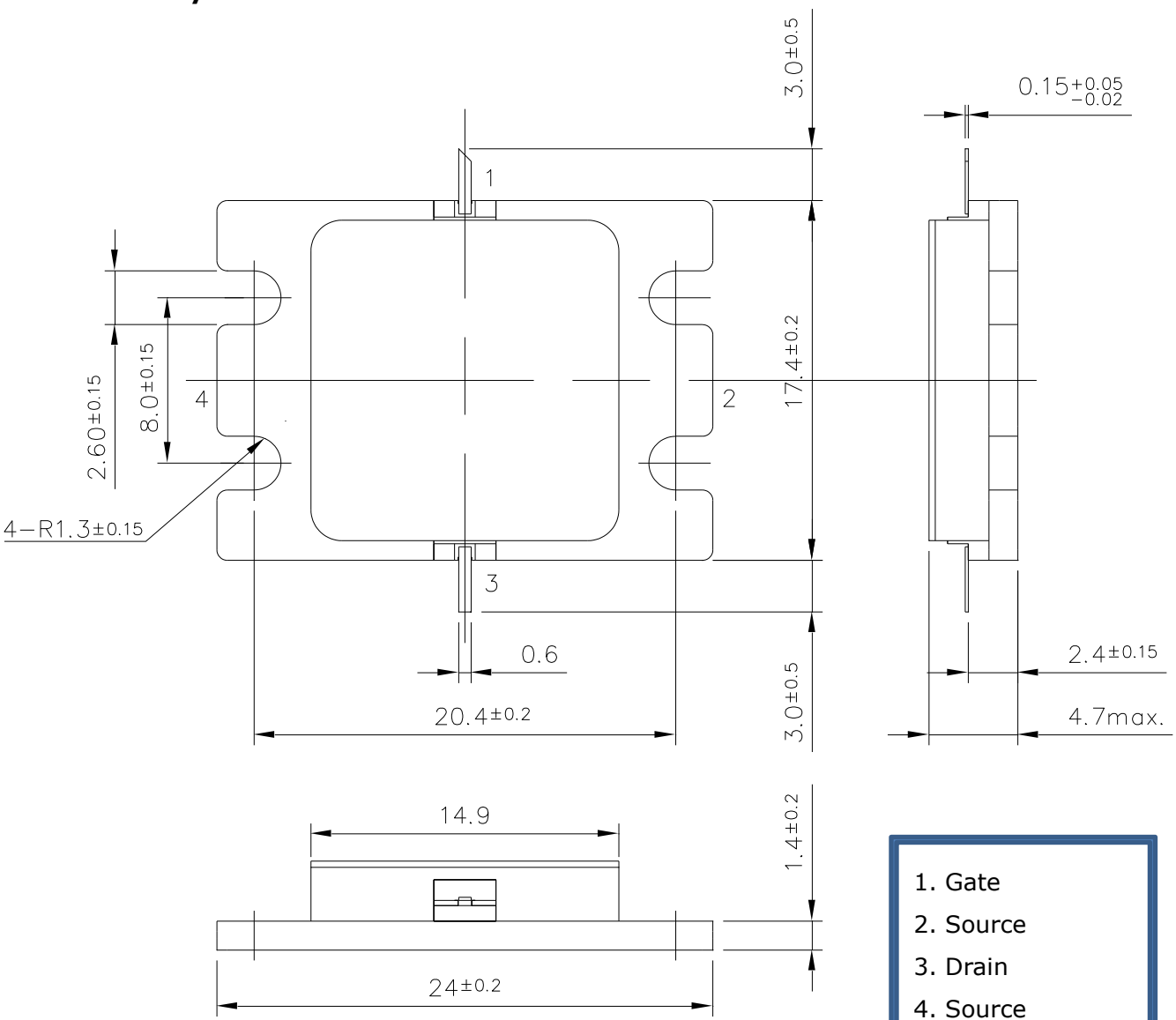
- **Circuit board example**



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

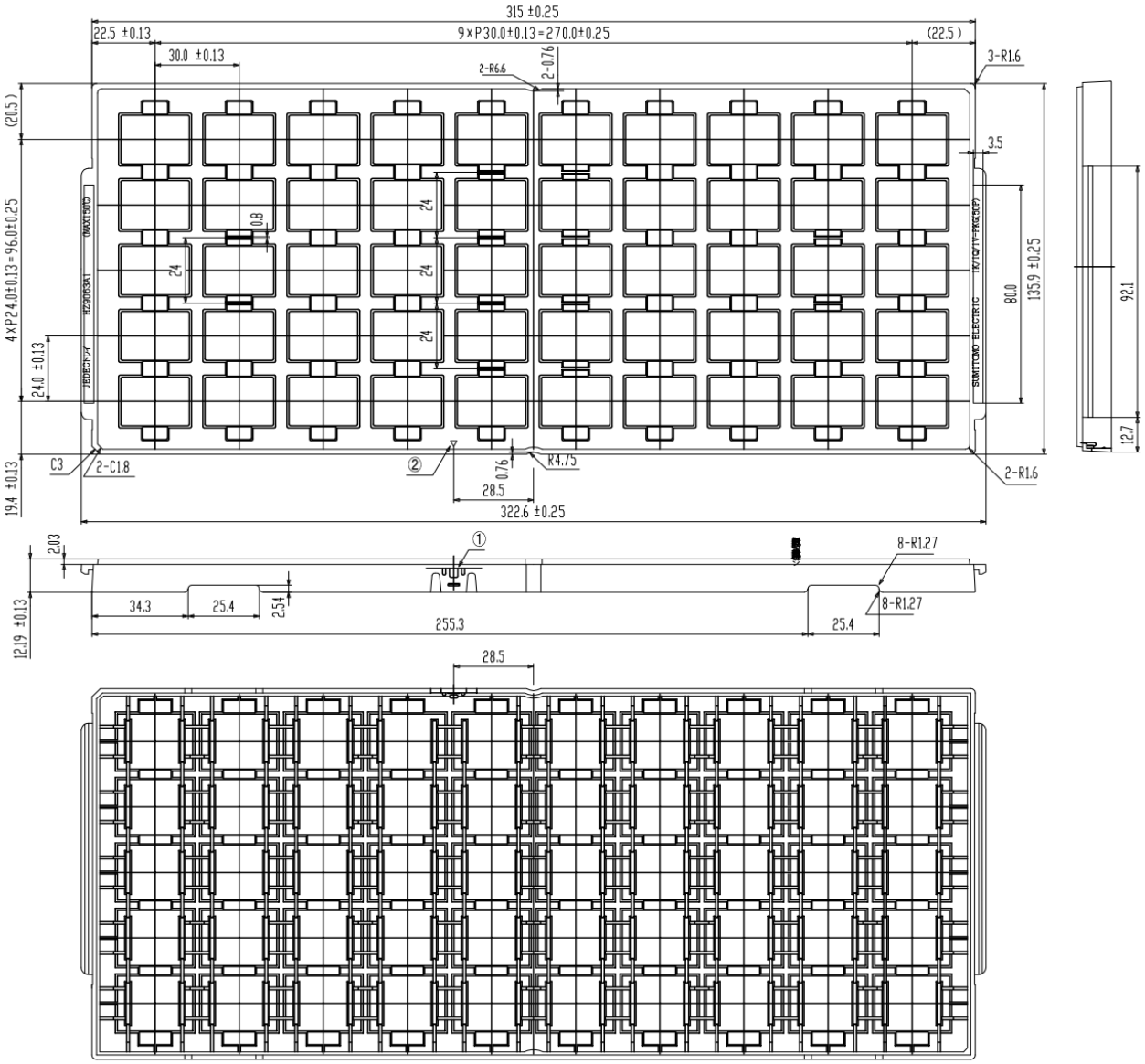


1. Gate
2. Source
3. Drain
4. Source

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.

Graphite Sheets Shipping Data JEDEC tray

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.

Any information in this document, such as descriptions of a function and examples of application circuits ("Reference Information"), are presented solely as a reference for the purpose to show examples of operations and uses of Sumitomo Electric semiconductor device(s); Sumitomo Electric does not warrant that the devices(s) function as described in Reference Information. When the user develops equipment incorporating the device(s) by referencing Reference Information, the user shall assume full responsibility arising out of such development, incorporation of the device(s), or use of Reference Information. Sumitomo Electric assumes no liability for any damages whatsoever arising out of such development, incorporation of the device(s), or use of Reference Information.

YOU HEREBY AGREE THAT BY PURCHASING THE SUMITOMO ELECTRIC GROUP PRODUCTS ("SEG PRODUCTS") DESCRIBED IN THIS DOCUMENT, YOU ARE DEEMED TO HAVE AGREED TO THE FOLLOWING:

- **SEG PRODUCTS IMPLEMENTED IN YOUR MANUFACTURING PROCESS SHALL BE FULLY EVALUATED IN YOUR PRODUCT OR SYSTEM NOT ONLY INITIAL PERFORMANCE BUT ALSO LONG-TERM-RELIABILITY, AND YOU SHALL DETERMINE THE APPLICABILITY OF SEG PRODUCTS AT YOUR OWN RESPONSIBILITY.**
- **YOU SHALL BE RESPONSIBLE FOR ALL LOSSES, EXPENSES, OR DAMAGES RESULTING FROM ANY DEFECTS IN THE SEG PRODUCTS ARISING FROM YOUR HANDLING, ASSEMBLY AND IMPLEMENTATION PROCESS.**

Any information in this document, including descriptions of function and schematic diagrams, shall not be construed as a license for the use or exercise of any intellectual property right, such as patent right or copyright, or any other right of Sumitomo Electric or any third party nor does Sumitomo Electric warrant non-infringement of any third-party's intellectual property right or other right by using such information. Sumitomo Electric assumes no liability for any infringement of the intellectual property rights or other rights of third parties which would result from the use of information contained herein.

The products described in this document are designed, developed and manufactured as contemplated for general use, including, without limitation, ordinary industrial use, general office use, personal use, and household use, but are not designed, developed and manufactured as contemplated (1) for use accompanying fatal risks or dangers that, unless extremely high safety is secured, could have a serious effect to the public, and could lead directly to death, personal injury, severe physical damage or other loss (i.e., nuclear reaction control in nuclear facility, aircraft flight control, air traffic control, mass transport control, medical life support system, missile launch control in weapon system), or (2) for use requiring extremely high reliability (i.e., submersible repeater and artificial satellite).
Please note that Sumitomo Electric will not be liable to the user and/or any third party for any claims or damages arising from the aforementioned uses of the products.

Any semiconductor devices have an inherent chance of failure. You must protect against injury, damage or loss from such failures by incorporating safety design measures into your facility and equipment such as redundancy, fire protection, and prevention of excessive current levels and other abnormal operating conditions.

If any products described in this document represent goods or technologies subject to certain restrictions on export under the Foreign Exchange and Foreign Trade Law of Japan, the prior authorization of the Japanese government will be required for export of those products from Japan.

https://www.sedi.co.jp/

ATTENTION
Information in this document is subject to change without notice.