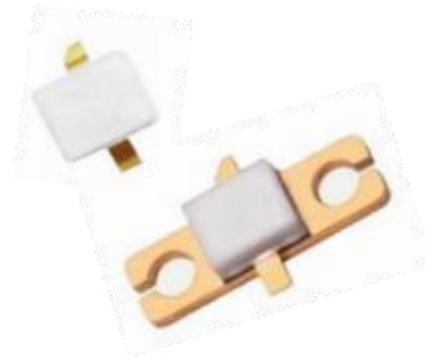


### Features

- High Efficiency and Linear Gain Operation
- Negative Gate Voltage and Bias Sequencing Required
- Excellent Thermal Stability and Excellent Ruggedness
- Metal Based Package Sealed with Ceramic-Epoxy Lid
- Gold Metallization System: Chip-Wire Bond-Package

### Picture



### Description

SAC3159 is a 30-watt, unmatched gallium nitride (GaN) high electron mobility transistor (HEMT) which designed specifically with high efficiency, high gain and wide bandwidth capabilities with frequency up to 6000MHz. The transistor is supplied in a ceramic /metal flange package.

### Typical Performance (Tc=25°C) of Demonstration Amplifier

**Table1.** (Test in Fixture):  $V_{DD}=28V$ ,  $I_{DQ}=80mA$ , 100us, 10%.

Frequency (MHz)	Psat (dBm)	G <sub>P</sub> (dB)	η <sub>D</sub> (%)
2000	45.3	19.9	70.2
3000	45.2	14.8	62.4
4000	44.9	13.2	64.0
5000	44.7	11.7	65.9

### Table2. Maximum Ratings

Rating	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	+160	$V_{dc}$
Gate-Source Voltage	$V_{GS}$	- 10 to +2	$V_{dc}$
Operating Voltage	$V_{DD}$	+55	$V_{dc}$
Storage Temperature Range	$T_{stg}$	-65 to +150	°C
Case Operating Temperature	$T_c$	+150	°C
Operating Junction Temperature	$T_J$	+225	°C

### Table3. Electrical Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Conditions
<b>DC Characteristics</b>						
Gate Threshold Voltage	$V_{GS(th)}$		-3.3		V	$V_{DS}=28V$ , $I_D=6.3mA$
Gate Quiescent Voltage	$V_{GS(Q)}$		-3.0		V	$V_{DS}=28V$ , $I_{DS}=50mA$
Drain-Source Breakdown Voltage	$V_{BR}$		150		V	$V_{GS}=-10V$ , $I_{DS}=6.3mA$
Total Device Power Dissipation (Derated above 25°C)	$P_{diss}$		46		W	

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Thermal Characteristics						
Thermal Resistance, Junction to Case $T_c=85^\circ\text{C}$ , $T_j=200^\circ\text{C}$ , DC Power Dissipation	$R_{\theta jc}$		4.5		$^\circ\text{C/W}$	

### Load Pull Data

Bias:  $V_{DD}=28\text{V}$ ,  $I_{DQ}=50\text{mA}$ ,  $100\mu\text{s}$ , 10%

Maximum Output Power						
Freq (MHz)	$Z_{Source}(\Omega)$	$Z_{Load}(\Omega)$	Gain(dB)	Psat(dBm)	Psat(W)	$\eta D(\%)$
2000	7.2-j2.6	7.7+j3.6	19.9	45.3	33.9	70.2
3000	7.5-j 10.7	7.5+j2.7	14.8	45.2	33.1	62.4
4000	8.0-j 17.2	8.9+j3.1	13.2	44.9	30.9	64
5000	10.0-j28.8	8.7-j0.7	11.7	44.7	29.5	65.9
Maximum Drain Efficiency						
Freq (MHz)	$Z_{Source}(\Omega)$	$Z_{Load}(\Omega)$	Gain(dB)	Psat(dBm)	Psat(W)	$\eta D(\%)$
2000	7.2-j2.6	7.8+j 11.2	22.5	43.6	22.9	83
3000	7.5-j 10.7	4.7+j8.3	16.3	44.2	26.3	81.1
4000	8.0-j 17.2	5. 1+j9.7	14.8	43.5	22.4	79.3
5000	10.0-j28.8	5.0+j3.9	12.8	44.2	26.3	78

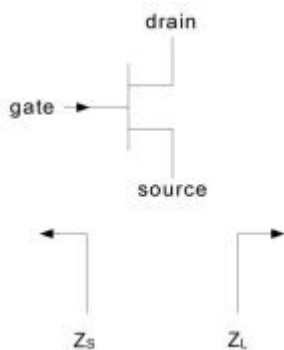


Figure 1. Definition of Transistor Impedance

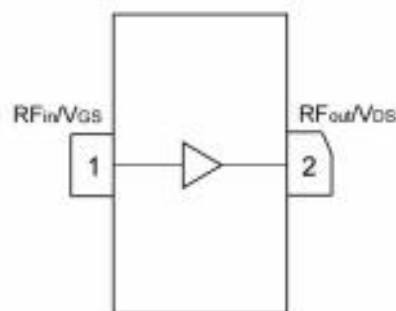
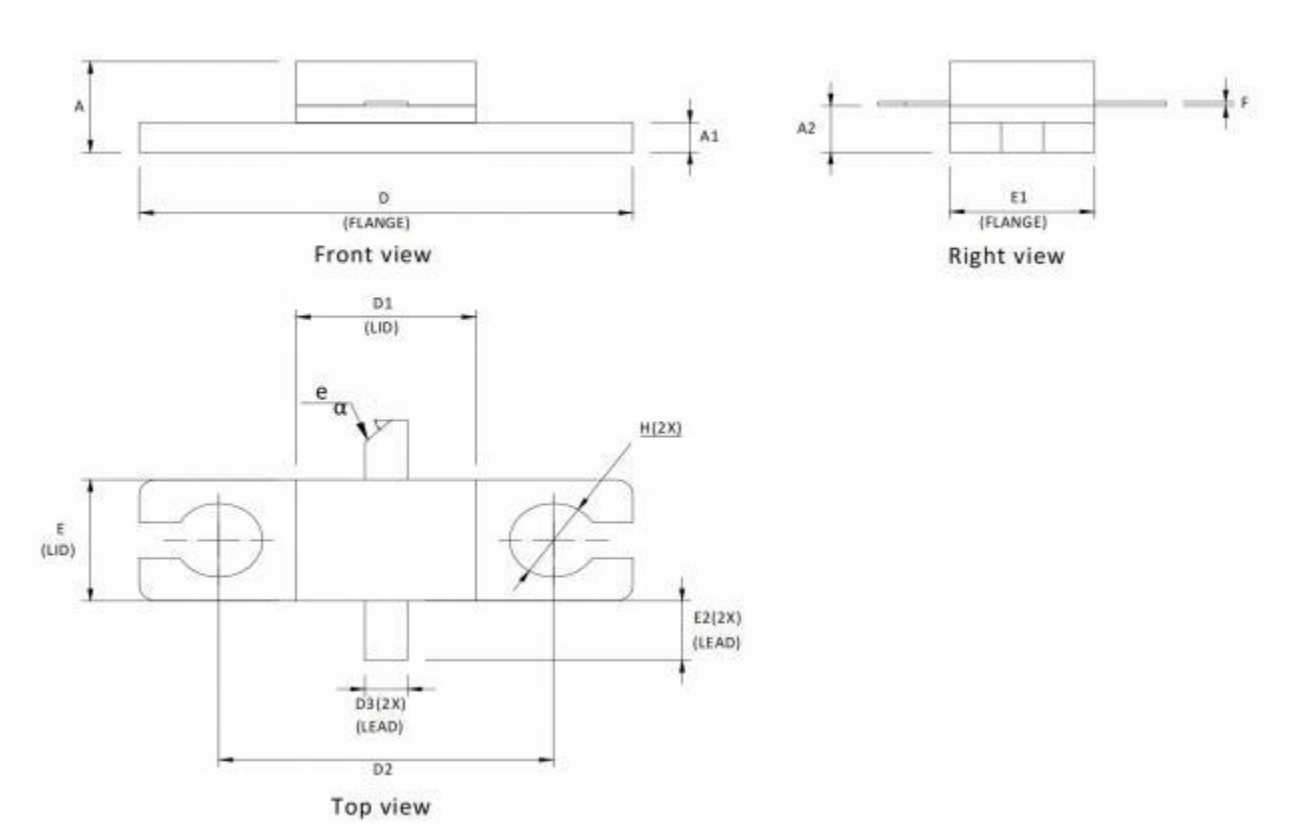


Figure 2. Definition of Pin

### Packaging Diagram

Flanged Ceramic Package; 2 leads



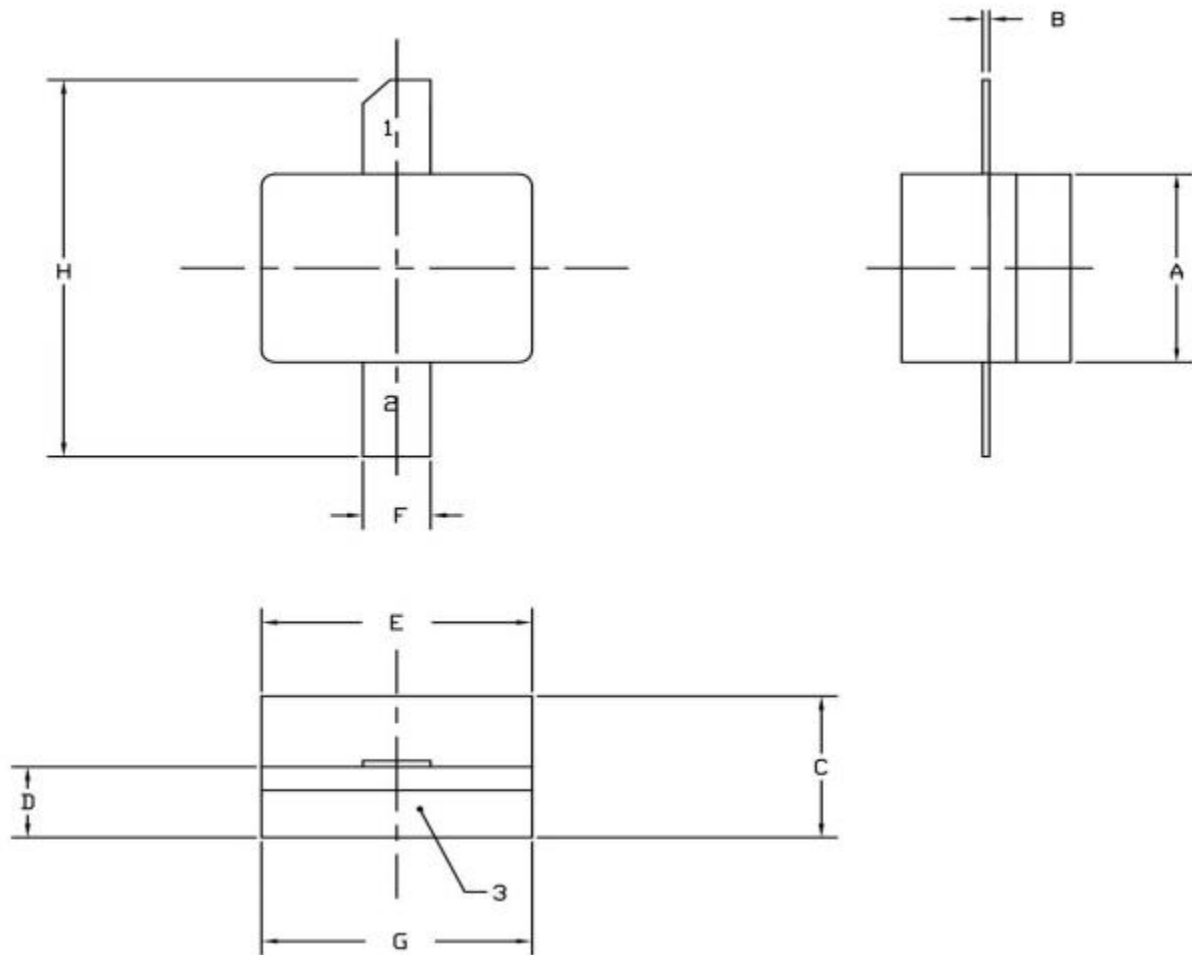
Serial Number	Inch			mm		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.116	0.127	0.138	2.94	3.22	3.50
A1	0.034	0.039	0.044	0.87	1.00	1.13
A2	0.057	0.062	0.067	1.44	1.57	1.70
D	0.546	0.551	0.556	13.87	14.00	14.13
D1	0.196	0.201	0.206	4.97	5.10	5.23
D2	0.374 REF			9.5 REF		
D3	0.042	0.047	0.052	1.07	1.20	1.33
E	0.156	0.161	0.167	3.97	4.10	4.23
E1	0.156	0.161	0.167	3.97	4.10	4.23
E2	0.070	0.080	0.089	1.77	2.02	2.27
F	0.004	0.005	0.006	0.11	0.13	0.15
e	TYP 0.030			TYP 0.75		
a	45°REF			45°REF		
H	Φ0.098 REF			Φ2.5 REF		

# SAC3159

## GaN High Electron Mobility Transistor

Rev 1.0

Earless Flanged Ceramic Package; 2 leads (1-Drain, 2-Gate, 3-Source)



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.155	0.165	3.94	4.19
B	0.003	0.006	0.10	0.15
C	0.115	0.135	2.92	3.17
D	0.057	0.067	1.45	1.70
E	0.195	0.205	4.95	5.21
F	0.045	0.055	1.14	1.40
G	0.195	0.205	4.95	5.21
H	0.280	0.360	7.11	9.14

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