

PNP Germanium RF Transistor

AF 240

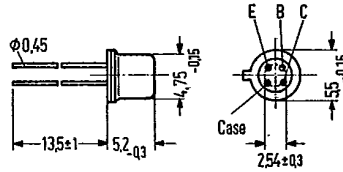
SIEMENS AKTIENGESELLSCHAFT

T-31-07

for mixer and oscillator stages up to 900 MHz

AF 240 is a germanium PNP mesa transistor in TO 72 case (18 A 4 DIN 41 876). The leads are electrically insulated from the case.

Type	Ordering code
AF 240	Q60106-X240



Approx. weight 0.4 g

Dimensions in mm

Maximum ratings

Collector-emitter voltage	$-V_{CEO}$	15	V
Collector-emitter voltage	$-V_{CES}$	20	V
Emitter-base voltage	$-V_{EBO}$	0.3	V
Collector current	$-I_C$	10	mA
Emitter current	$I_E$	11	mA
Base current	$-I_B$	1	mA
Junction temperature	$T_j$	90	°C
Storage temperature range	$T_{stg}$	-30 to +75	°C
Total power dissipation ( $T_{amb} \leq 45^\circ\text{C}$ )	$P_{tot}$	60	mW

Thermal resistance

Junction to ambient air	$R_{thJA}$	$\leq 750$	K/W
Junction to case	$R_{thJC}$	$\leq 400$	K/W

T-31-07

**Static characteristics** ( $T_{amb} = 25^{\circ}\text{C}$ )

$-V_{CE}$ V	$-I_C$ mA	$-I_B$ $\mu\text{A}$	$h_{FE}$ $I_C/I_B$	$-V_{BE}$ mV
10	2	80	25 (>10)	370

Collector cutoff current ( $-V_{CES} = 20\text{ V}$ ) $-I_{CES}$  0.5 (<8)  $\mu\text{A}$ Collector cutoff current ( $-V_{CEO} = 15\text{ V}$ ) $-I_{CEO}$  <500  $\mu\text{A}$ Emitter cutoff current ( $-V_{EBO} = 0.3\text{ V}$ ) $-I_{EBO}$  <100  $\mu\text{A}$ **Dynamic characteristics** ( $T_{amb} = 25^{\circ}\text{C}$ )

Transition frequency

( $-I_C = 2\text{ mA}$ ;  $-V_{CE} = 10\text{ V}$ ;  $f = 100\text{ MHz}$ ) $f_T$  500 MHz

Reverse transfer capacitance

( $-I_C = 1\text{ mA}$ ;  $-V_{CE} = 10\text{ V}$ ;  $f = 1\text{ MHz}$ , $-C_{12e}$  0.26 pF

Power gain

( $-I_C = 2\text{ mA}$ ;  $-V_{CE} = 10\text{ V}$ ;  $f = 800\text{ MHz}$ ; $R_L = 2\text{ k}\Omega$ ) $G_{pb}$  13 dB

Power gain

( $-I_C = 2\text{ mA}$ ;  $-V_{CE} = 10\text{ V}$ ;  $f = 800\text{ MHz}$ ; $R_L = 50\Omega$ ) $G_{pb}$  11 dB

Noise figure

( $-I_C = 2\text{ mA}$ ;  $-V_{CE} = 10\text{ V}$ ;  $f = 800\text{ MHz}$ ; $R_g = 60\Omega$ )

NF 6.5 dB

( $-I_C = 2\text{ mA}$ ;  $-V_{CE} = 10\text{ V}$ ;  $f = 200\text{ MHz}$ ; $R_g = 60\Omega$ )

NF 3 dB

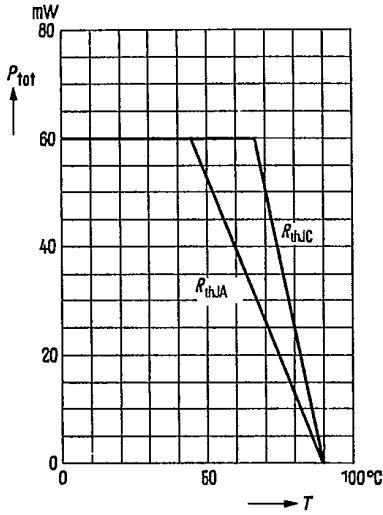
**Four-pole characteristics** (measured at a spacing of 1 mm)Operating point:  $-I_C = 3\text{ mA}$ ;  $-V_{CE} = 10\text{ V}$ ; $f = 800\text{ MHz}$ :

$g_{11b} = 4,8\text{ mS}$	$ y_{12b}  = 0,31\text{ mS}$	$ y_{21b}  = 22\text{ mS}$	$g_{22b} = 0,5\text{ mS}$
$b_{11b} = -25\text{ mS}$	$\varphi_{12b} = -108^{\circ}$	$\varphi_{21b} = 25^{\circ}$	$b_{22b} = 5,2\text{ mS}$

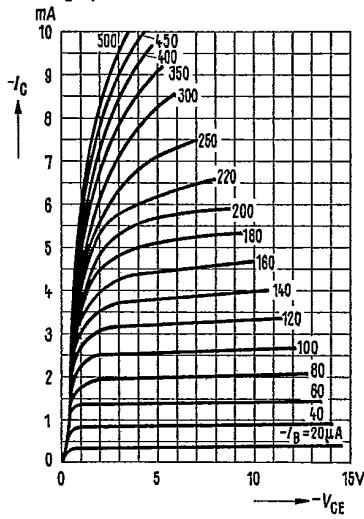
 $f = 400\text{ MHz}$ :

$g_{11b} = 30\text{ mS}$	$ y_{12b}  = 0,25\text{ mS}$	$ y_{21b}  = 51\text{ mS}$	$g_{22b} = 0,2\text{ mS}$
$b_{11b} = -46\text{ mS}$	$\varphi_{12b} = -90^{\circ}$	$\varphi_{21b} = 85^{\circ}$	$b_{22b} = 2,5\text{ mS}$

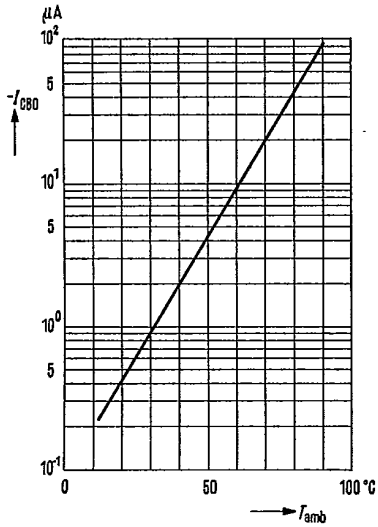
**Total perm. power dissipation versus temperature**  $P_{tot} = f(T)$ ;  
 $R_{th}$  = parameter



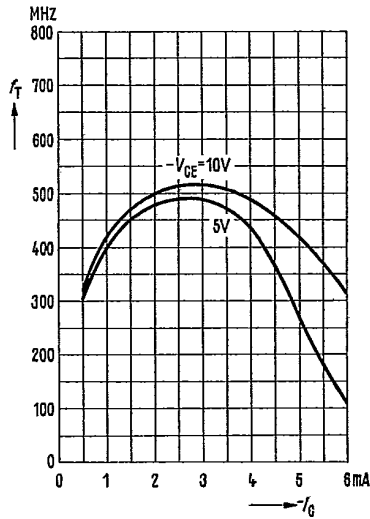
**Output characteristics**  $I_C = f(V_{CE})$ ;  
 $I_B$  = parameter



**Collector cutoff current versus temperature**  
 $I_{CBO} = f(T_{amb})$ ;  $-V_{CE} = 20V$



**Transition frequency**  $f_T = f(I_C)$   
 $-V_{CE} =$  parameter;  $f = 100\text{ MHz}$



**PNP Germanium UHF Transistor**

**AF 279 S**

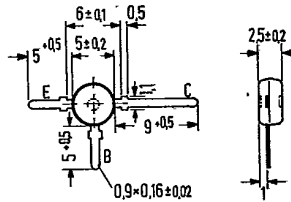
SIEMENS AKTIENGESELLSCHAFT 25C 04079 D \_\_\_\_\_

**T-31-07**

for input stages up to 900 MHz

AF 279 S is a germanium PNP UHF planar transistor with passivated surface in low-capacitance 50 B 3 DIN 41867 plastic package similar to TO 119. This transistor is particularly intended for use in low-noise regulated input stages up to 900 MHz in diode-tuned tuners.

Type	Ordering code
AF 279 S	Q62701-F87



Approx. weight 0.25 g

Dimensions in mm

**Maximum ratings**

Collector-emitter voltage	$-V_{CEO}$	15	V
Collector-emitter voltage	$-V_{CES}$	20	V
Emitter-base voltage	$-V_{EBO}$	0.3	V
Collector current	$-I_C$	10	mA
Emitter current	$I_E$	11	mA
Base current	$-I_B$	1	mA
Junction temperature	$T_j$	90	°C
Storage temperature range	$T_{stg}$	-30 to +75	°C
Total power dissipation	$P_{tot}$	60	mW

**Thermal resistance**

Junction to ambient air	$R_{thJA}$	≤ 600	K/W
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**Static characteristics** ( $T_{amb} = 25^{\circ}\text{C}$ )

$-V_{CE}$ V	$-I_C$ mA	$-I_B$ $\mu\text{A}$	$h_{FE}$ $I_C/I_B$	$-V_{BE}$ mV
10	2	40	50 (<10)	350
5	5	110	45	400

Collector cutoff current ( $-V_{CES} = 20\text{ V}$ )	$-I_{CES}$	1 (<15)	$\mu\text{A}$
Collector cutoff current ( $-V_{CEO} = 15\text{ V}$ )	$-I_{CEO}$	<500	$\mu\text{A}$
Emitter cutoff current ( $-V_{EBO} = 0.3\text{ V}$ )	$-I_{EBO}$	<100	$\mu\text{A}$

**Dynamic characteristics** ( $T_{amb} = 25^{\circ}\text{C}$ )

Transition frequency ( $-I_C = 2\text{ mA}$ ; $-V_{CE} = 10\text{ V}$ ; $f = 100\text{ MHz}$ )	$f_T$	820	MHZ
Collector base capacitance ( $-V_{CB} = 10\text{ V}$ ; $f = 1\text{ MHz}$ )	$-C_{CBO}$	0.4	pF
Power gain ( $-I_C = 2\text{ mA}$ ; $-V_{CE} = 10\text{ V}$ ; $f = 800\text{ MHz}$ ; $R_L = 2\text{ k}\Omega$ )	$G_{pb}$	20	dB
( $-I_C = 2\text{ mA}$ ; $-V_{CE} = 10\text{ V}$ ; $f = 900\text{ MHz}$ ; $R_L = 500\Omega$ )	$G_{pb}$	12	dB
Noise figure ( $-I_C = 2\text{ mA}$ ; $-V_{CE} = 10\text{ V}$ ; $f = 800\text{ MHz}$ ; $R_g = 60\Omega$ )	NF	<4.5	dB

**Four-pole characteristics:**

$-I_C = 2\text{ mA}$ ;  $-V_{CE} = 10\text{ V}$ ;  $f = 800\text{ MHz}$  (measured at a spacing of 1.5 mm)

$g_{11b} = 23\text{ mS}$	$ y_{12b}  = 0,6\text{ mS}$	$ y_{21b}  = 38\text{ mS}$	$g_{22b} = 0,3\text{ mS}$
$-b_{11b} = 33\text{ mS}$	$\varphi_{12b} = -90^{\circ}$	$\varphi_{21b} = 75^{\circ}$	$b_{22b} = 2,5\text{ mS}$

Test circuit for power gain and noise figure at  $f = 800\text{ MHz}$

