

Integrated Circuit

TDA1087

NPN double transistor

DATASHEET

OEM – Telefunken

Source: Telefunken Databook 1979/80

TDA 1087

Monolithisch Integrierte NPN-Doppeltransistoren Monolithic integrated NPN double transistors

Anwendung: Hochstrom Kaskadenverstärkerstufe bis 300 MHz

Application: High current cascade amplifier stage up to 300 MHz

Besondere Merkmale:

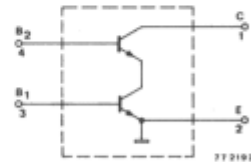
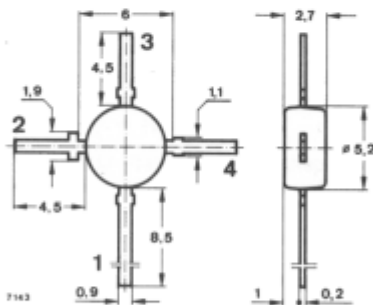
- Kleine Rückwirkung
- Hohe Aussteuerfähigkeit
- Hoher Innenwiderstand
- Hohe dynamische Stabilität

Features:

- Low feedback
- High input signal opportunity
- High internal resistance
- High dynamic stability

Vorläufige technische Daten · Preliminary specifications

**Abmessungen in mm
Dimensions in mm**



Normgehäuse
Case
50 B 4 DIN 41 867
JEDEC TO 50
Gewicht · Weight
max. 0,1 g

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Absolute Grenzdaten Absolute maximum ratings

Kollektor-Basis 2-Sperrspannung Collector-base 2 voltage	U_{CB20}	20	V
Kollektor-Basis 1-Sperrspannung Collector-base 1 voltage	U_{CB10}	20	V
Kollektor-Emitter-Sperrspannung Collector-emitter voltage	U_{CEO}	20	V
Emitter-Basis 1-Sperrspannung Emitter-base 1 voltage	U_{EB10}	4	V
Emitter-Basis 2-Sperrspannung Emitter-base 2 voltage	U_{EB20}	5	V
Kollektorstrom Collector current	I_C	50	mA
Basisstrom Base current	I_{B1}, I_{B2}	5	mA
Gesamtverlustleistung Total power dissipation $t_{amb} \leq 55^\circ\text{C}$	P_{tot}	280	mW
Sperrschichttemperatur Junction temperature	t_j	125	$^\circ\text{C}$
Lagerungstemperaturbereich Storage temperature range	t_{stg}	-25 ... +125	$^\circ\text{C}$

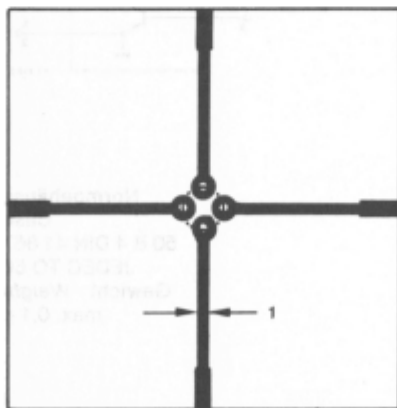
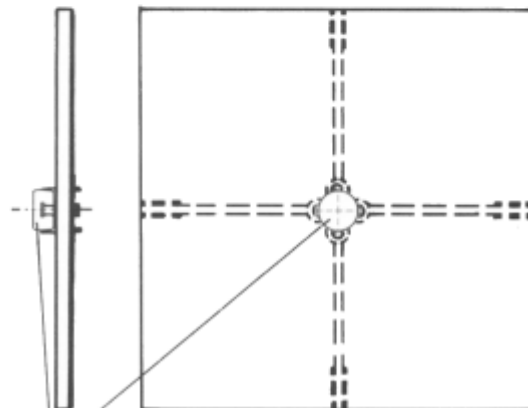


Fig 1 Glasfaser - Leiterplatte
Glass fiber board
50 × 50 × 1,5 mm



Baelement eingelötet
Device soldered

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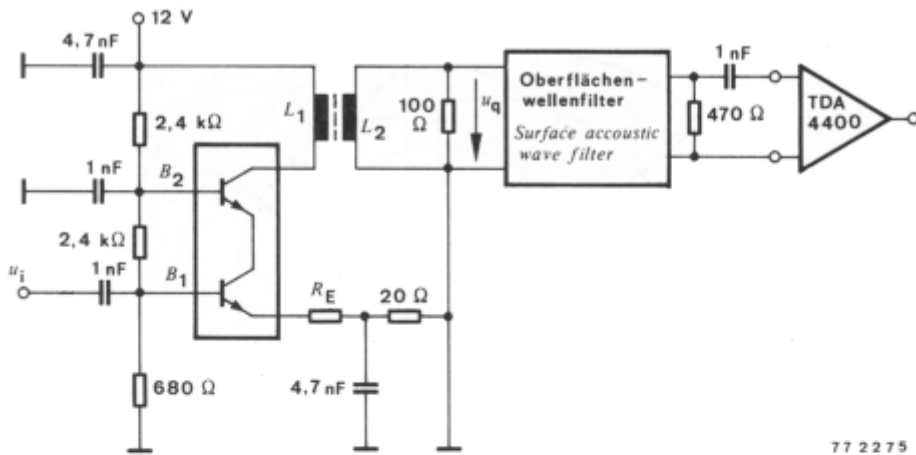
	Min.	Typ.	Max.
Wärmewiderstände Thermal resistances			
Sperrschicht-Umgebung <i>Junction ambient</i> $t_L = \text{konstant}$ <i>constant</i> befestigt auf Glasfaser-Leiterplatte einseitig kaschiert Cu 35 μm <i>mounted on a glass fiber board</i> <i>one side Cu 35 μm thickness</i> 50 x 50 x 1,5 mm, Fig. 1	R_{thJA}		200 °C/W
Statische Kenngrößen DC characteristics			
$t_{\text{amb}} = 25^\circ\text{C}$, falls nicht anders angegeben <i>unless otherwise specified</i>			
Kollektorreststrom <i>Collector cut-off current</i> $-U_{\text{CE}} = 15 \text{ V}, -U_{\text{B2E}} = 6 \text{ V}$	I_{CB1S}		100 nA
Kollektor-Basis-Durchbruchspannung <i>Collector-base breakdown voltage</i> $-I_{\text{C}} = 10 \mu\text{A}$	$-U_{(\text{BR})\text{CB2O}}$ $-U_{(\text{BR})\text{CB1O}}$	20 20	V V
Kollektor-Emitter-Durchbruchspannung <i>Collector-emitter breakdown voltage</i> $-I_{\text{C}} = 100 \mu\text{A}$	$-U_{(\text{BR})\text{CEO}}$	20	V
Emitter-Basis-Durchbruchspannung <i>Emitter-base breakdown voltage</i> $-I_{\text{E}} = 10 \mu\text{A}$	$U_{(\text{BR})\text{EB1O}}$ $U_{(\text{BR})\text{EB2O}}$	4 5	V V
Kollektor-Basis-Gleichstromverhältnis <i>DC forward current transfer ratio</i> $-U_{\text{CE}} = 10 \text{ V}, -U_{\text{B2E}} = 6 \text{ V}, -I_{\text{C}} = 3 \text{ mA}$ $I_{\text{C}} = 20 \text{ mA}$	h_{FE} h_{FE}	30 40	
Dynamische Kenngrößen AC characteristics			
$t_{\text{amb}} = 25^\circ\text{C}$			
Transitfrequenz <i>Gain bandwidth product</i> $-U_{\text{CE}} = 10 \text{ V}, -U_{\text{B2E}} = 6 \text{ V}, f = 100 \text{ MHz}$ $I_{\text{C}} = 3 \text{ mA}$ $I_{\text{C}} = 10 \text{ mA}$	f_{T} f_{T}	500 680	MHz MHz

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		Min.	Typ.	Max.	
Rückwirkungskapazität Feedback capacitance					
$U_{CE} = 10 \text{ V}, U_{B2E} = 6 \text{ V}, f = 200 \text{ MHz}$	C_{CB2}		0,7		pF
	C_{CB1}		10		fF
Kollektor-Emitter-Kapazität Collector-emitter capacitance					
$U_{CE} = 10 \text{ V}, U_{B2E} = 6 \text{ V}, I_C = 10 \text{ mA},$ $f = 200 \text{ MHz}$	C_{CE10}		2,5		pF
Rauschmaß Noise figure					
$U_{CE} = 10 \text{ V}, U_{B2E} = 6 \text{ V}, R_G = 50 \Omega,$ $f = 200 \text{ MHz}, I_C = 3 \text{ mA}$	F		3,8	5	dB
$I_C = 10 \text{ mA}$	F		5,8	7	dB
Unilateralverstärkung Unilateral gain					
$U_{CE} = 10 \text{ V}, U_{B2E} = 6 \text{ V}, R_E = 100 \Omega,$ $I_C = 10 \text{ mA}, f = 40 \text{ MHz}$	$G_U^{1)}$		48		dB
$f = 200 \text{ MHz}$	$G_U^{1)}$		31		dB
$I_C = 20 \text{ mA}, f = 40 \text{ MHz}$	$G_U^{1)}$		49		dB

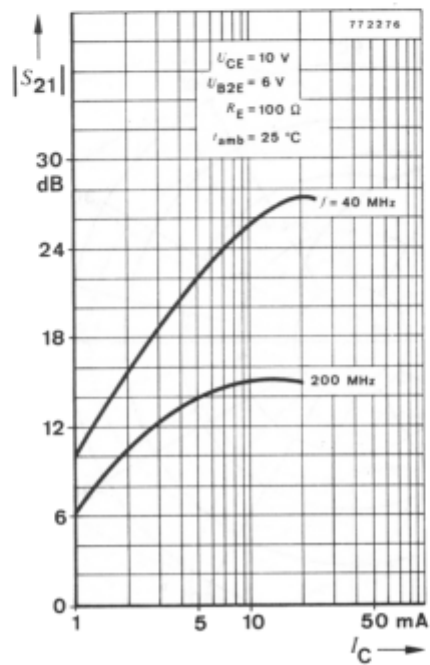
$$1) G_U = \frac{|S_{21}|^2}{(1 - |S_{11}|^2) \cdot (1 - |S_{22}|^2)}$$

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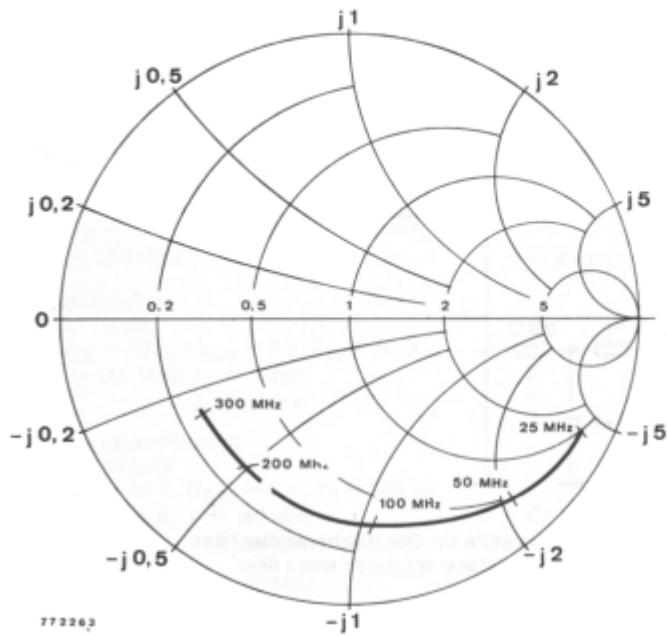


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Fig. 2 Anwendungsbeispiel: Vorverstärkerstufe für Oberflächenwellenfilter
Application: Pre-amplifier stage for surface acoustic wave filter

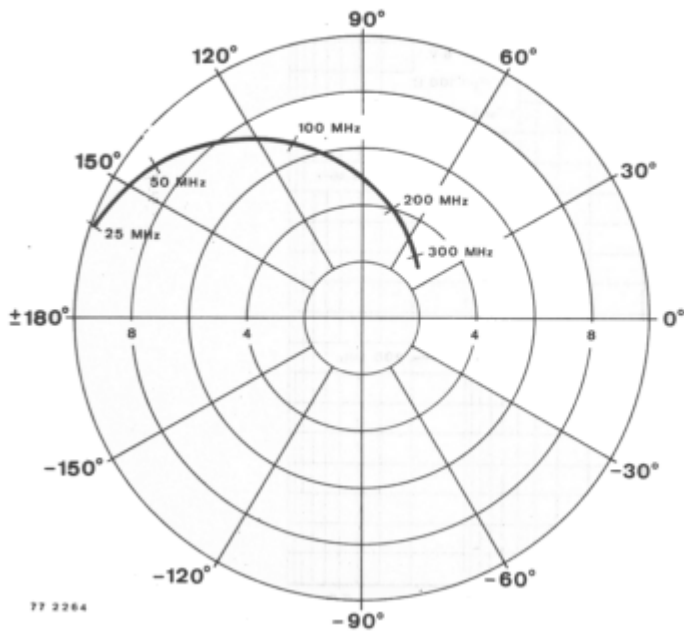


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S_{11}

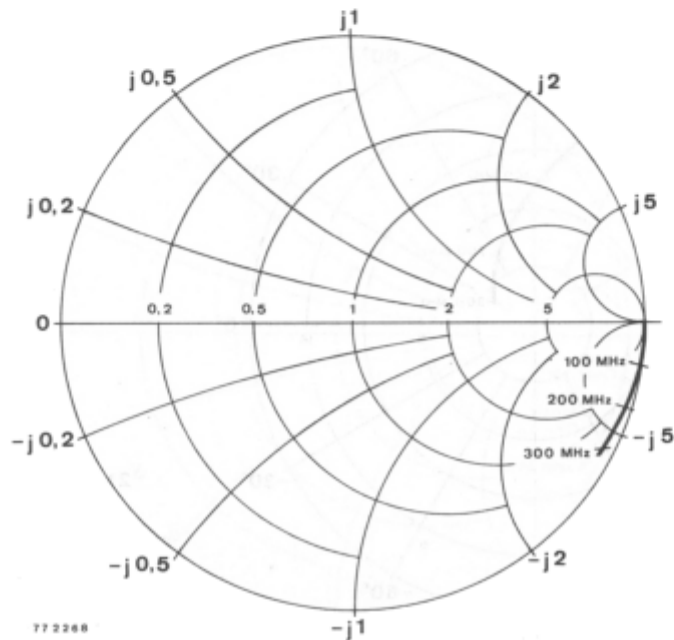
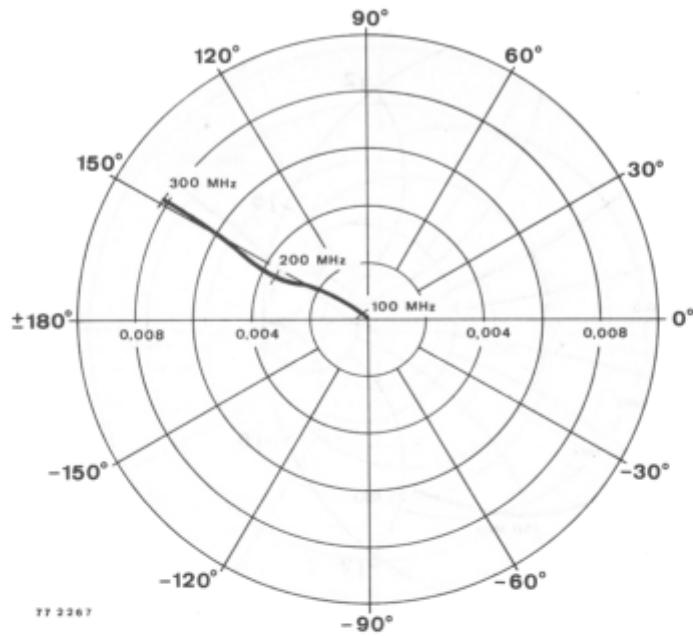
$U_{CE} = 10 \text{ V}$
 $U_{B2E} = 6 \text{ V}$
 $I_C = 3 \text{ mA}$
 $Z_0 = 50 \Omega$
 $f = 25 \dots 300 \text{ MHz}$



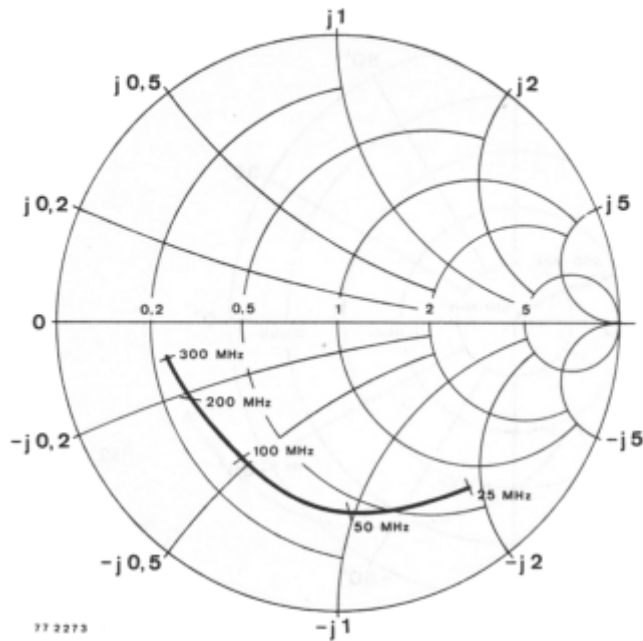
S_{21}

$U_{CE} = 10 \text{ V}$
 $U_{B2E} = 6 \text{ V}$
 $I_C = 3 \text{ mA}$
 $f = 25 \dots 300 \text{ MHz}$

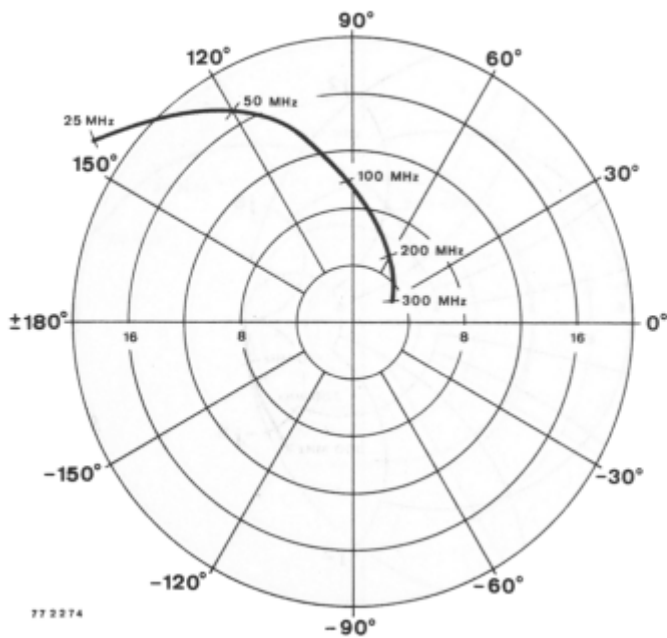
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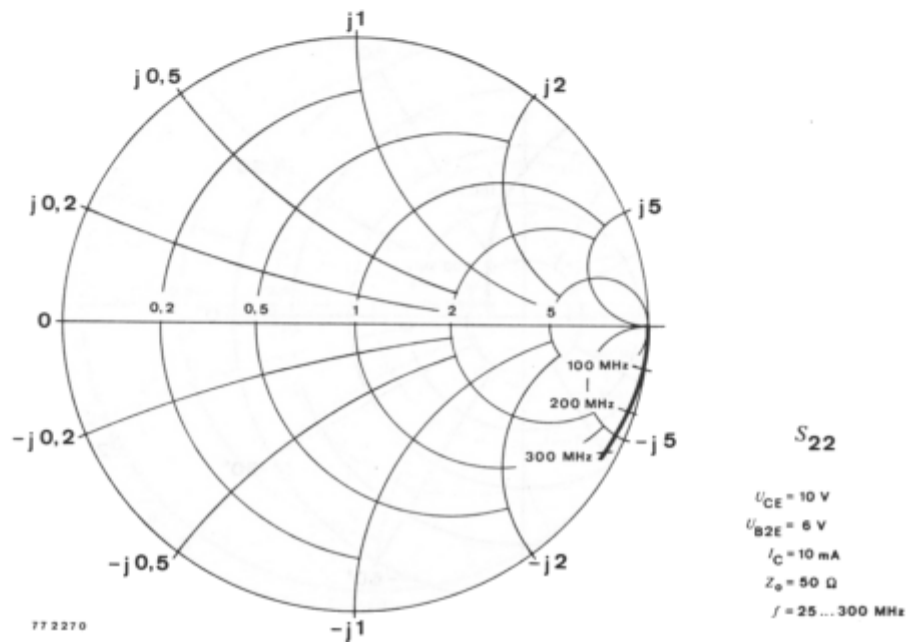
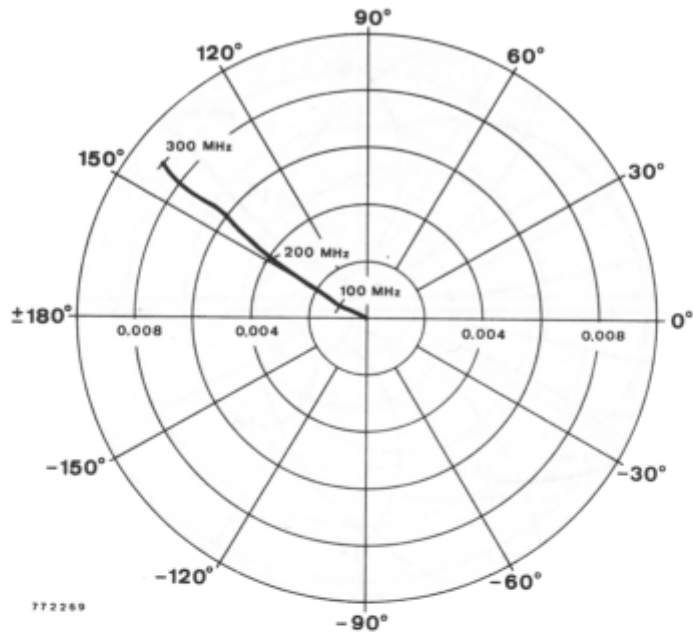


S_{11}
 $U_{CE} = 10 \text{ V}$
 $U_{B2E} = 6 \text{ V}$
 $I_C = 10 \text{ mA}$
 $Z_0 = 50 \Omega$
 $f = 25 \dots 300 \text{ MHz}$

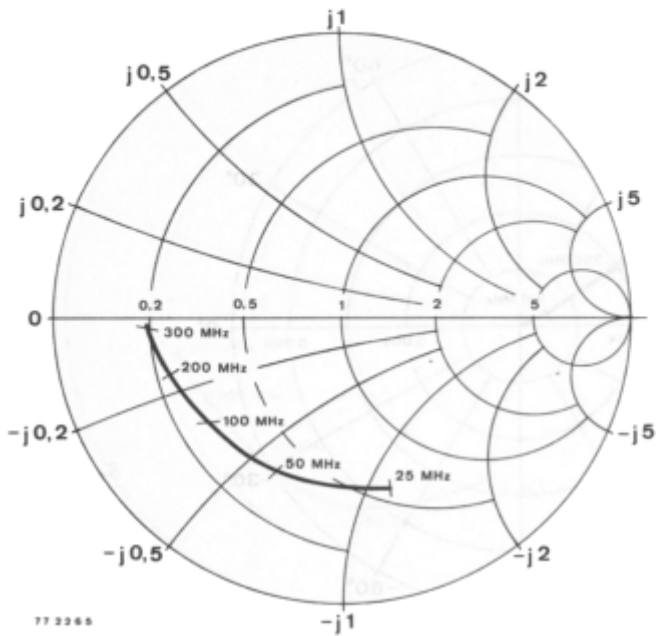


S_{21}
 $U_{CE} = 10 \text{ V}$
 $U_{B2E} = 6 \text{ V}$
 $I_C = 10 \text{ mA}$
 $f = 25 \dots 300 \text{ MHz}$

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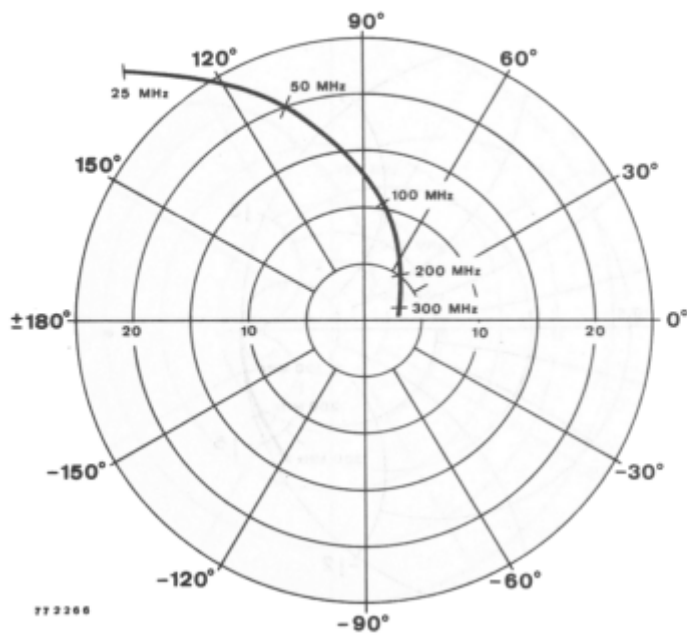


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S_{11}

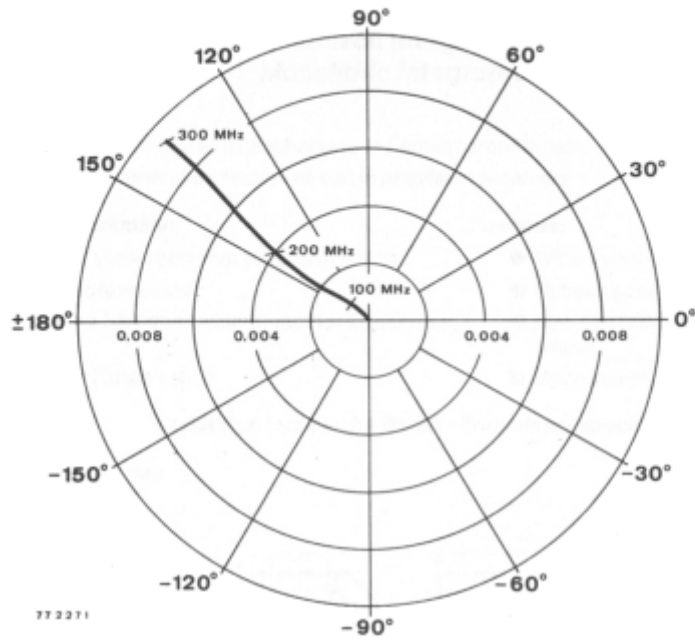
$U_{CE} = 10 \text{ V}$
 $U_{B2E} = 6 \text{ V}$
 $I_C = 20 \text{ mA}$
 $Z_0 = 50 \Omega$
 $f = 25 \dots 300 \text{ MHz}$



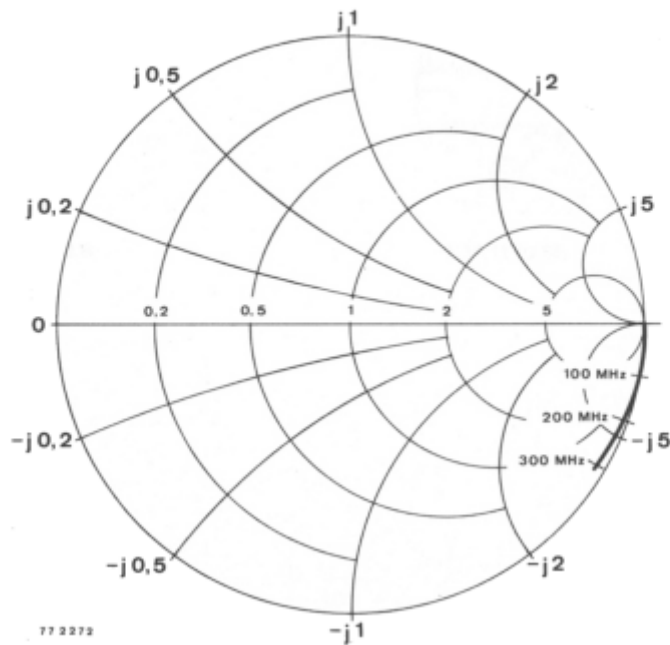
S_{21}

$U_{CE} = 10 \text{ V}$
 $U_{B2E} = 6 \text{ V}$
 $I_C = 20 \text{ mA}$
 $f = 25 \dots 300 \text{ MHz}$

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S_{12}
 $U_{CE} = 10 \text{ V}$
 $U_{B2E} = 6 \text{ V}$
 $I_C = 20 \text{ mA}$
 $f = 25 \dots 300 \text{ MHz}$



S_{22}
 $U_{CE} = 10 \text{ V}$
 $U_{B2E} = 6 \text{ V}$
 $I_C = 20 \text{ mA}$
 $Z_0 = 50 \Omega$
 $f = 25 \dots 300 \text{ MHz}$