

AH152...AH169

GaAs ABRUPT

TUNING VARACTORS

FEATURES

- Large capacitance change ratio : up to 4.3: 1
- High Q: min 4000 at f = 50MHz and V=-4V
- Case style flexibility
- 3 breakdown voltage ranges: 30, 45, 60V

APPLICATIONS

VCO's, filters, phased locked loops by modulating the oscillating frequency. Usable from VHF to Ka Band.

DESCRIPTION

The tuning varactors operate in junction capacitance variation versus reverse applied voltage. The dependence of junction capacitance C_j is given by :

$$C_j(V) = \frac{C_{j0}}{\left[1 - \frac{V}{\phi}\right]^\gamma}$$

- ϕ = Built in potential (1.3 for GaAs material)
- C_{j0} = Junction capacitance at zero volt biasing
- V = Applied voltage
- γ = Capacitance voltage slope exponent (gamma) = 0.5

SELECTION CHART

	Cto (pF) (±20%)	0.7	1	1.4	2.2	3	5
GAMMA	VBR (V) min.	ABRUPT VARACTORS					
0.5 ±0.05	30 45 60	AH152 AH160 AH165	AH153 AH161 AH166	AH154 AH162 AH167	AH155 AH163 AH168	AH156 AH164 AH169	AH157

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Operating temperature	T _{op}	-40	+85	°C
Storage temperature	T _{stg}	-65	+175	°C



ELECTRICAL CHARACTERISTICS (T = +25°C)

TEST CONDITIONS		$V_R = -4\text{ V}$ $f = 1\text{ MHz}$	$f = 1\text{ MHz}$	$V_R = -4\text{ V}$ $f = 50\text{ MHz}$	$I_R = 10\text{ }\mu\text{A}$	$V_R = -10\text{ V}$	LIMITING CONDITIONS	
CHARACTERISTICS $T_{\text{case}} = +25^\circ\text{C}$		$C_{T0} \pm 20\%$	$C_{T(0)} / C_{T(VR1)}$	(1) Q-4	V_{BR}	I_R	TEMPERATURES OPERATING STORAGE	
TYPES	CASES*	pF	MIN.	MIN.	V MIN.	$\mu\text{ A}$ MAX.	$^\circ\text{C}$	
		VR1 = - 30 V					-40 +85	-65 +175
AH152	F 27d	0.7	2.25	11 000	30	0.1		
AH153	F 27d	1	2.6	9 500	30	0.1		
AH154	F 27d	1.4	3	8 000	30	0.1		
AH155	F 27d	2.2	3.4	6 000	30	0.1		
AH156	F 27d	3	3.7	5 000	30	0.1		
AH157	F 27d	5.0	4	4 000	30	0.1		
		VR1 = - 40 V						
AH160	F 27d	0.7	2.35	9 500	45	0.1		
AH161	F 27d	1	2.7	8 000	45	0.1		
AH162	F 27d	1.4	3.1	7 000	45	0.1		
AH163	F 27d	2.2	3.7	5 500	45	0.1		
AH164	F 27d	3	4	4 500	45	0.1		
		VR1 = - 55 V						
AH165	F 27d	0.7	2.45	8 000	60	0.1		
AH166	F 27d	1	2.9	6 600	60	0.1		
AH167	F 27d	1.4	3.4	5 500	60	0.1		
AH168	F 27d	2.2	4	4 500	60	0.1		
AH169	F 27d	3	4.3	4 000	60	0.1		

* Other cases on request

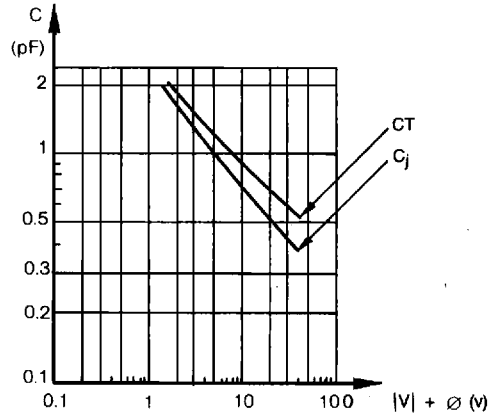
Chip form available on request

(1) Determined on a simple basis



TECHNICAL DATA

TYPICAL PERFORMANCE CURVES



Typical capacitance versus reverse voltage (AH 155 type).

$T = +25^{\circ}\text{C}$

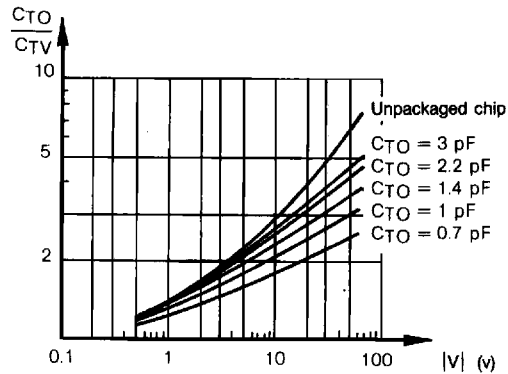
$$C_j(V) = C_{j(0)} \left[1 - \frac{V}{\phi} \right]^{-1/2}$$

$\phi = 1.3 \text{ V}$

$$C_T = C_j + C_p^*$$

$C_p = 0.2 \text{ pF}$ for F27d

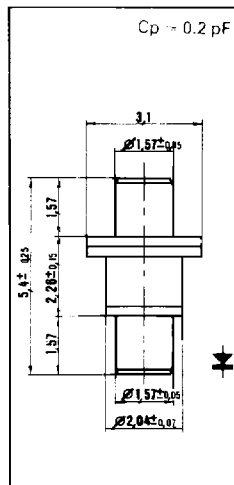
* For other cases,
see the values of C_p



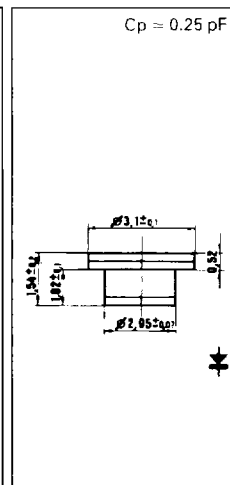
Typical $\frac{C_{TO}}{C_{TV}}$ ratio versus reverse voltage

PACKAGES

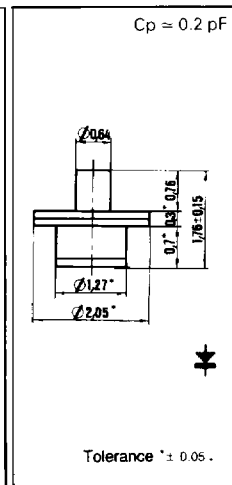
F27d



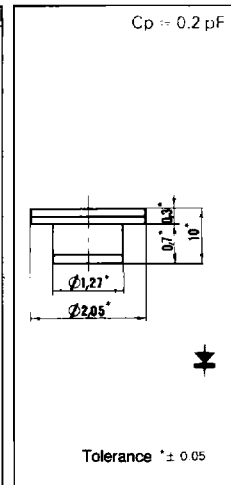
F30



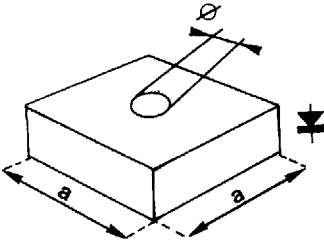
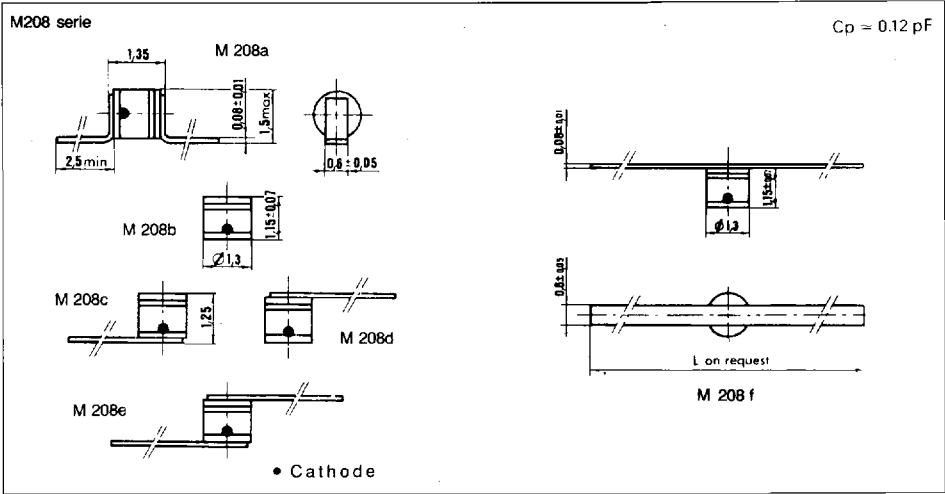
F54



F54s



PACKAGES (Continued)



a μm typ.	ø μm min/max.
250 or 380	20/160

