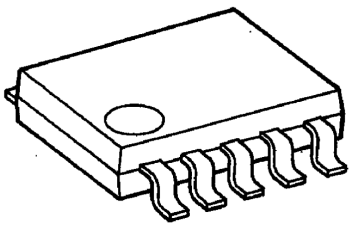
TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

TA8158F

FM Front End IC

The TA8158F is low operation voltage FM front end IC for the portable equipments which is suitable for the headphone stereo radios and radio cassette players.



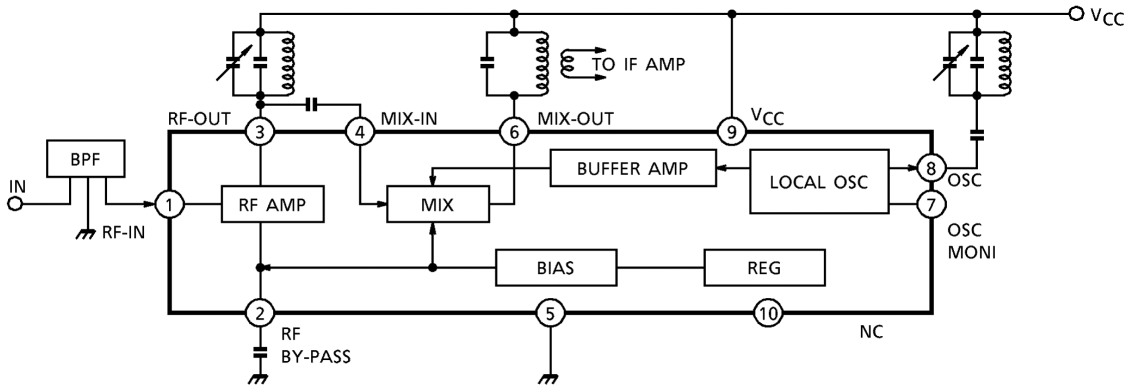
SSOP10-P-225-1.00

Weight: 0.10g (typ.)

Features

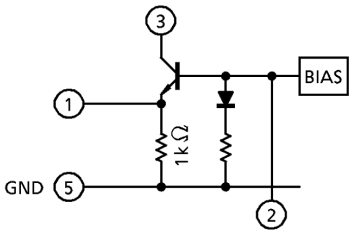
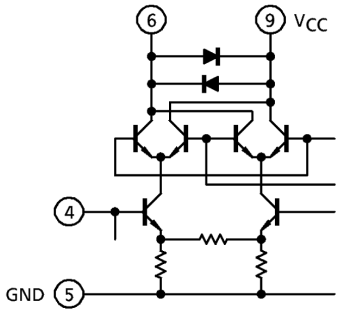
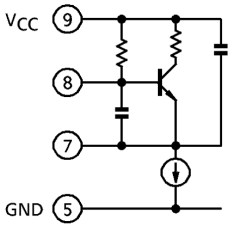
- Wide supply voltage range: V_{CC} = 1.6~6.0V (Ta = 25°C)
- Excellent supply voltage dependence of local oscillator : Oscillation stop V_{CC} = 0.9V (typ.)
- Improved inter−modulation characteristics by double balanced type mixer circuit.
- Built−in clampping diode for the local oscillator output.

Block Diagram



Explanation Of Terminal

(terminal voltage is DC voltage at Ta = 25°C, V_{CC} = 5V, and no signal)

Pin No.	Symbol	Internal Circuit	Terminal Voltage (V)
1	FM–RF IN		0.8
2	By pass		1.5
3	FM–RF OUT		5.0
4	MIX IN		1.5
5	GND	—	0
6	MIX OUT	Cf, pin(4)	5.0
7	OSC MONITOR		4.3
8	OSC		5.0
9	V_{CC}	—	5.0
10	NC	—	—

Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Supply voltage	V_{CC}	8	V
Power dissipation	P_D (Note)	400	mW
Operating temperature	T_{opr}	−25~75	°C
Storage temperature	T_{stg}	−55~150	°C

(Note) Derated above Ta = 25°C in the proportion of 3.2mW / °C.

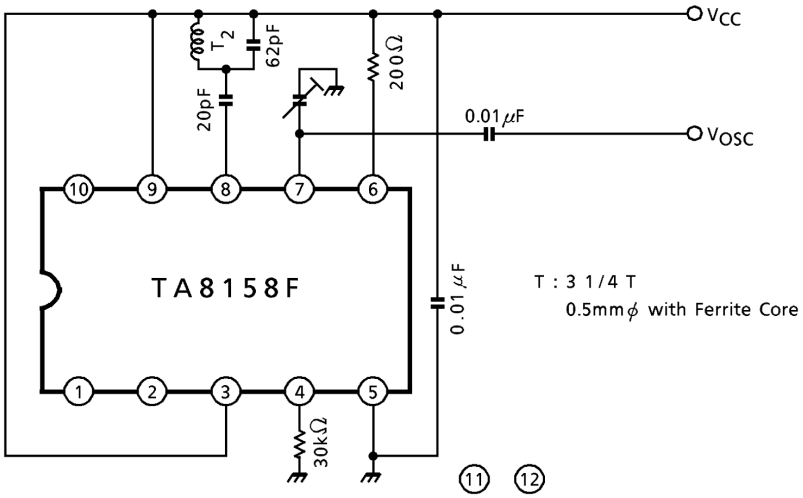
Electrical Characteristics

Unless Otherwise Specified

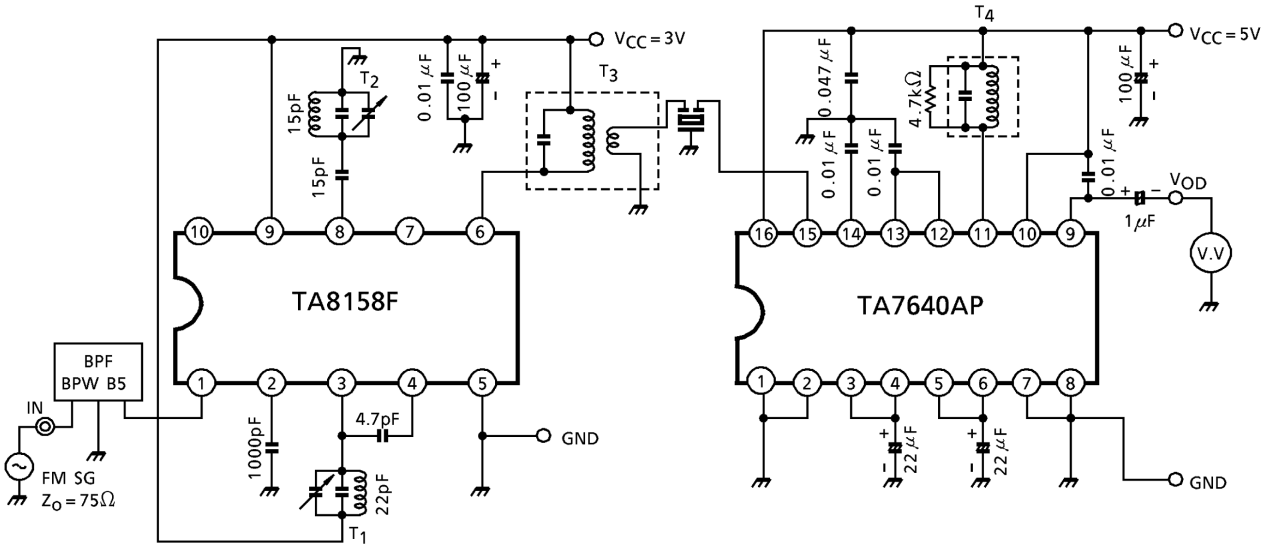
(V_{CC} = 3V, f = 83MHz, f_m = 1kHz, Δf = 22.5kHz dev, Ta = 25°C)

Characteristic		Symbol	Test Cir−cuit	Test Condition	Min.	Typ.	Max.	Unit
Supply current		I_{CC}	2	V_{in} = 0	—	5.2	8.0	mA
−3dB limiting sensitivity		$V_{in\ (lim)}$	2	—	—	3.0	7.0	dBμV EMF
Quiescent sensitivity		Q_S	2	—	—	11.0	—	dBμV EMF
Conversion gain		G_C	—	—	—	31	—	dB
Local OSC voltage		V_{OSC}	1	f_{OSC} = 60MHz	140	220	340	mV_{rms}
Pin(1) impedance	Parallel input resistance	r_{ip1}	3	f = 83MHz	—	57	—	Ω
Pin(3) impedance	Parallel output resistance	r_{op3}	3		—	25	—	kΩ
	Parallel output capacitance	c_{op3}			—	2.0	—	pF
Pin(4) impedance	Parallel input resistance	r_{ip4}	3		—	2.7	—	kΩ
	Parallel input capacitance	c_{ip4}			—	3.3	—	pF
Pin(6) impedance	Parallel output resistance	r_{op6}	3	f = 10.7MHz	—	100	—	kΩ
	Parallel output capacitance	c_{op6}			—	4.8	—	pF
Local OSC stop voltage		V_{stop}	1	—	—	0.9	—	V

Test Circuit 1



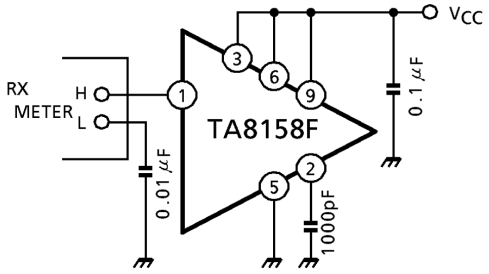
Test Circuit 2



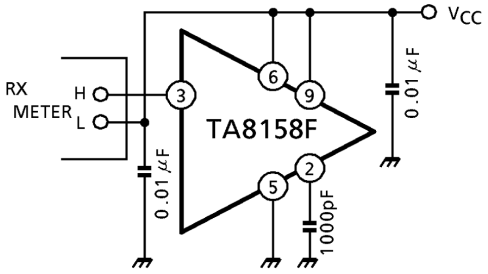
Test Circuit 3

Input, output impedance

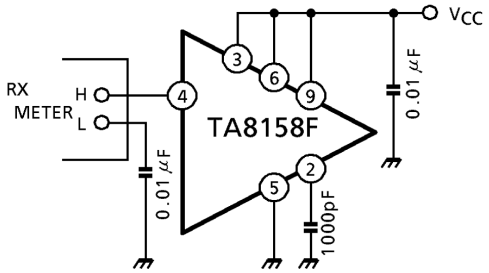
(1) r_{ip1}



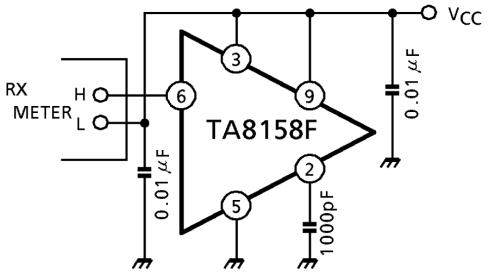
(2) r_{op3}, c_{op3}



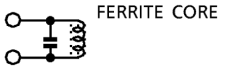
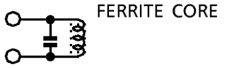
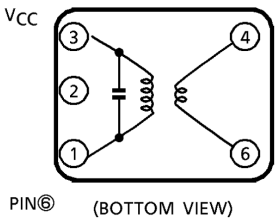
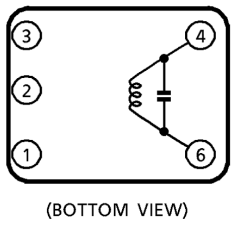
(3) r_{ip4}, c_{ip4}



(4) r_{op6}, c_{op6}



Text Circuit Coil Data (Japan band for 76.0MHz to 108.0MHz)

Coil	f_o	Q_o	Turns	Capaci−tance	
T_1 RF coil	100MHz	100	0.5mmϕ $2\frac{1}{4}$T Center tap	15pF (external)	
T_2 OSC coil	100MHz	100	0.5mmϕ $2\frac{1}{2}$T	15pF (external)	
T_3 IFT coil	10.7MHz	115	(1)−(3) 12T (4)−(6) 1T Wire 0.12mmϕ UEW SUMIDA ELECTRIC Co., LTD. 5764 or equivalent	75pF	
T_4 Quad coil	10.7MHz	150	(4)−(6) 14T Wire 0.12mmϕ UEW SUMIDA ELECTRIC Co., LTD. 44M−933A or equivalent	47pF	

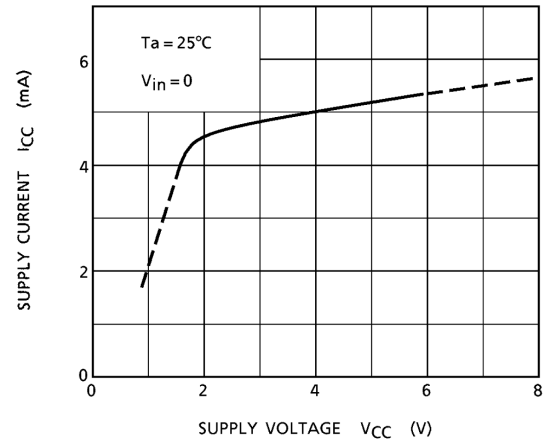
Band pass filter (BPF)

SOSHIN ELECTRIC Co., LTD. BPWB5

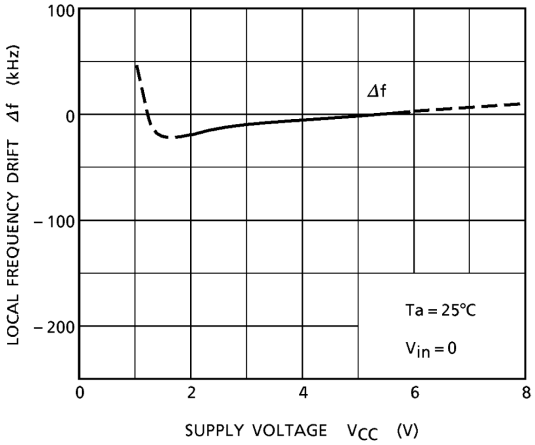
Tuning capacitor

ALPS ELECTRIC Co., LTD. CB41EL933

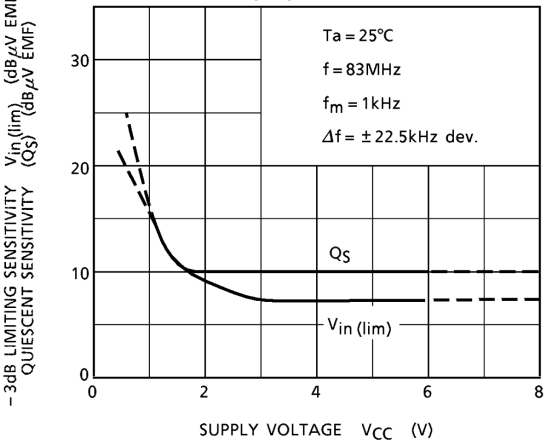
I_{CC} – V_{CC}



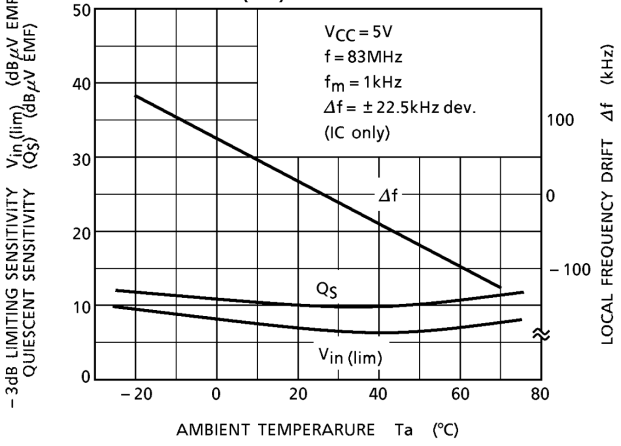
Δf – V_{CC}



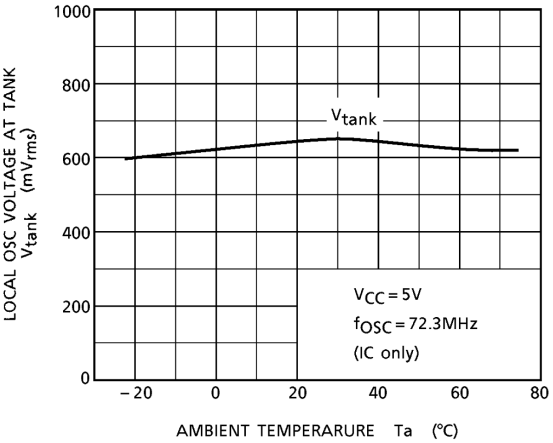
$V_{in\,(lim)}$, Q_S – V_{CC}



$V_{in\,(lim)}$, Q_S, Δf – Ta

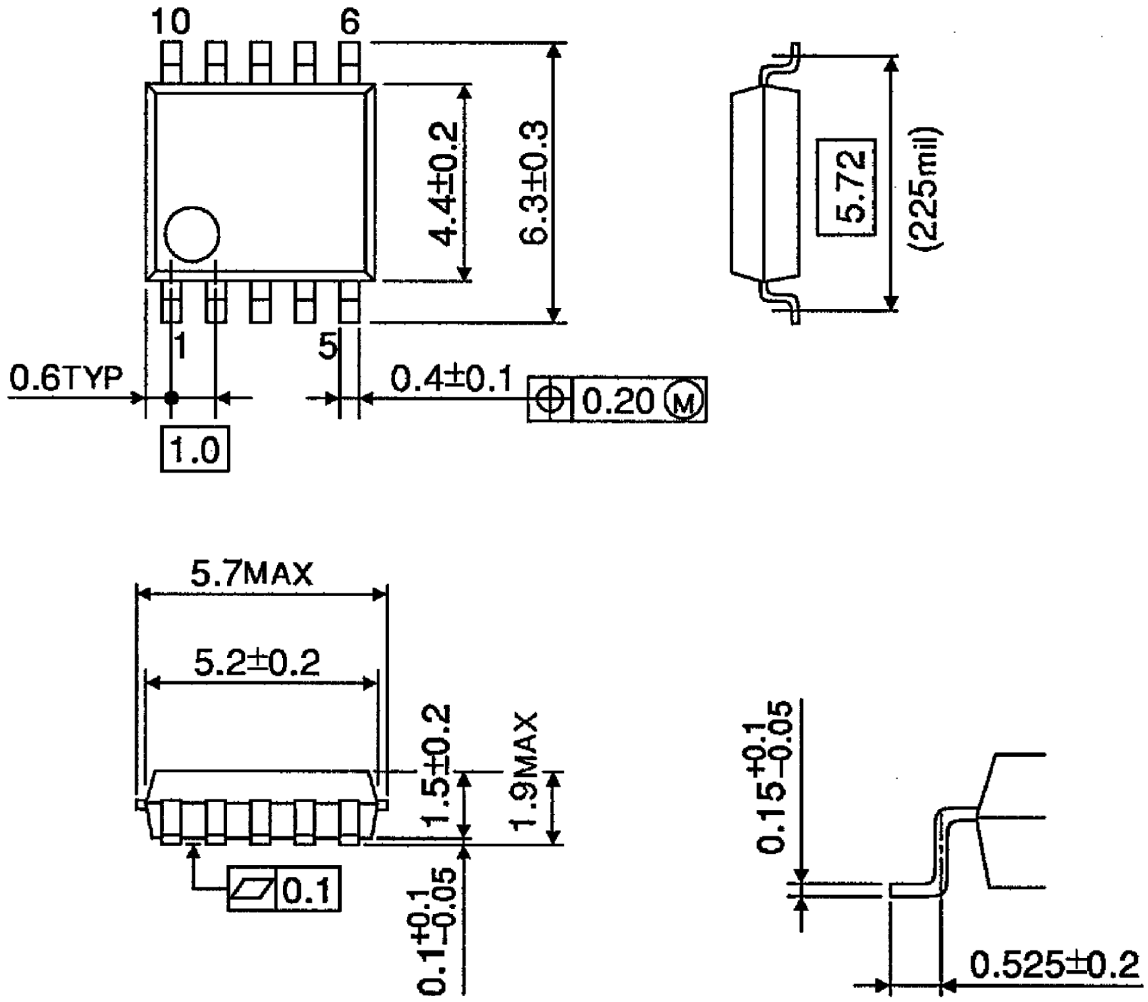


V_{tank} – Ta



Package Dimensions

SSOP10-P-225-1.00 Unit : mm



Weight: 0.10g (typ.)

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