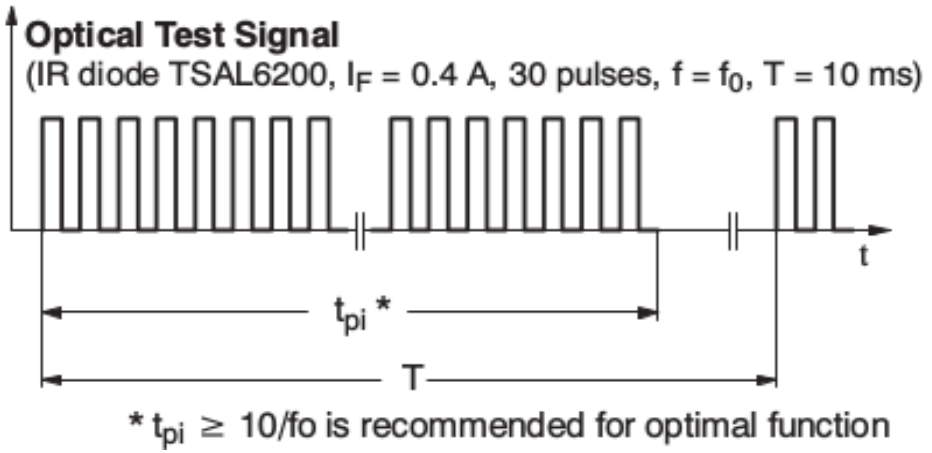
Background on TSOP12xx Modulation

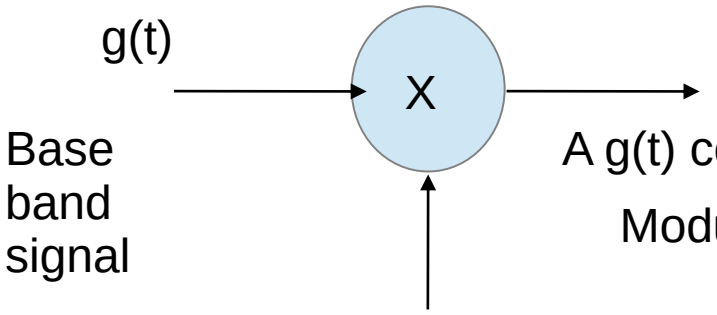
Base band Signal



Carrier signal ' s Frequency

Part	Carrier Frequency
TSOP1230	30 kHz
TSOP1233	33 kHz
TSOP1236	36 kHz
TSOP1237	36.7 kHz
TSOP1238	38 kHz
TSOP1240	40 kHz
TSOP1256	56 kHz

Time Domain



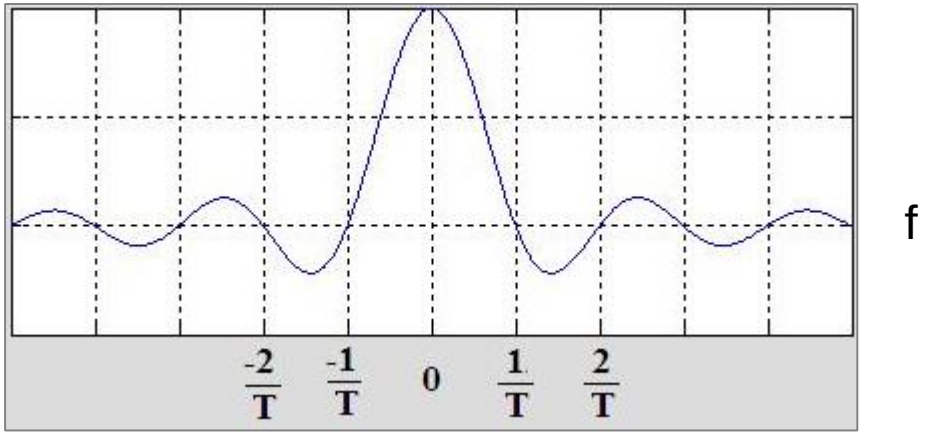
$$g(t) = \begin{cases} 1 & \text{for } -T/2 <= t <= T/2 \\ 0 & \text{otherwise} \end{cases} \quad \ldots (1)$$

$$FT[g(t)] = \frac{T \sin(\pi * f_c * T)}{\pi * f_c * T} \quad \ldots (2)$$

Frequency Characteristics

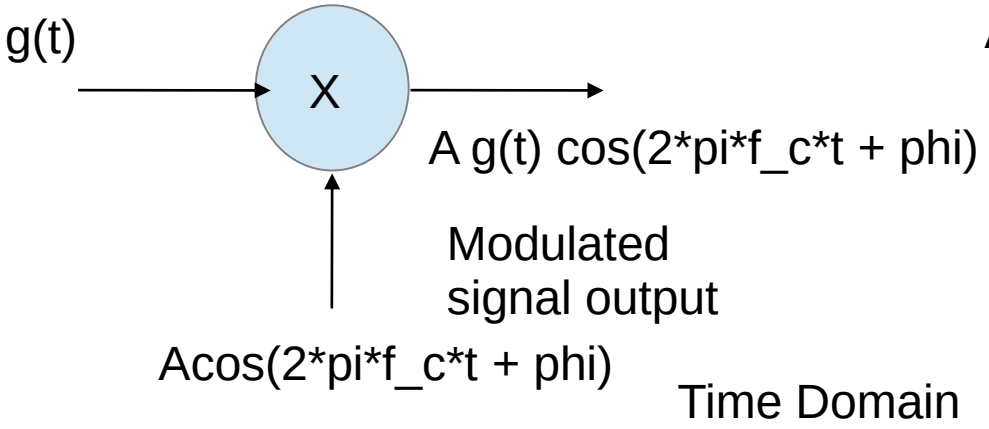
Fourier Transform of the Base band Signal

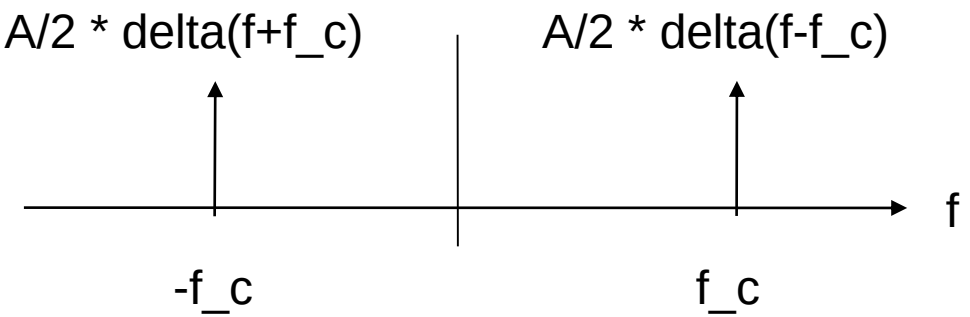
$$FT[g(t)] = \frac{T \sin(\pi f T)}{\pi f T}$$



Fourier Transform of the carrier

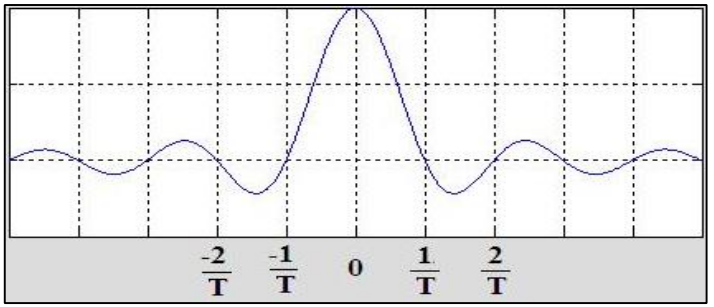
$$FT[A\cos(2\pi f_c t)] = A/2\,[\delta(f-f_c) + \delta(f+f_c)] \quad \ldots (3)$$



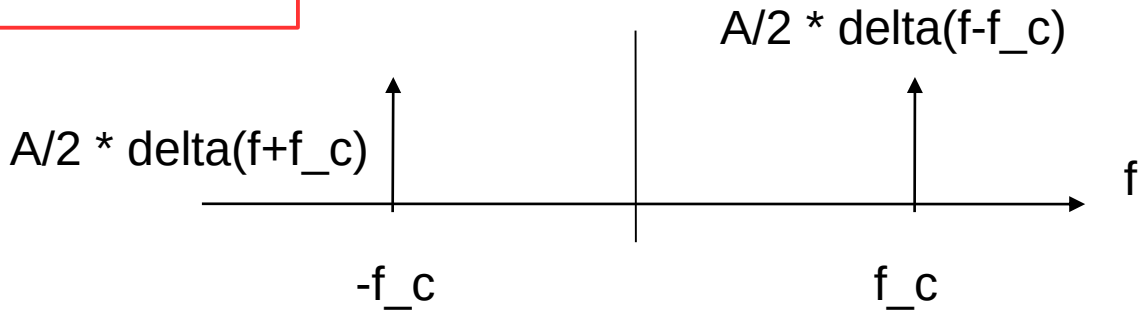


Frequency Characteristics of the Output

$$FT[g(t)] = \frac{T \sin(\pi f T)}{\pi f T}$$



$$FT[A\cos(2\pi f_c t)] = A/2\,[\delta(f-f_c) + \delta(f+f_c)]$$



Convolution

$$FT[A\,g(t)\cos(2\pi f_c t + \phi)] = FT(g(t)) * FT[A\cos(2\pi f_c t)] \quad \ldots (4)$$

$$A/2 \left\{ \frac{T \sin(\pi(f-f_c) T)}{\pi (f-f_c) T} + \frac{T \sin(\pi(f+f_c) T)}{\pi (f+f_c) T} \right\} \quad \ldots (4\text{-}1)$$