

SANYO

Received Frequency Display for Radio Receivers

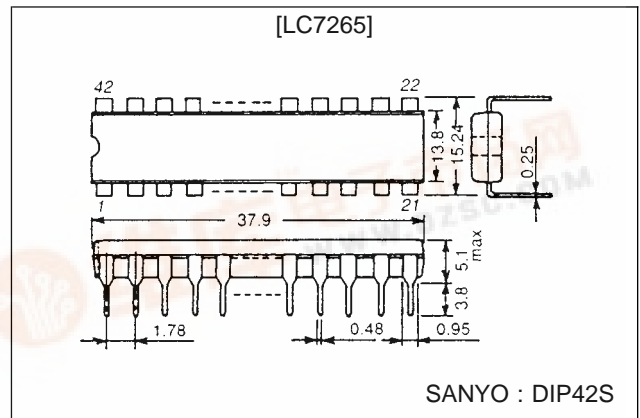
Features

- Displays received frequency of each band of FM, MW, LW (LED static display).
- Counts local oscillation frequency and displays received frequency.
- Number of display digits : FM-5 digits, MW-4 digits, LW-3 digits.
- Covers intermediate frequencies shown below.
 FM : +10.700, +10.725, +10.750, +10.675 MHz
 -10.700, -10.725, -10.675, -10.650 MHz
 MW, LW : +450 kHz : 10 kHz step display
 +450 kHz : 1 kHz step display
 +455 kHz : 1 kHz step display
 +469 kHz : 1 kHz step display
- Contains blanking circuit to turn off display.
- Contains hold circuit to hold display contents.
- Uses crystal resonator having 7.2 MHz reference frequency.
- Uses LB3500 (+8 prescaler) jointly at the time of FM reception.
- Supply voltage V_{DD} : 4.5 V to 10 V

Package Dimensions

unit : mm

3025B-DIP42S



Specifications

Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$, $V_{SS} = 0\text{ V}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{DD\ max}$		-0.3 to +11	V
Input voltage	V_{IN}	All input pins	-0.3 to $V_{DD}+0.3$	V
Output voltage	V_{O1}	X_{OUT} , HLD , $\bar{50\ Hz}$, output: off	-0.3 to $V_{DD}+0.3$	V
	V_{O2}	Output pins other than V_{O1}	0 to 15	V
Allowable power dissipation	$Pd\ max$	$T_a \leq 65^\circ\text{C}$	550	mW
Allowable power dissipation of segment outputs	$Pd\ (seg)1$	MHz, b&c, b&e, $V_{DD} = 4.5\ to\ 6.5\ V$, $I_{OL} = 33\ mA$	30	mW
	$Pd\ (seg) 2$	Other outputs, $V_{DD} = 4.5\ to\ 6.5\ V$, $I_{OL} = 16.5\ mA$	15	mW
	$Pd\ (seg) 3$	MHz, b&c, b&e, $V_{DD} = 6.0\ to\ 10\ V$, $I_{OL} = 36\ mA$	25	mW
	$Pd\ (seg) 4$	Other outputs, $V_{DD} = 6.0\ to\ 10\ V$, $I_{OL} = 18\ mA$	12	mW
Operating temperature	$Topr$		-30 to +65	$^\circ\text{C}$
Storage temperature	$Tstg$		-40 to +125	$^\circ\text{C}$



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Allowable Operating Ranges at $T_a = 25\text{ }^\circ\text{C}$, $V_{DD} = 4.5\text{ to }10\text{ V}$, $V_{SS} = 0\text{ V}$

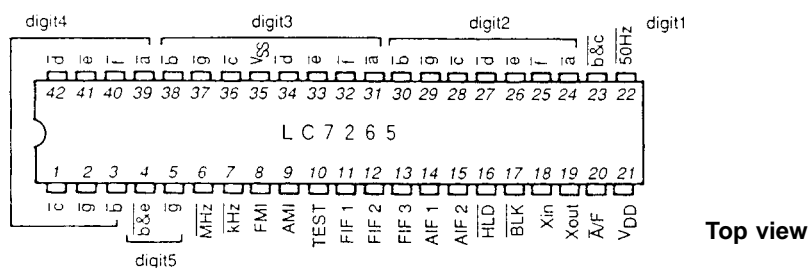
Parameter	Symbol	Conditions	min	typ	max	Unit
Supply voltage	V_{DD}		4.5		10	V
Input high-level voltage	V_{IH1}	$\overline{A/F}$, \overline{BLK}	$0.7V_{DD}$		V_{DD}	V
	V_{IH2}	FIF1, FIF2, FIF3, AIF1, AIF2	$0.9V_{DD}$		V_{DD}	V
Input low-level voltage	V_{IL1}	$\overline{A/F}$, \overline{BLK}	0		$0.3V_{DD}$	V
	V_{IL2}	FIF1, FIF2, FIF3, AIF1, AIF2	0		$0.1V_{DD}$	V
Input frequency	f_{IN1}	FMI, sine wave, capacitive coupling, $V_{IN1} = 0.7\text{Vp-p}$	1		18	MHz
	f_{IN2}	AMI, sine wave, capacitive coupling, $V_{IN2} = 0.5\text{Vp-p}^*$	0.5		3	MHz
	f_{IN3}	X_{IN}	0.2		7.5	MHz
Input amplitude	V_{IN1}	FMI, sine wave, capacitive coupling, $f_{IN1} = 1\text{ to }18\text{ MHz}$	0.7		$0.9V_{DD}$	Vp-p
	V_{IN2}	AMI, sine wave, capacitive coupling, $f_{IN2} = 0.5\text{ to }3\text{ MHz}$	0.5^*		$0.9V_{DD}$	Vp-p
	V_{IN3}	X_{IN} , sine wave, capacitive coupling, $f_{IN3} = 0.2\text{ to }7.5\text{ MHz}$	1.0		$0.9V_{DD}$	Vp-p
Segment current	Iseg1	\overline{MHz} , $\overline{b\&e}$, $\overline{b\&c}$	0		30	mA
	Iseg2	Other outputs	0		15	mA

*: For $f_{IN2} = 0.5\text{ MHz to }0.9\text{ MHz}$ and $V_{DD} = 8\text{ to }10\text{ V}$, $V_{IN2}\text{ min} = 1.0\text{ Vp-p}$ applies.

Electrical Characteristics at $T_a = 25\text{ }^\circ\text{C}$, $V_{DD} = 4.5\text{ to }10\text{ V}$, $V_{SS} = 0\text{ V}$

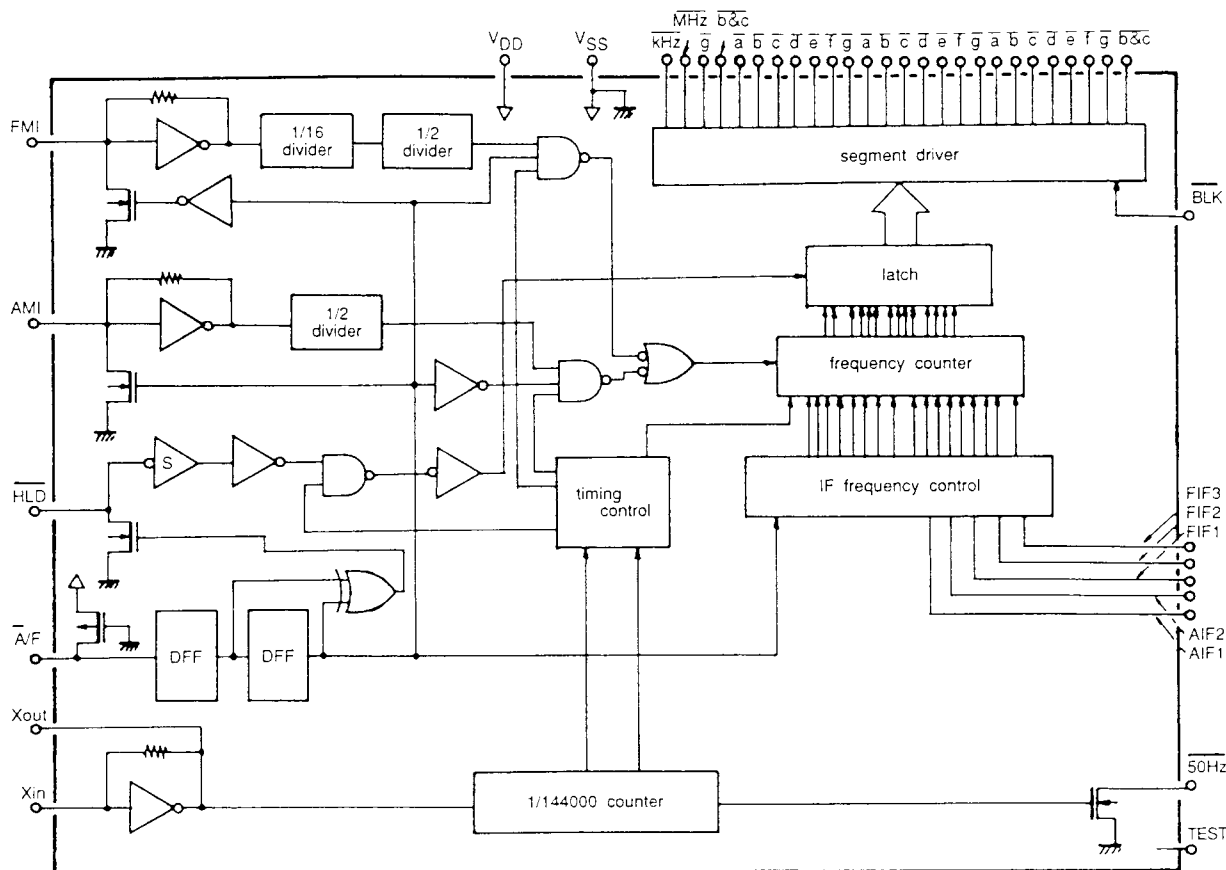
Parameter	Symbol	Conditions	min	typ	max	Unit
Input high-level current	I_{IH1}	FIF1, FIF2, FIF3, AIF1, AIF2 $V_I = V_{DD}$	0		10	μA
	I_{IH2}	\overline{BLK} $V_I = V_{DD}$	0		2	μA
Input low-level current	I_{IL1}	FIF1, FIF2, FIF3, AIF1, AIF2 $V_I = V_{SS}$	0		10	μA
	I_{IL2}	\overline{BLK} $V_I = V_{SS}$	0		2	μA
	I_{IL3}	$\overline{A/F}$ $V_I = V_{SS}$	20		500	μA
Input floating voltage	V_{IF}	$\overline{A/F}$ $V_I = \text{open}$	$0.8V_{DD}$		V_{DD}	V
Input/output high-level leakage current	I_{OFF}	\overline{HLD} , output off, $V_I = V_{DD}$	0		2	μA
Output low-level voltage	V_{OL1}	\overline{HLD} , output on, $I_O = 1\text{ mA}$	0		1	V
	V_{OL2}	$\overline{b\&e}$, $\overline{b\&c}$, MHz $V_{DD} = 4.5\text{ to }10\text{ V}$, $I_{OL} = 30\text{ mA}$	0		0.7	V
	V_{OL3}	Segments other than above $V_{DD} = 4.5\text{ to }10\text{ V}$, $I_{OL} = 15\text{ mA}$	0		0.7	V
	V_{OL4}	50 Hz, $I_O = 0.2\text{ mA}$	0		1.0	V
Input high-level threshold voltage	V_{th}	\overline{HLD}	$0.4V_{DD}$	$0.5V_{DD}$	$0.7V_{DD}$	V
Output off leakage current	I_{OFF2}	All segments output pins, $V_O = 13\text{ V}$, output off	0		10	μA
Current drain	I_{DD}	FM mode, $\overline{A/F} = \text{open or }V_{DD}$, $f_{IN1} = 18\text{ MHz}$, 0.7Vp-p or (AM mode, $\overline{A/F} = V_{SS}$, $f_{IN2} = 3\text{ MHz}$, 0.5Vp-p) $f_{IN3} = 7.2\text{ MHz}$, 1Vp-p FIF1, FIF2, FIF3 = V_{DD} AIF1, AIF2 = V_{DD} \overline{HLD} , $\overline{BLK} = V_{DD}$ other pins open	0		18	mA

Pin Assignment



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Equivalent Circuit Block Diagram



1. Display

1-1 Display font

1 2 3 4 5 6 7 8 9 0

1-2 Lighting system

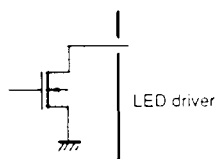
- Static lighting

1-3 Display range (High-order 1 digit : zero blanking)

- FM : 00.00 MHz to 199.95 MHz 50 kHz step
- MW, LW : 000 kHz to 1999 kHz 10 kHz or 1 kHz step

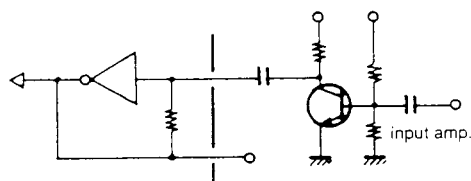
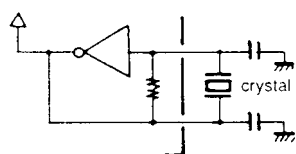
2. Pin Description

2-1 • \overline{a} to \overline{g} , $\overline{b\&c}$, $\overline{b\&e}$, \overline{MHz} , \overline{kHz} : LED



2-2 • V_{DD} , V_{SS} : Power supply pins

2-3 • X_{IN} , X_{OUT} : Crystal resonator or input amp pin



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2-4 • FIF1, FIF2, FIF3 : FM IF select pins

FIF1	0	0	0	0	1	1	1	1
FIF2	0	0	1	1	0	0	1	1
FIF3	0	1	0	1	0	1	0	1
IF (MHz)	+10.700	+10.725	+10.675	+10.750	-10.700	-10.725	-10.675	-10.650

2-5 • AIF1, AIF2 : AM IF select pins

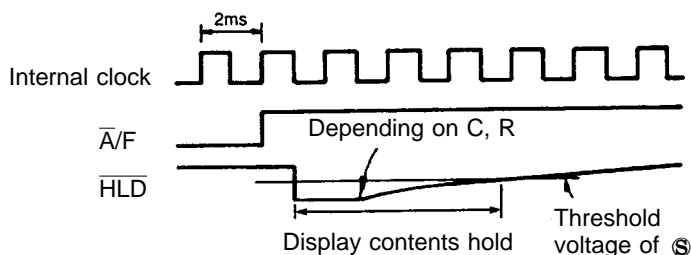
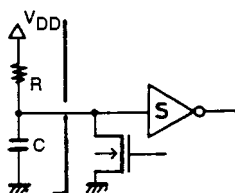
AIF1	0	0	1	1
AIF2	0	1	0	1
IF (kHz)	+450 (2)	+450 (1)	+455	+469

1 : High level (V_{DD})
0 : Low level (V_{SS})

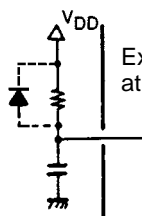
(Note) 450 kHz(1) : 10 kHz step display, others : 1 kHz step display

2-6 • \overline{HLD} : Display contents hold pin

Normally, this pin is set at high level. To hold display contents, this pin is set at low level. Connecting time constant circuit to this pin makes it possible to hold display contents for a certain period of time at the time of FM/MW, LW band selection.



2-7 • \overline{BLK} : Display blanking pin



Example of blanking misdisplay at the time of application of power.

2-8 • FMI, AMI : Local oscillation signal input pins

FMI — For FM : 0.7Vp-p input sensitivity

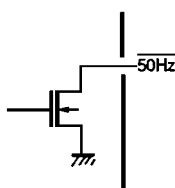
AMI — For MW, LW : 1.0Vp-p input sensitivity ($V_{DD} = 8$ to 10 V, $f_{IN} = 0.5$ to 0.9 MHz)
0.5Vp-p input sensitivity (other than above)

2-9 • $\overline{A/F}$: FM/MW, LW select pin

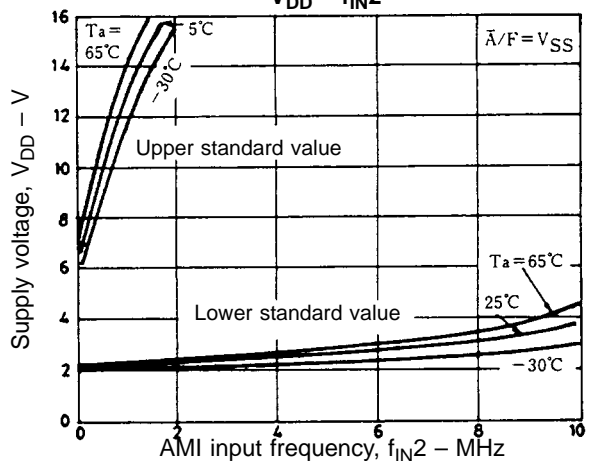
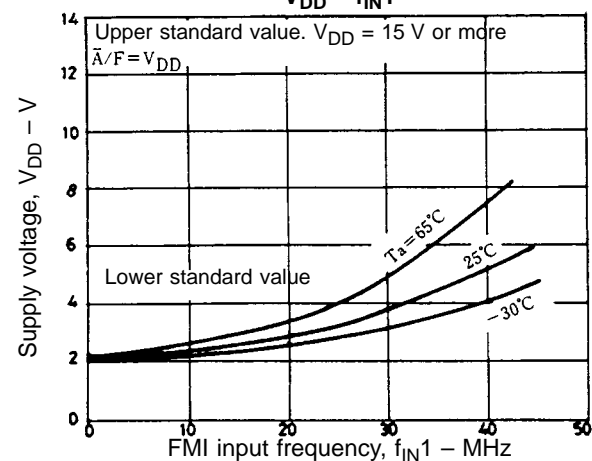
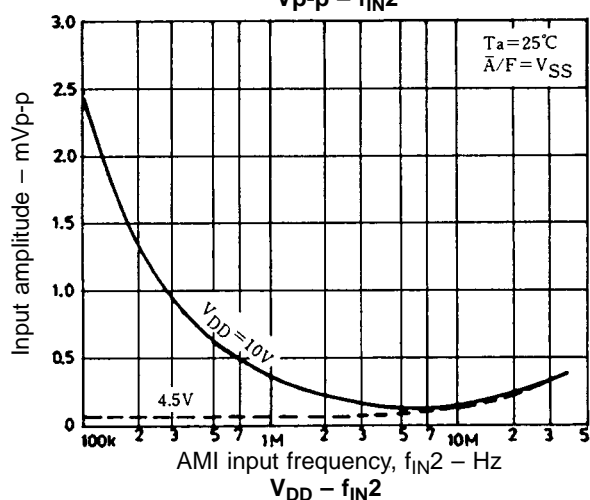
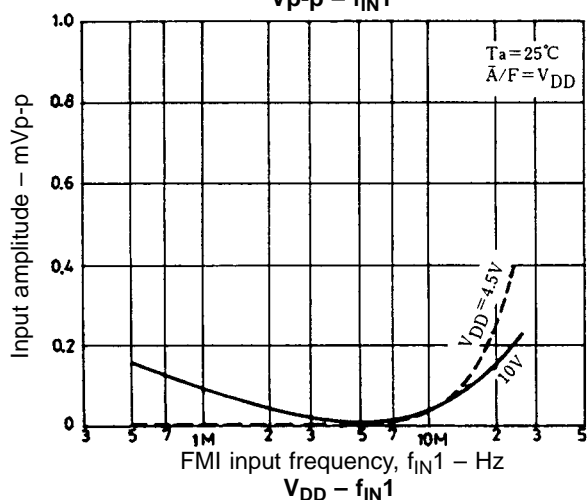
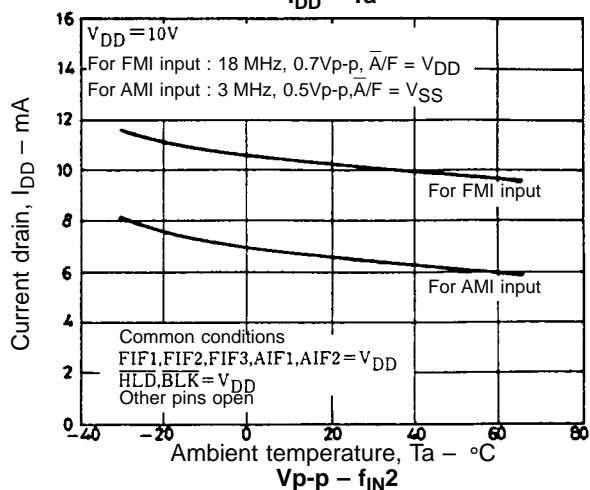
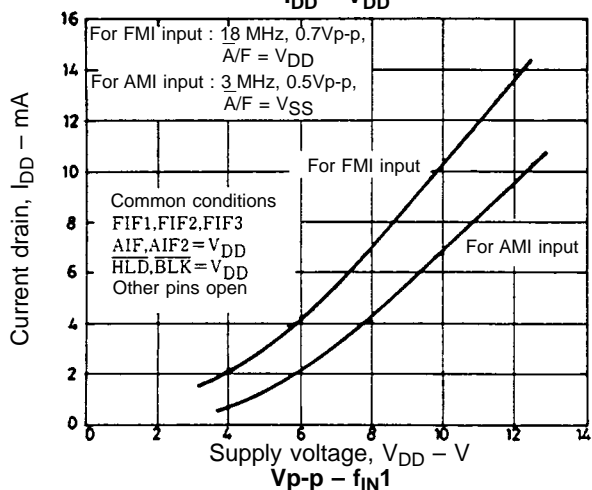
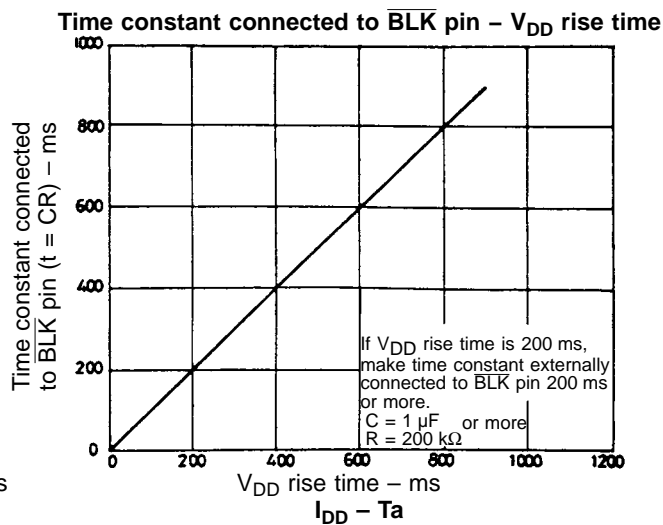
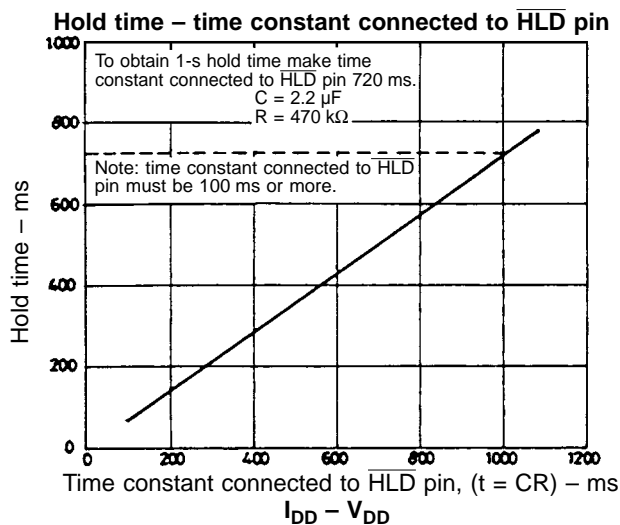
FM — Pin open or high level

MW, LW — Low level

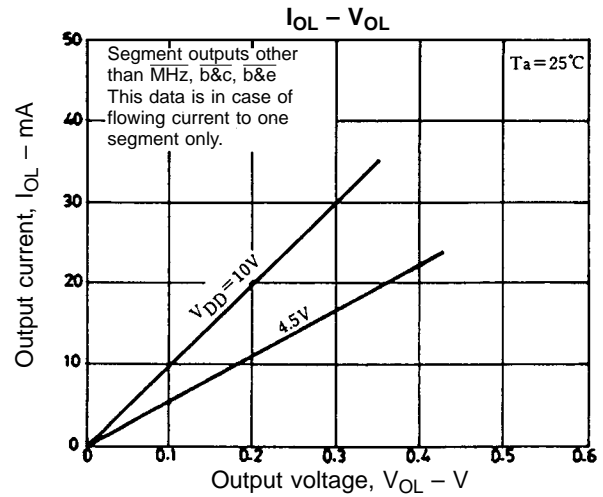
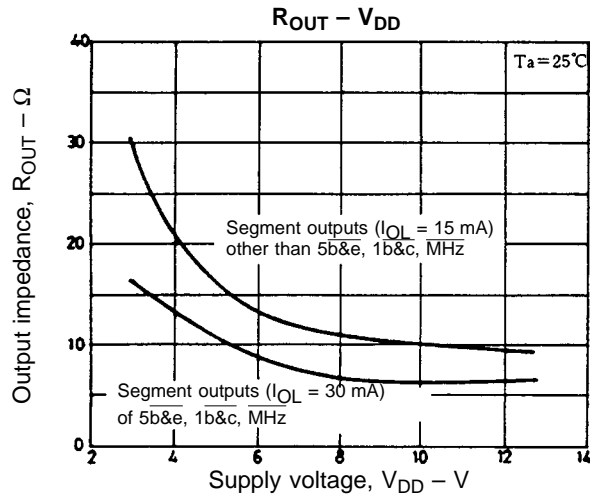
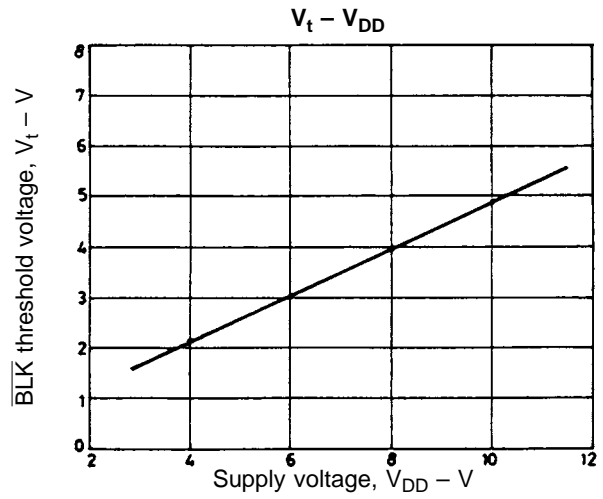
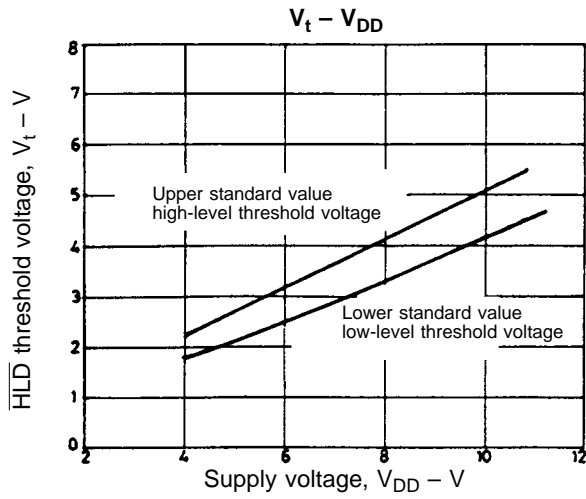
2-10 • 50 Hz : 50 Hz time base output pin



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