

MC1378

Color Television Composite Video Overlay Synchronizer

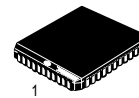
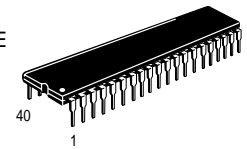
The MC1378 is a bipolar composite video overlay encoder and microcomputer synchronizer. The MC1378 contains the complete encoder function of the MC1377, i.e., quadrature color modulators, RGB matrix, and blanking level clamps, plus a complete complement of synchronizers to lock a microcomputer-based video source to any remote video source. The MC1378 can be used as a local system timing and encoding source, but it is most valuable when used to lock the microcomputer source to a remotely originated video signal.

- Contains All Needed Reference Oscillators
- Can Be Operated in PAL or NTSC Mode, 625 or 525 Line
- Wideband, Full-Fidelity Color Encoding
- Local or Remote Modes of Operation
- Minimal External Components
- Designed to Operate from 5.0 V supply
- Will Work with non standard Video

COLOR TELEVISION COMPOSITE VIDEO OVERLAY SYNCHRONIZER

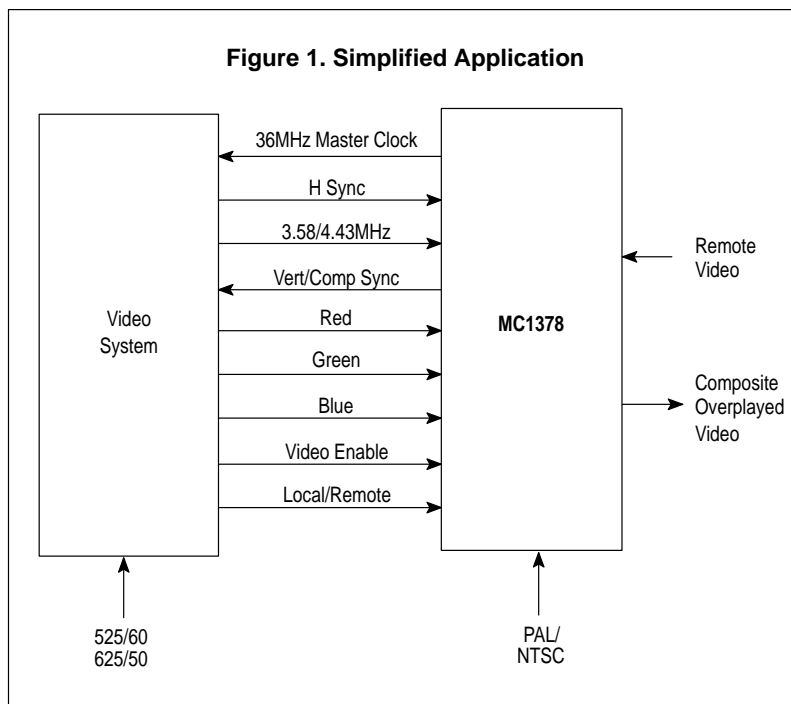
SEMICONDUCTOR TECHNICAL DATA

P SUFFIX
PLASTIC PACKAGE
CASE 711



FN SUFFIX
PLASTIC PACKAGE
CASE 777
(PLCC-44)

Figure 1. Simplified Application



PIN CONNECTIONS

Local/Rem.	1 (1)	(44) 40	H. Sync In
H. PLL Filter	2 (2)	(43) 39	Comp. Sync Out
H. VCO	3 (3)	(42) 38	V. Out/Sync In
	4 (4)	(41) 37	Clock PLL Filter
Burst Gate Out	5 (5)	(40) 36	Clock V _{CC}
PAL/NTSC Mode	6 (7)	(38) 35	Clock Output
Ground	7 (8)	(37) 34	Clock Ground
3.58/4.43 In	8 (9)	(36) 33	Clock VCO
Chroma PLL Filter	9 (10)	(35) 32	
Chroma VCO	10 (11)	(34) 31	Killer Filter
	11 (12)	(33) 30	Quad. Loop Filter
R-Y Clamp	12 (13)	(32) 29	PAL Indent. Cap
B-Y Clamp	13 (14)	(31) 28	V _{CC}
R Input	14 (15)	(30) 27	Comp. Vid. Out
G Input	15 (16)	(29) 26	Ground
B Input	16 (18)	(27) 25	Overlay Enable
-Y Output	17 (19)	(26) 24	Rem. Vid. In
Chroma Out	18 (20)	(25) 23	ACC Filter
Loc. Vid. Clamp	19 (21)	(24) 22	-Y Input
Chroma In	20 (22)	(23) 21	Rem. Vid. Clamp

* () PLCC Pin Assignments

ORDERING INFORMATION

Device	Operating Temperature Range	Package
MC1378P	T _A = 0° to +70°C	Plastic DIP
MC1378FN		PLCC-44

MC1378

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Supply Voltage	V_{CC}	6.0	Vdc
Operating Temperature	T_A	0 to +70	°C
Storage Temperature	T_{stg}	-65 to +150	°C
Junction Temperature	$T_{J(max)}$	150	°C
Power Dissipation, Package Derate above 25°C	P_D	1.25 10	W mW/°C

RECOMMENDED OPERATING CONDITIONS

Condition	Pin	Value	Unit
Supply Voltage	28, 36	5.4 ± 0.25	Vdc
RGB Input for 100% Saturation	14, 15, 16	1.0	Vpp
Color Oscillator Input Level	8	0.5	Vpp
Video Input, Positive	24	1.0	Vpp

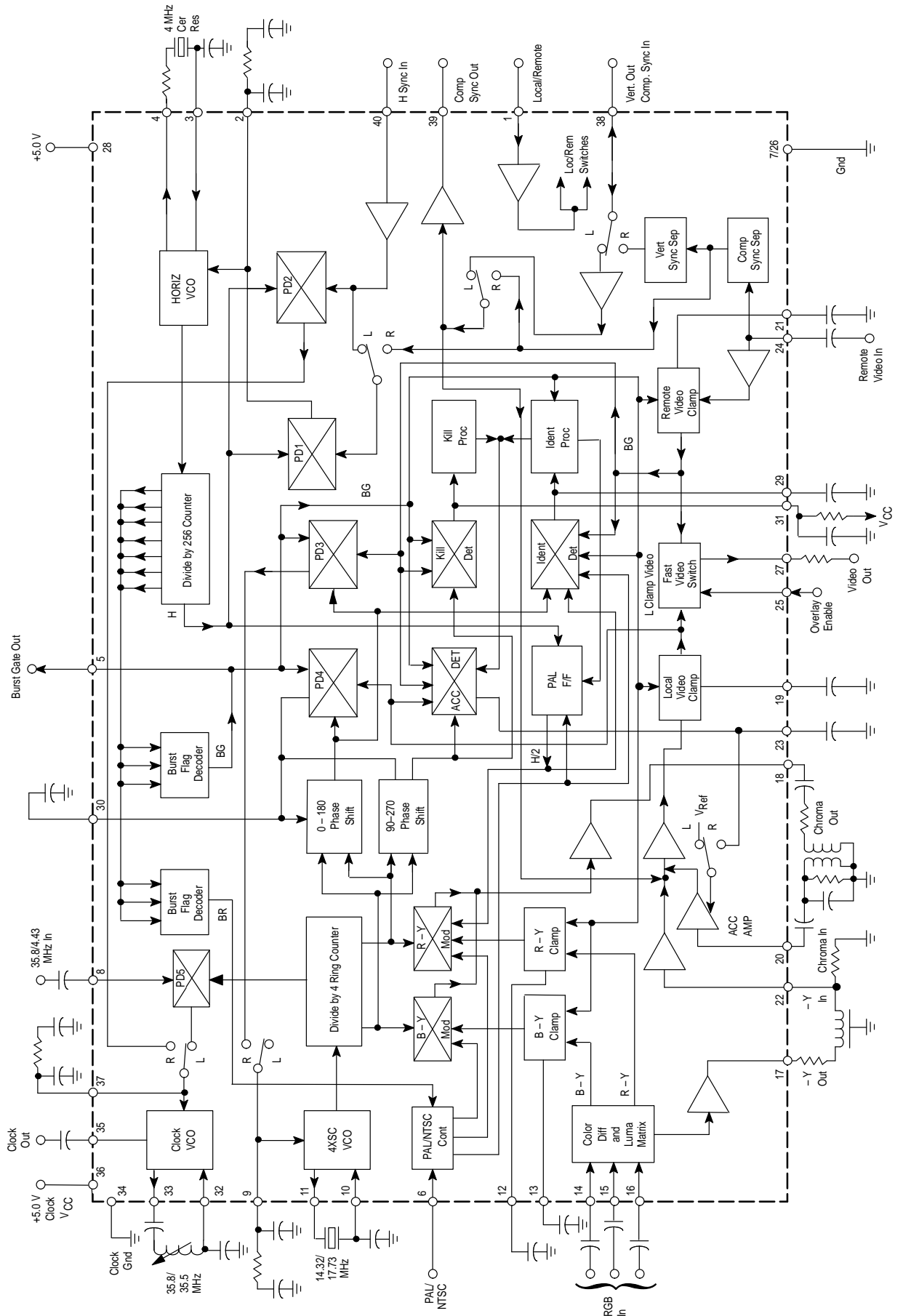
ELECTRICAL CHARACTERISTICS ($V_{CC} = 5.0$ V, $T_A = 25^\circ\text{C}$, circuit of Figure 4 or 5)

Characteristics	Pin	Min	Typ	Max	Unit	
Supply Current	28, 36	–	100	–	mAdc	
Video Output, Open Circuit, Positive	27	–	2.0	9.4	Vpp	
Modulation Angle (R – Y) to (B – Y)	–	87	90	93	Degrees	
RGB Input Impedance	14, 15, 16	–	10	–	k Ω	
Local/Remote Switch (TTL)	High Low	1	Remote Local	–	–	
Horizontal Sync Input, Negative Going	(TTL)	40	–	4.3	–	Vpp
Vertical Sync Output, Negative Going, Remote Mode	(TTL)	38	–	4.3	–	Vpp
Composite Sync Output, Negative Going	(TTL)	39	–	4.3	–	Vpp
Burst Gate Output, Positive Going	(TTL)	5	–	4.3	–	Vpp

Description of Operation – Refer to Figures 3, 4

Remote Mode	Local Mode
<p>The incoming remote video signal (Pin 24) supplies all synchronizing information. A discussion of the function of the phase detectors helps to clarify the lockup method:</p> <p>PD1 — locks the internally counted-down 4 MHz horizontal VCO to the incoming horizontal sync. It is fast acting, to follow VCR source fluctuations.</p> <p>PD2 — locks the 36 MHz clock VCO, which is divided down by the video system, to the divided down horizontal VCO.</p> <p>PD3 — is a gated phase detector which locks the 14 MHz crystal oscillator, divided by 4, to the incoming color burst.</p> <p>PD4 — controls an internal phase shifter to assure that the outgoing color burst is the same phase as incoming burst at PD3.</p> <p>PD5 — not used in REMOTE MODE</p> <p>Vertical lock is obtained by continuously resetting the sync generator in the video system with separated vertical sync from the MC1378, Pin 38. This signal is TTL level vertical block sync, negative going. The horizontal sync from the video system to Pin 40 is also TTL level with sync negative going. The local/remote switch, Pin 1, is in local mode when grounded, remote mode when taken to 5.0 V. The overlay control, Pin 25, has an analog characteristic, centered about 1.0 V, which allows fading from local to remote.</p>	<p>The MC1378 and a video system combine to provide a fully synchronized standard signal source. In this case, composite sync must be supplied by the video system or other time base system. In the MC1378 the phase detectors operate as follows:</p> <p>PD1 — locks the internally counted-down 4 MHz horizontal VCO to a Horizontal Sync signal (at Pin 40) from the video system (counted down from 36 MHz)</p> <p>PD2 — not used in LOCAL MODE. PD3 — not used in LOCAL MODE.</p> <p>PD4 — active, but providing an arbitrary phase shift setting between the color oscillator and the output burst phase.</p> <p>PD5 — locks the 36 MHz clock VCO (which is divided down by the video system) to the 14 MHz (crystal) color oscillator. The 14 MHz is, therefore, the system standard in LOCAL MODE, and is not DC controlled.</p> <p>COMPOSITE VIDEO GENERATION The color encoding at the RGB signals is done exactly as in the MC1377. Composite chroma is looped out at Pins 18 and 20 to allow the designer to choose band shaping. Luminance is similarly brought out (Pins 17 and 22) to permit installation of the appropriate delay. Composite sync output, Pin 39, and burst gate output, Pin 5, are provided for convenience only.</p>

Figure 2. Representative Block Diagram



MC1378

Figure 3. Remote Mode

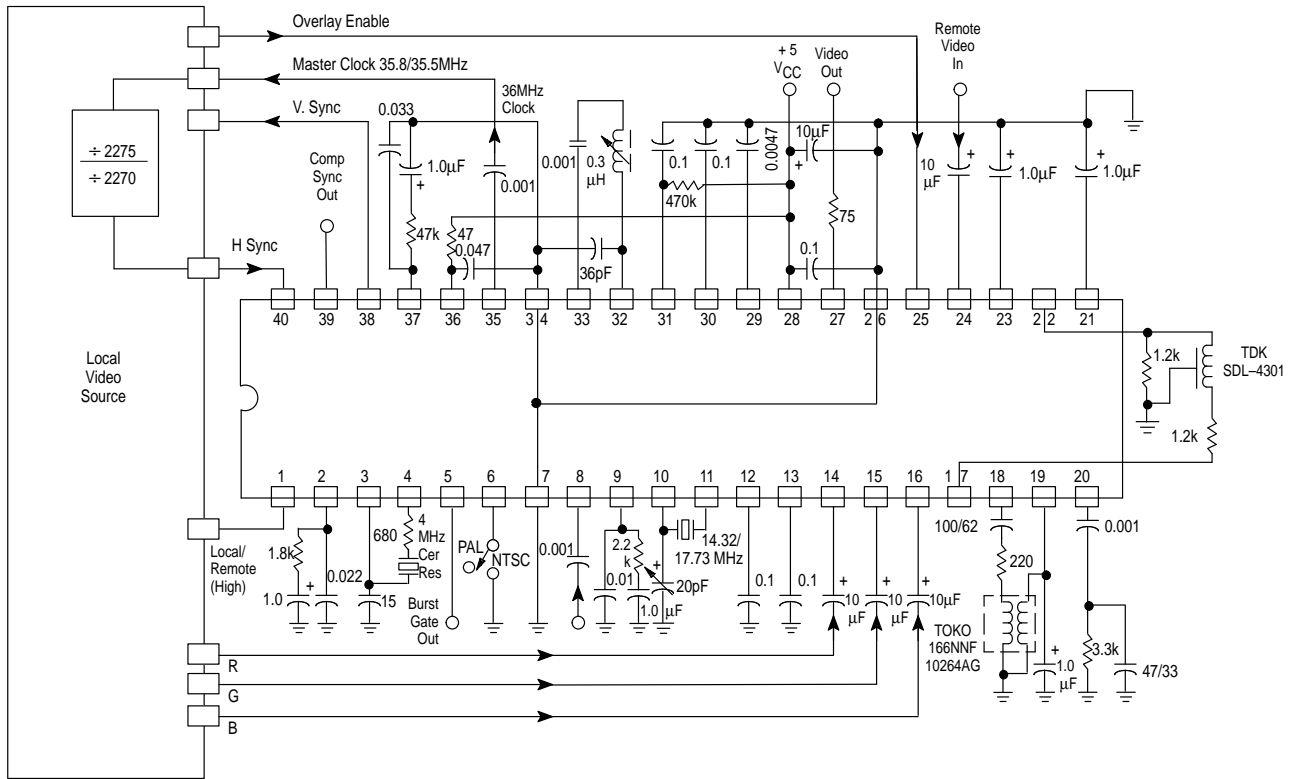
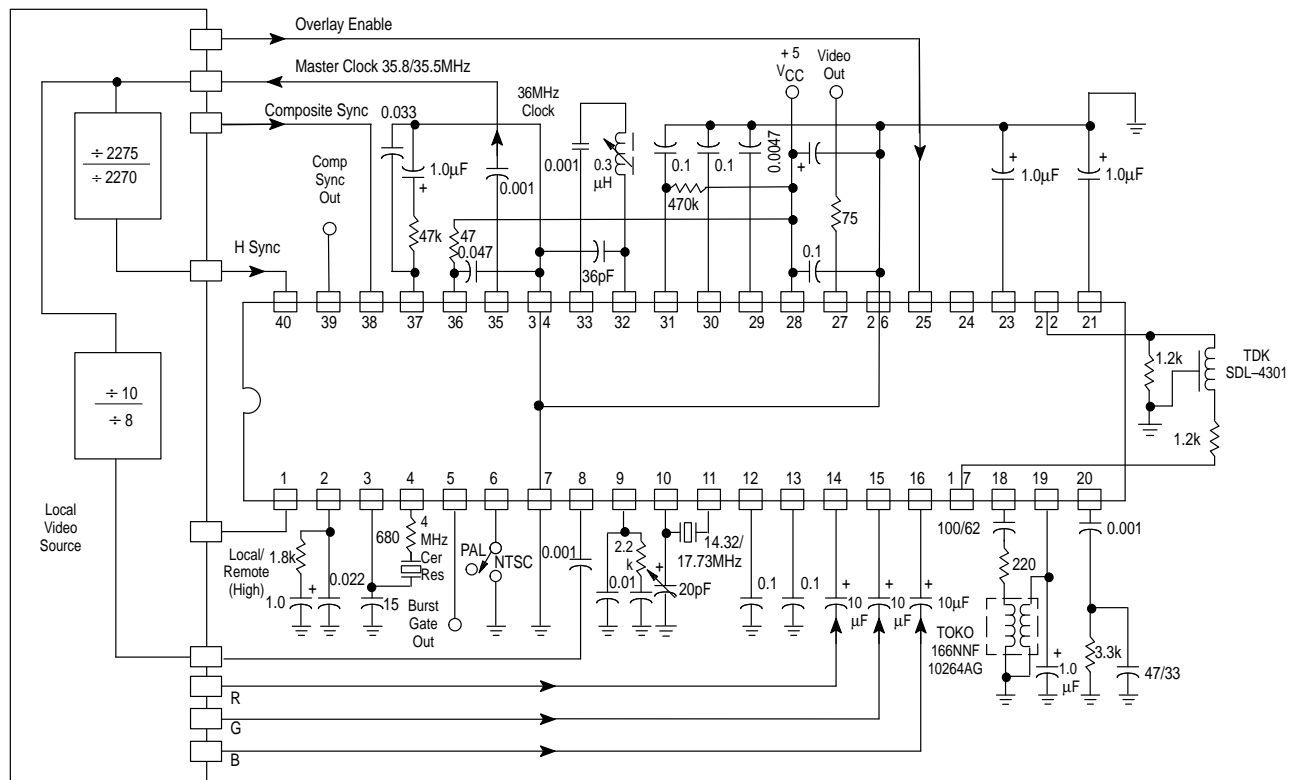


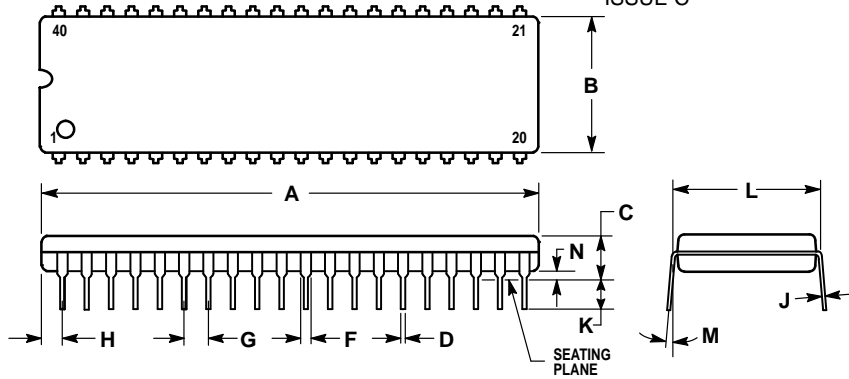
Figure 4. Local Mode



MC1378

OUTLINE DIMENSIONS

P SUFFIX
PLASTIC PACKAGE
CASE 711-03
ISSUE C

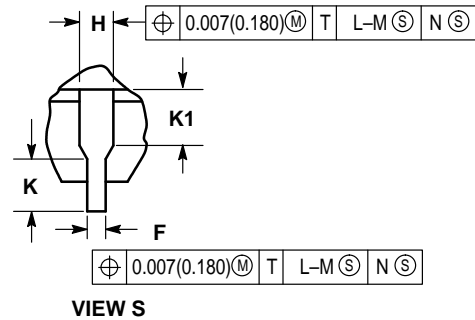
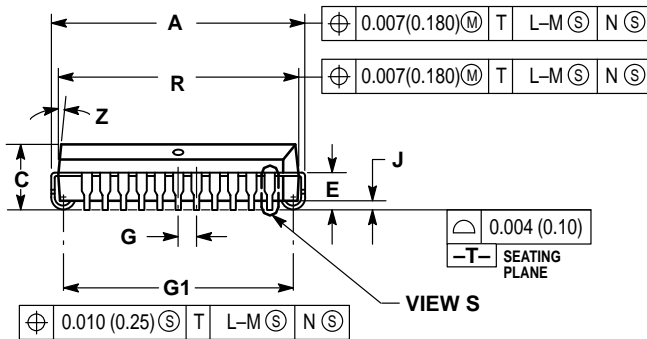
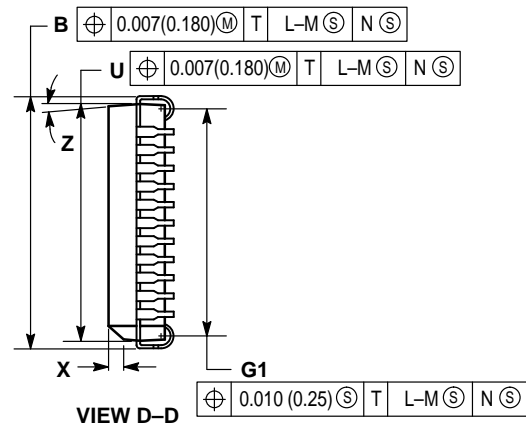
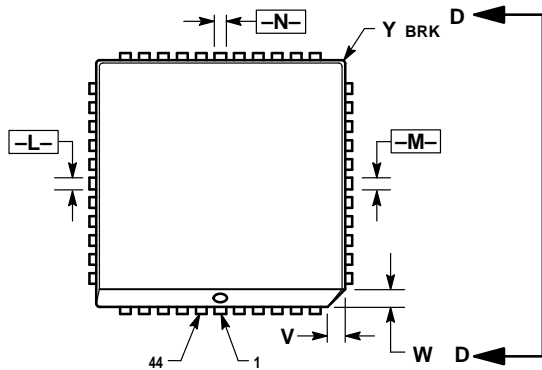


NOTES:

1. POSITIONAL TOLERANCE OF LEADS (D), SHALL BE WITHIN 0.25 (0.010) AT MAXIMUM MATERIAL CONDITION, IN RELATION TO SEATING PLANE AND EACH OTHER.
2. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
3. DIMENSION B DOES NOT INCLUDE MOLD FLASH.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	51.69	52.45	2.035	2.065
B	13.72	14.22	0.540	0.560
C	3.94	5.08	0.155	0.200
D	0.36	0.56	0.014	0.022
F	1.02	1.52	0.040	0.060
G	2.54 BSC		0.100 BSC	
H	1.65	2.16	0.065	0.085
J	0.20	0.38	0.008	0.015
K	2.92	3.43	0.115	0.135
L	15.24 BSC		0.600 BSC	
M	0°		15°	
N	0.51	1.02	0.020	0.040


FN SUFFIX
PLASTIC PACKAGE
CASE 777-02
(PLCC-44)
ISSUE C



NOTES:

1. DATUMS -L-, -M-, AND -N- ARE DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
2. DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
3. DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.25) PER SIDE.
4. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
5. CONTROLLING DIMENSION: INCH.
6. THE PACKAGE TOP MAY BE SMALLER THAN THE PACKAGE BOTTOM BY UP TO 0.012 (0.300). DIMENSIONS R AND U ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY EXCLUSIVE OF MOLD FLASH, TIE BAR BURRS, GATE BURRS AND INTERLEAD FLASH, BUT INCLUDING ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
7. DIMENSION H DOES NOT INCLUDE DAMBAR PROTRUSION OR INTRUSION. THE DAMBAR PROTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE GREATER THAN 0.037 (0.940). THE DAMBAR INTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE SMALLER THAN 0.025 (0.635).

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.685	0.695	17.40	17.65
B	0.685	0.695	17.40	17.65
C	0.165	0.180	4.20	4.57
E	0.090	0.110	2.29	2.79
F	0.013	0.019	0.33	0.48
G	0.050 BSC		1.27 BSC	
H	0.026	0.032	0.66	0.81
J	0.020	—	0.51	—
K	0.025	—	0.64	—
R	0.650	0.656	16.51	16.66
U	0.650	0.656	16.51	16.66
V	0.042	0.048	1.07	1.21
W	0.042	0.048	1.07	1.21
X	0.042	0.056	1.07	1.42
Y	—	0.020	—	0.50
Z	2°		10°	
G1	0.610	0.630	15.50	16.00
K1	0.040	—	1.02	—

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters which may be provided in Motorola data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and  registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

How to reach us:

USA/EUROPE/Locations Not Listed: Motorola Literature Distribution;
P.O. Box 20912; Phoenix, Arizona 85036. 1-800-441-2447 or 602-303-5454

MFAX: RMFAX0@email.sps.mot.com – TOUCHTONE 602-244-6609
INTERNET: <http://Design-NET.com>

JAPAN: Nippon Motorola Ltd.; Tatsumi-SPD-JLDC, 6F Seibu-Butsuryu-Center,
3-14-2 Tatsumi Koto-Ku, Tokyo 135, Japan. 03-81-3521-8315

ASIA/PACIFIC: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298

