

8-channel LCD & Camera EMI Filter with ESD Protection

Features

- Eight (8) Low pass EMI filters with excellent attenuation at high frequencies
- ESD protection at 15KV per IEC61000
- Available in CSP-20 device or uDFN-16 package
- RoHS Compliant

Applications

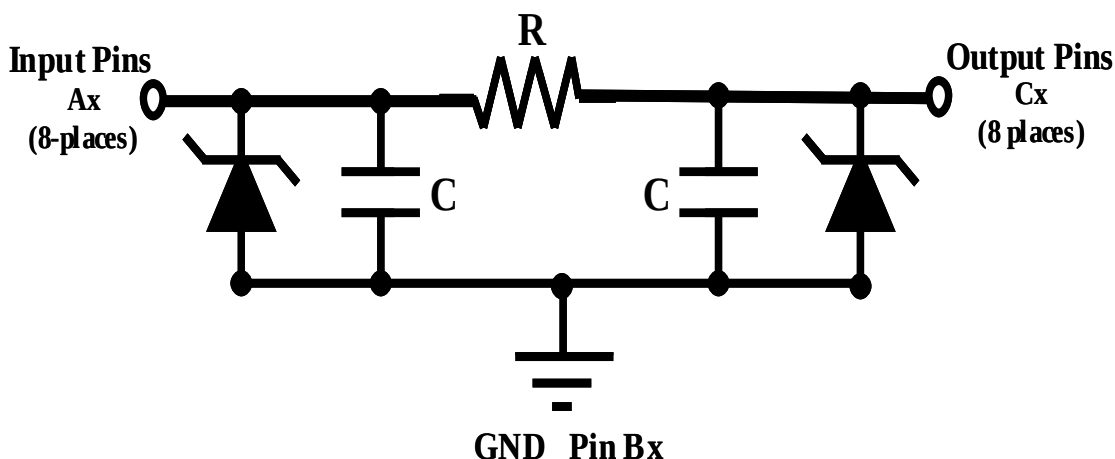
- Cellular Handsets
- PDA
- MP3 Players
- PC & Notebooks
- Smart Cards
- Digital Cameras

Product Description

The EMF4020-08 is an 8-channel pi-style Capacitor-Resistor-Capacitor EMI/RFI Filter with integrated Diodes for electrostatic discharge (ESD) protection. This device offers greater than 30dB attenuation in the 800MHz to 3GHz. The diodes provide a 15kV contact-discharge ESD protection per IEC-61000 specifications.

The device is offered in both a CSP format and a uDFN package with 0.5mm pitch, ideal for portable electronic systems.

Schematic for Each Line



ELECTRICAL OPERATING CHARACTERISTICS (Note: 1)						
SYMBOL	PARAMETERS	CONDITIONS	MIN	TYP	MAX	UNITS
R	Resistance		80	100	120	Ω
C	Capacitance	@ 2.5V DC, 1MHz, 30mV AC	12	15	18	pF
V _{DIODE}	Diode Standoff Voltage	I _{DIODE} = 10 μ A		6		V
V _{LEAK}	Diode Leakage Current (Reverse Bias)	V _{DIODE} = 3.3V		100	200	nA
V _{SIG}	Signal Voltage:	I _{LOAD} = 10mA				
	Positive		5.6	6.8	9	V
	Negative		-1.5	-0.8	-0.4	V
V _{ESD}	ESD Protection:	(Note: 2 & 3)				
	(a) Human Body Model, MIL-STB-883, Method 3015		± 30			kV
	(b) Contact discharge per IEC 61000-4- 2 Level 4 standards		± 15			kV
V _{DYN}	Dynamic Resistance:					
	Positive			2.3		Ω
	Negative			0.9		Ω
f _c	Cut-off Frequency:	R = 100 Ω ; C = 15pF				
	Z _{SOURCE} = 50 Ω ; Z _{LOAD} = 50 Ω			120		MHz
T	Temperature Range:					
	Operating		-40		85	$^{\circ}$ C
	Storage		-55		150	$^{\circ}$ C

Notes:

1. Parameters at Ambient Temperature (TA) of 25 $^{\circ}$ C unless otherwise specified
2. ESD applied to input and output pins with respect to Ground, one pin at a time
3. Parameters are guaranteed by design and characterization

ORDERING PART NUMBER					
PART NUMBER	NUMBER OF CHANNELS	PACKAGE TYPE	DEVICE MARKING	T & R Qty	ROHS COMPLIANCE
EMF4020-08CR	8	CSP-20	EMF4020-C	3,500/Reel	YES
EMF4020-08U5R	8	uDFN-16	EMF4020-U	3,000/Reel	YES

Figure 1: Typical Insertion Loss Curve

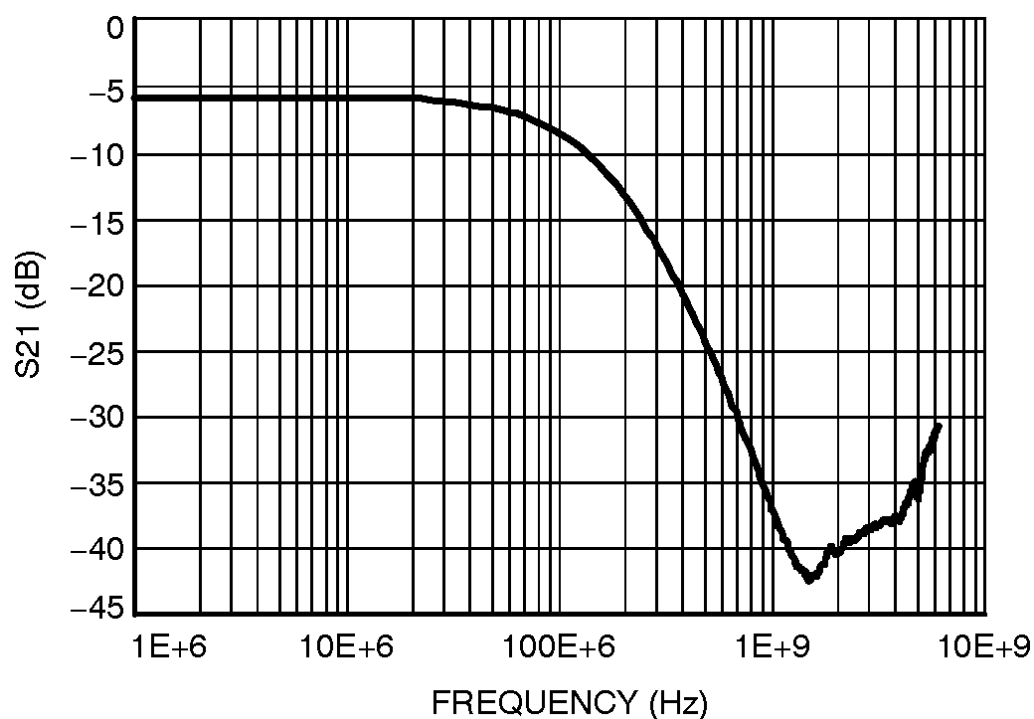
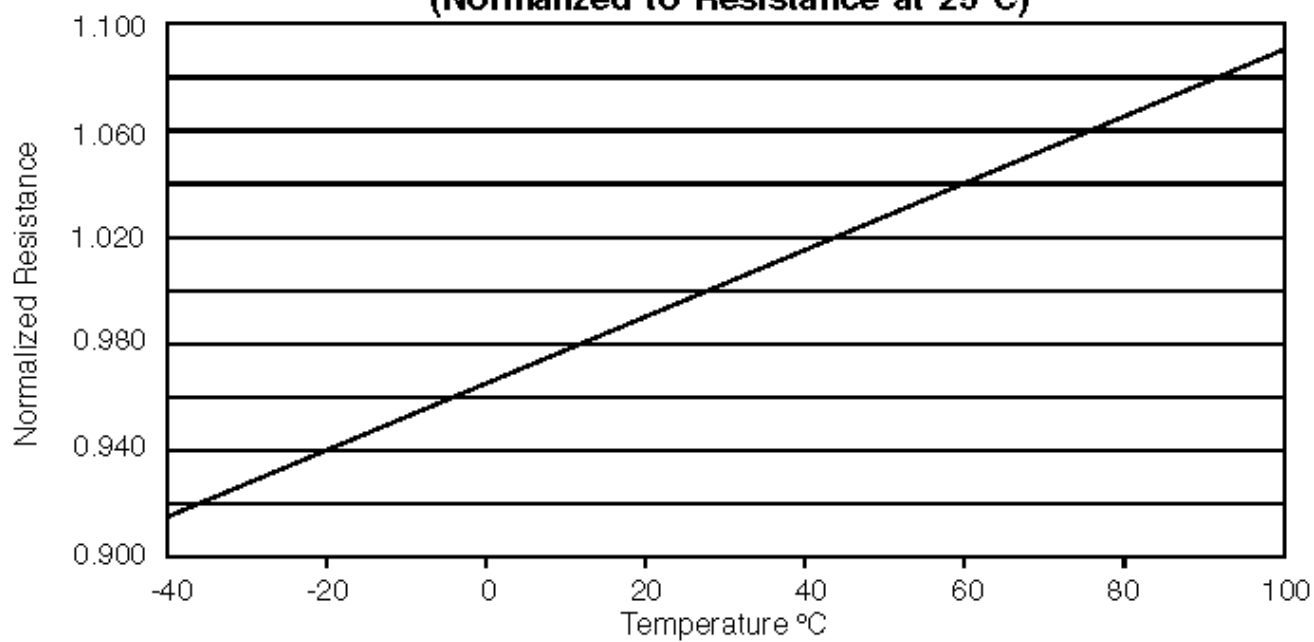
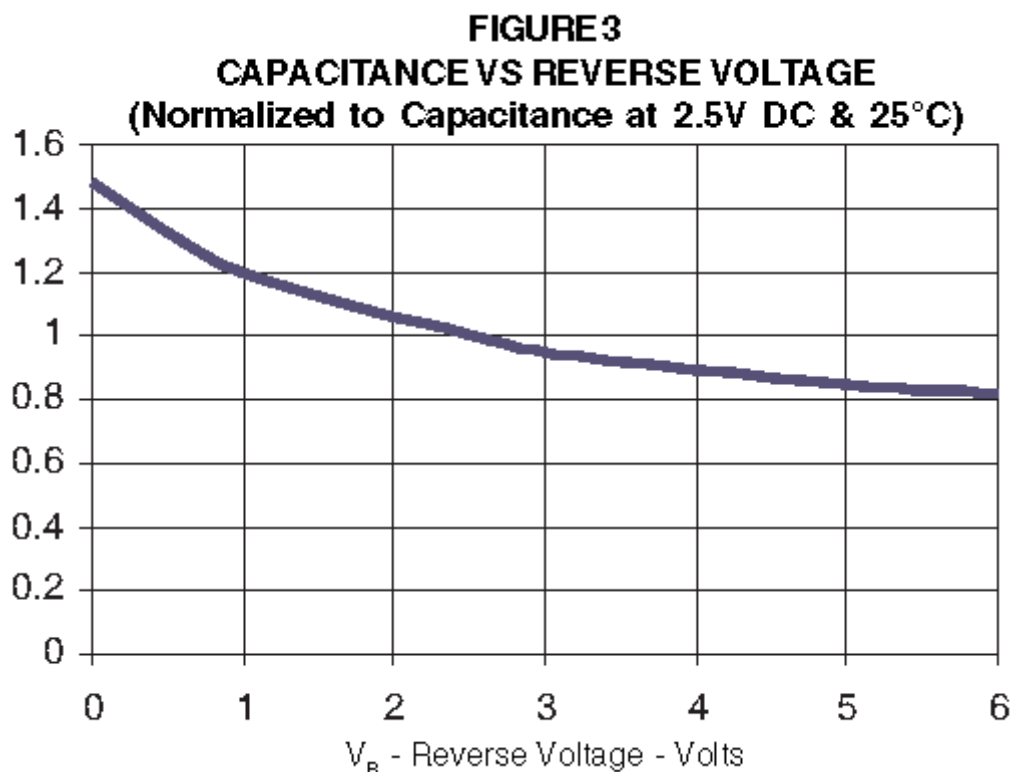


FIGURE 2
RESISTANCE VS TEMPERATURE
(Normalized to Resistance at 25°C)

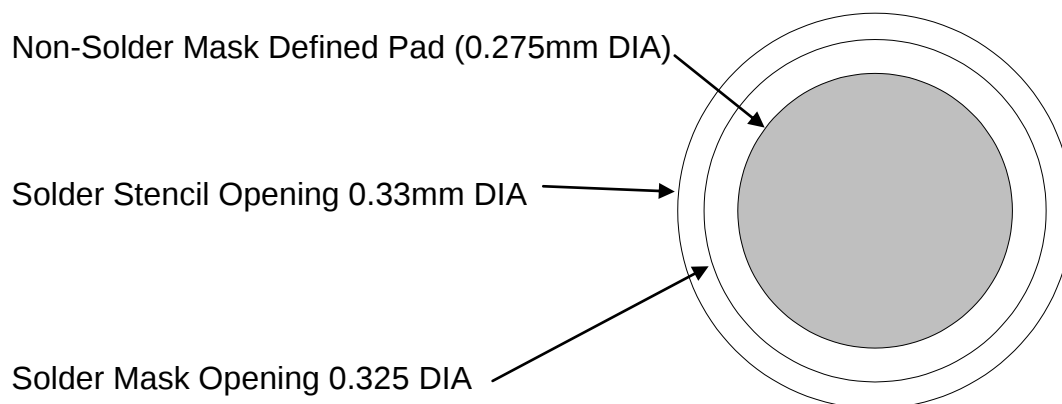
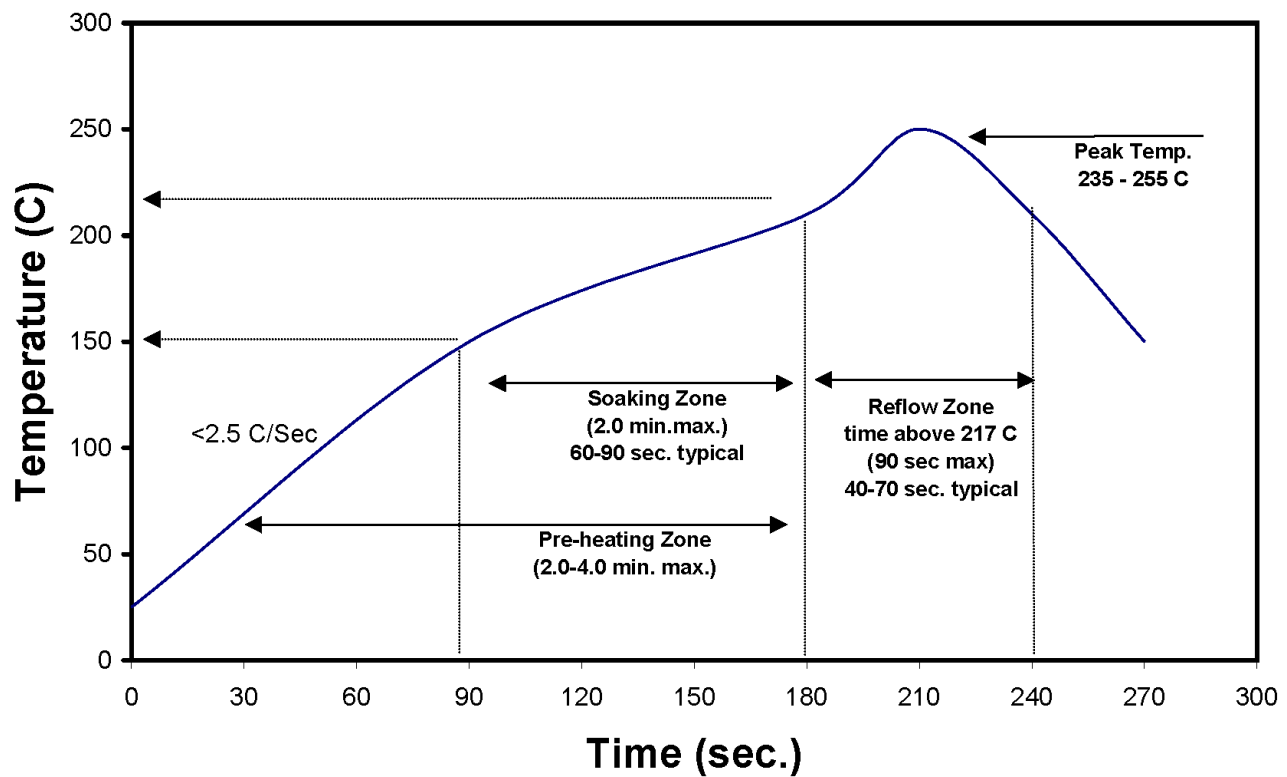




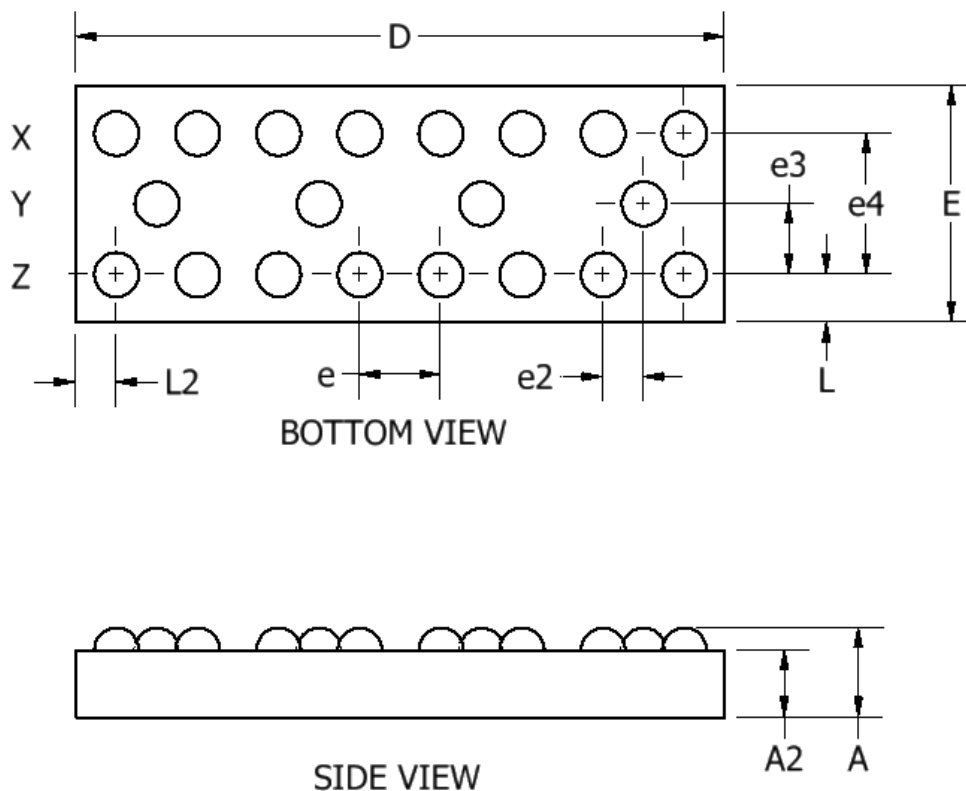
Application Information (for CSP-20)

PRINTED CIRCUIT BOARD RECOMMENDATIONS	
PARAMETER	VALUE
Pad Size on PCB	0.275mm
Pad Shape	Round
Pad Definition	Non-Solder Mask defined pads
Solder Mask Opening	0.325mm Round
Solder Stencil Thickness	0.125mm - 0.150mm
Solder Stencil Aperture Opening (laser cut, 5% tapered walls)	0.330mm Round
Solder Flux Ratio	50/50 by volume
Solder Paste Type	No Clean
Pad Protective Finish	OSP (Entek Cu Plus 106A)
Tolerance — Edge To Corner Ball	+50µm
Solder Ball Side Coplanarity	+20µm
Maximum Dwell Time Above Liquidous ⁶	0 seconds
Maximum Soldering Temperature	260°C

Lead Free SnAgCu Solder Ball Reflow Profile (for CSP-20)



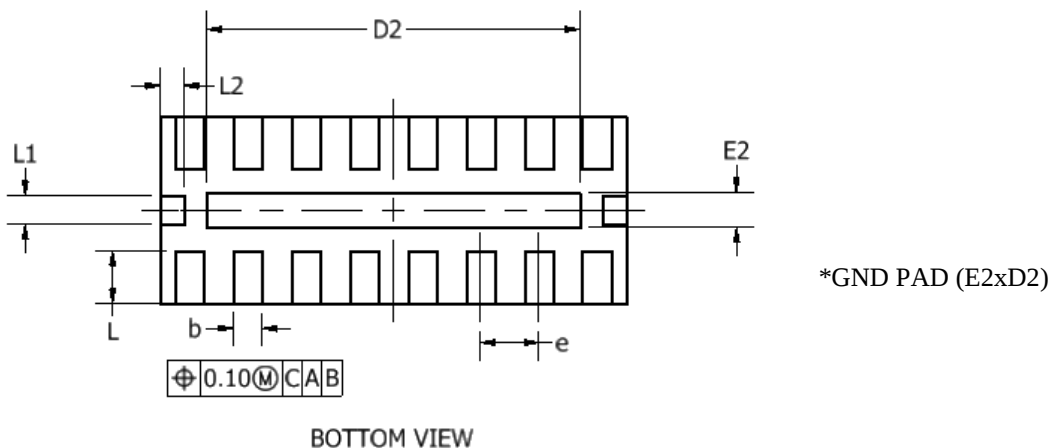
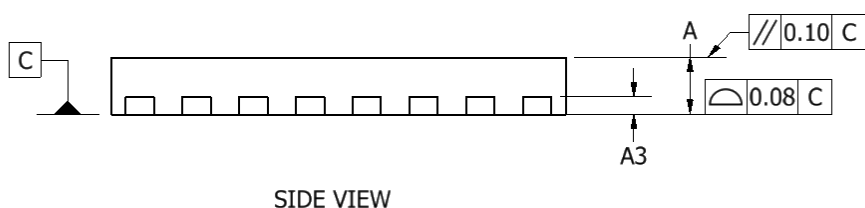
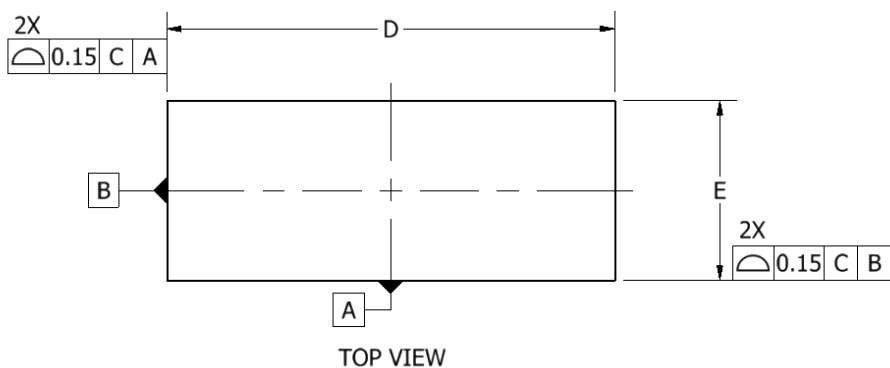
Package Diagram EMF4020-08CR (CSP-20) (4.00x1.50x0.6mm)(0.5mm pitch)



*Bumps in Row Y are connected to GND

PACKAGE DIMENSIONS (CSP-20)						
Symbol	DIMENSIONS MM			DIMENSIONS INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.575	0.644	0.714	0.0226	0.0254	0.0281
A2	0.368	0.419	0.470	0.0145	0.0165	0.0185
D	3.955	4.000	4.045	0.1557	0.1575	0.1493
E	1.413	1.458	1.503	0.0556	0.0574	0.0592
e	0.495	0.500	0.505	0.0195	0.0197	0.0199
e2	0.245	0.250	0.255	0.0096	0.0098	0.0100
e3	0.430	0.435	0.440	0.0169	0.0171	0.0173
e4	0.860	0.870	0.880	0.0338	0.0342	0.0346
L	0.244	0.296	0.344	0.0096	0.0116	0.0135
L2	0.200	0.250	0.300	0.0079	0.0098	0.0118
Parts/Reel	3,500					

Package Diagram EMF4020-U5R (uDFN-16)(4.00x1.60x0.50 mm)(0.5mm pitch)



PACKAGE DIMENSIONS (uDFN-16)						
Symbol	DIMENSIONS MM			DIMENSIONS INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.45	0.50	0.55	0.018	0.020	0.022
A3	0.144	0.152	0.160	0.0056	0.0060	0.0063
b	0.20	0.25	0.30	0.0078	0.0100	0.0118
D	3.925	4.000	4.075	0.154	0.157	0.160
D2	3.10	3.20 REF	3.30	0.122	0.126 REF	0.130
E	1.527	1.600	1.675	0.061	0.063	0.066
E2	0.24	0.3 REF	0.36	0.010	0.012	0.014
e	0.50 BSC			0.0197 BSC		
L	0.40	0.45	0.50	0.016	0.018	0.020
L1	0.20	0.25	0.30	0.008	0.010	0.012
L2	0.15	0.20	0.25	0.006	0.008	0.010
Parts/Reel	3,000					