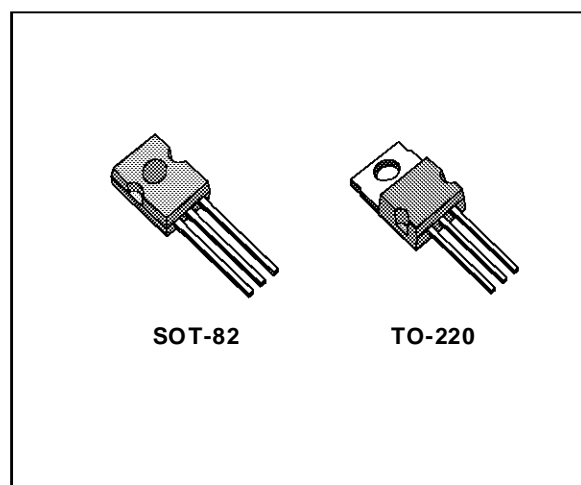


## VERY LOW DROP VOLTAGE REGULATORS

- INPUT/OUTPUT DROP TYP. 0.4V
- 400mA OUTPUT CURRENT
- LOW QUIESCENT CURRENT
- REVERSE POLARITY PROTECTION
- OVERVOLTAGE PROTECTION ( $\pm 60V$ )
- FOLDBACK CURRENT LIMITING
- THERMAL SHUTDOWN

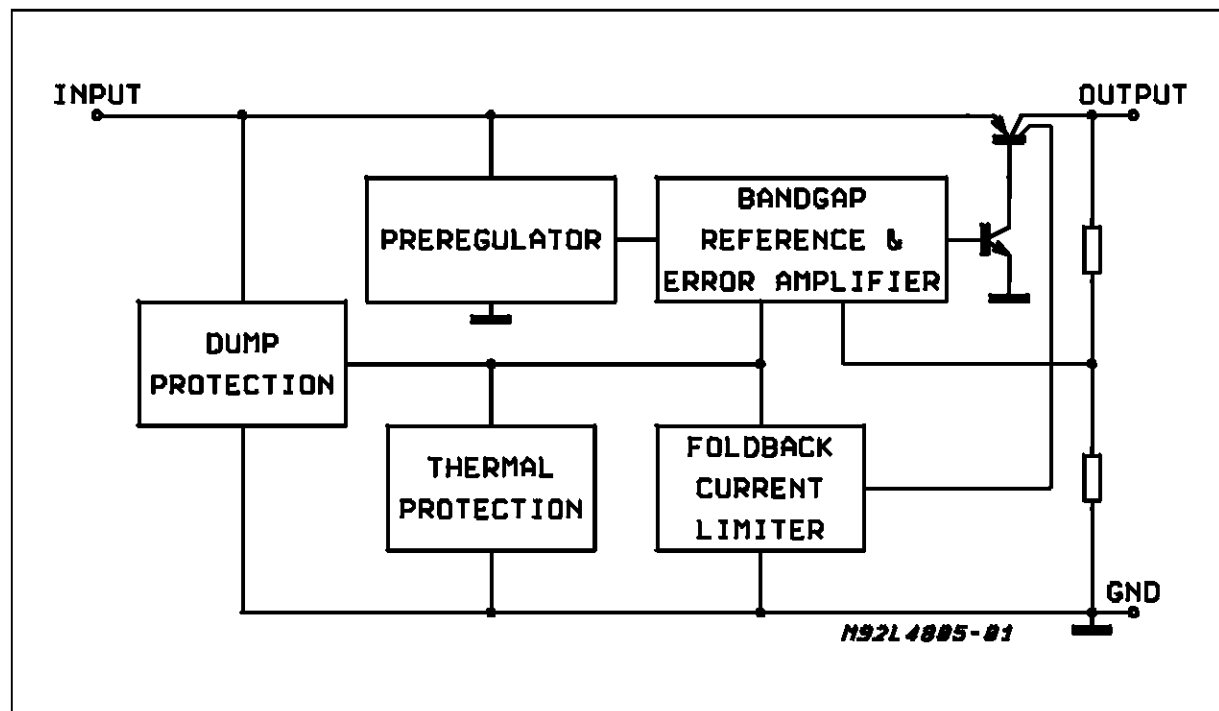
### DESCRIPTION

L4800 series devices are voltage regulators with a very low voltage drop (typically 0.4V at full rated current), output current up to 400mA, low quiescent current and comprehensive on-chip protection. These devices are protected against load dump and field decay transients of  $\pm 60V$ , polarity reversal and overheating. A foldback current limiter protects against load short circuits. Available in 5V, 8.5V, 9.2V, 10V and 12V versions (all  $\pm 4\%$ ,  $T_1 = 25^\circ C$ ) these regulators are designed for automotive, industrial and consumer applications where low consumption is particularly important.



In automotive applications the L4805 is ideal for 5V logic supplies because it can operate even when the battery voltage falls below 6V. In battery backup and standby applications the low consumption of these devices extends battery life.

### BLOCK DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_i$	DC Input Voltage	+ 35	V
	DC Input Reverse Voltage	- 18	V
	Transient Input Overvoltages : Load Dump : $5\text{ms} \leq T_{\text{rise}} \leq 10\text{ms}$ , $\tau_f$ Fall Time Constant = 100ms, $R_{\text{source}} \leq 0.5\Omega$ Field Decay : $5\text{ms} \leq t_{\text{fall}} \leq 10\text{ms}$ , $R_{\text{source}} \leq 10\Omega$ $\tau_r$ Rise Time Constant = 33ms	60  - 60	V  V
$T_j, T_{\text{stg}}$	Junction and Storage Temperature Range	- 55 to + 150	°C

### THERMAL DATA

Symbol	Parameter		SOT82	TO220	Unit
$R_{\text{th j-case}}$	Thermal Resistance Junction-case	Max.	8	4	°C/W
$R_{\text{th j-amb}}$	Thermal Resistance Junction-ambient	Max.	100	75	°C/W

### PIN CONNECTION (top view)

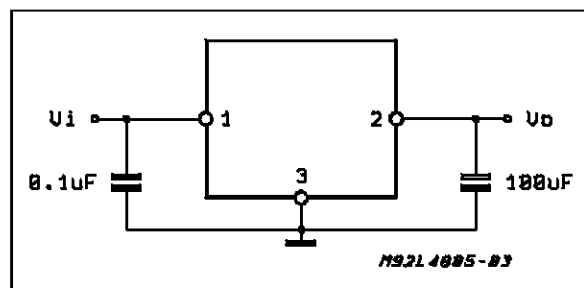
Order Codes		Output Voltage
TO-220	SOT-82	
L4805CV	L4805CX	5V
L4808CV	L4808CX	8V
L4885CV	L4885CX	8.5 V
L4892CV	L4892CX	9.2 V
L4810CV	L4810CX	10 V
L4812CV	L4812CX	12 V

### TEST AND APPLICATION CIRCUIT

The output capacitor is required for stability. Though the 100  $\mu\text{F}$  shown is the minimum recommended value, actual size and type may vary depending upon the application load and temperature range. Capacitor effective series resistance (ESR) also factors in the IC stability. Since ESR varies from one brand to the next, some bench work may be required to determine the minimum capacitor value to use in production. Worst-case is usually determined at the minimum ambient temperature and maximum load expected.

Output capacitors can be increased in size to any desired value above the minimum. One possible purpose of this would be to maintain the output voltages during brief conditions of negative input transients that might be characteristics of a particular system.

Capacitors must also be rated at all ambient temperature expected in the system. Many aluminum type electrolytics will freeze at temperatures less than  $-30\text{ }^\circ\text{C}$ , reducing their effective capacitance to zero. To maintain regulator stability down to  $-40\text{ }^\circ\text{C}$ , capacitors rated at that temperature (such as tantalums) must be used.



## L4805-L4808-L4885-L4892-L4810-L4812

**ELECTRICAL CHARACTERISTICS** ( $V_I = 14.4V$ ;  $C_O = 100\mu F$ ;  $T_j = 25^\circ C$  unless otherwise specified.)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage	$I_O = 5mA$ to 400mA (L4805)	4.80	5.00	5.20	V
		$I_O = 5mA$ to 400mA (L4808)	7.68	8.00	8.32	V
		$I_O = 5mA$ to 400mA (L4810)	8.16	8.50	8.84	V
		$I_O = 5mA$ to 400mA (L4812)	8.83	9.20	9.57	V
		$I_O = 5mA$ to 400mA (L4885)	9.60	10.00	10.40	V
		$I_O = 300mA$ (L4892)	11.50	12.00	12.50	V
$V_I$	Operating Input Voltage				26	V
$\Delta V_O/V_O$	Line Regulation	$V_I = 13$ to 26V; $I_O = 5mA$		1	10	mV/V
$\Delta V_O/V_O$	Load Regulation	$I_O = 5$ to 400mA*		3	15	mV/V
$V_I - V_O$	Dropout Voltage	$I_O = 400mA^*$		0.4	0.7	V
		$I_O = 150mA$		0.2	0.4	V
$I_q$	Quiescent Current	$I_O = 0mA$		0.8	2	mA
		$I_O = 150mA$		25	45	mA
		$I_O = 400mA^*$		65	90	mA
$\frac{\Delta V_O}{\Delta T \cdot V_O}$	Temperature Output Voltage Drift			0.1		$\frac{mV}{^\circ C \cdot V}$
SVR	Supply Voltage Rejection	$I_O = 350mA$ ; $f = 320Hz$ ; $C_O = 100\mu F$ ; $V_I = V_O + 3V + 2V_{pp}$		60		dB
$I_O$	Max Output Current			800		mA
$I_{SC}$	Output Short Circuit Current (fold back condition)			350	500	mA

\* only for L4892 the current test conditions is  $I_O = 300mA$

**ELECTRICAL CHARACTERISTICS** ( $V_I = 14.4V$ ;  $C_O = 100\mu F$ ;  $T_j = -40$  to  $125^\circ C$  (note 1) unless otherwise specified.)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage	$I_O = 5mA$ to 400mA (L4805)	4.70	5.00	5.30	V
		$I_O = 5mA$ to 400mA (L4808)	7.50	8.00	8.50	V
		$I_O = 5mA$ to 400mA (L4810)	8.00	8.50	9.00	V
		$I_O = 5mA$ to 400mA (L4812)	8.65	9.20	9.75	V
		$I_O = 5mA$ to 400mA (L4885)	9.40	10.00	10.60	V
		$I_O = 300mA$ (L4892)	11.30	12.00	12.70	V
$V_I$	Operating Input Voltage	see note 2			26	V
$\Delta V_O/V_O$	Line Regulation	$V_I = 14$ to 26V; $I_O = 5mA$		2	15	mV/V
$\Delta V_O/V_O$	Load Regulation	$I_O = 5$ to 400mA*		5	25	mV/V
$V_I - V_O$	Dropout Voltage	$I_O = 400mA^*$		0.5	0.9	V
		$I_O = 150mA$		0.25	0.5	V
$I_q$	Quiescent Current	$I_O = 0mA$		1.2	3	mA
		$I_O = 150mA$		40	70	mA
		$I_O = 400mA^*$		80	140	mA
$I_O$	Max Output Current			870		mA
$I_{SC}$	Output Short Circuit Current (fold back condition)			230		mA

- Notes :**
1. This limits are guaranteed by design, correlation and statistical control on production samples over the indicated temperature and supply voltage ranges..
  2. For a DC voltage  $26V < V_I < 35V$  the device is not operating.

Figure 1: Dropout Voltage vs. Output Current

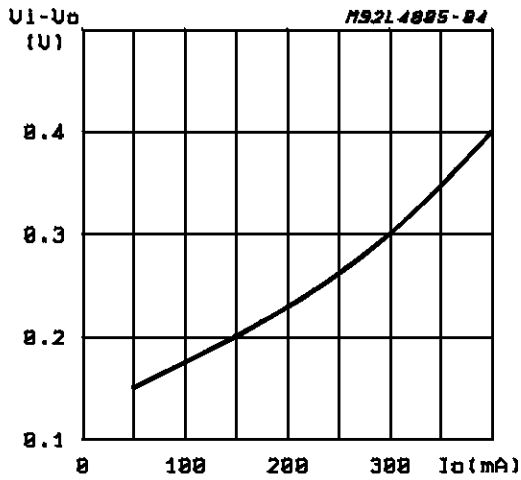


Figure 2: Quiescent Current vs. Output Current

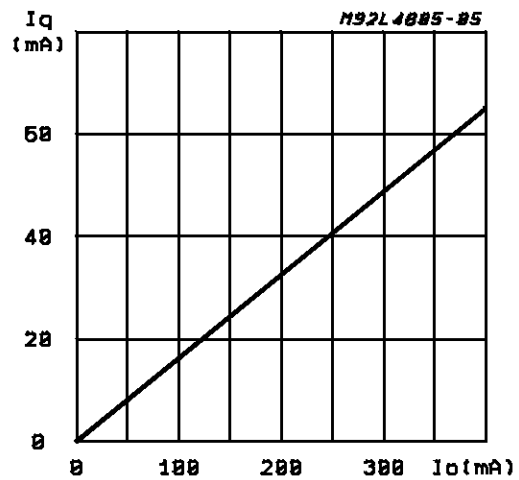


Figure 3: Output Voltage vs. Temperature

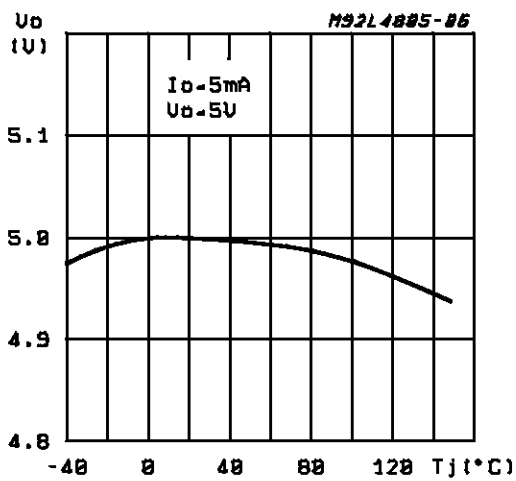


Figure 4: Foldback Current Limiting (L4805)

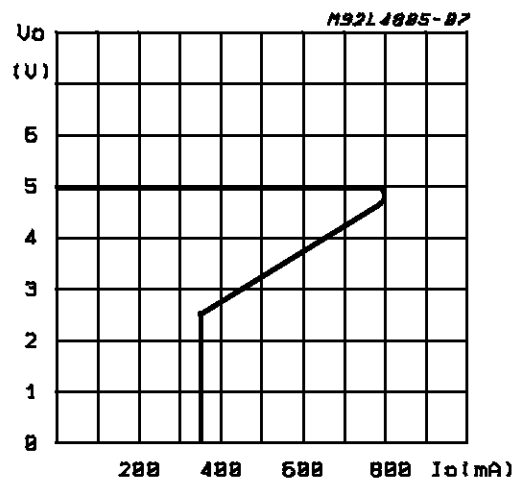
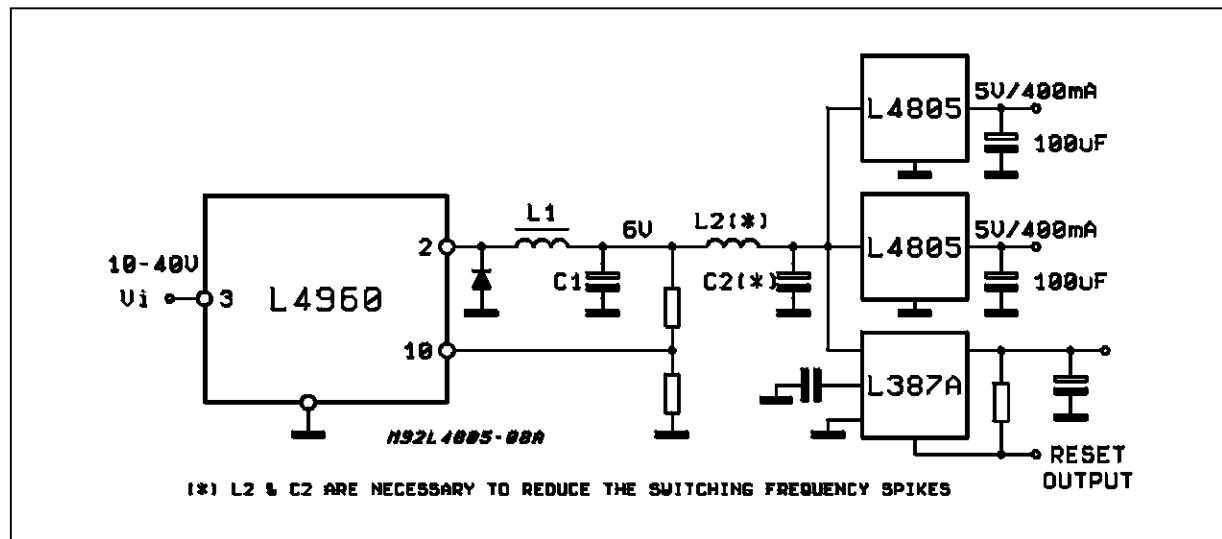
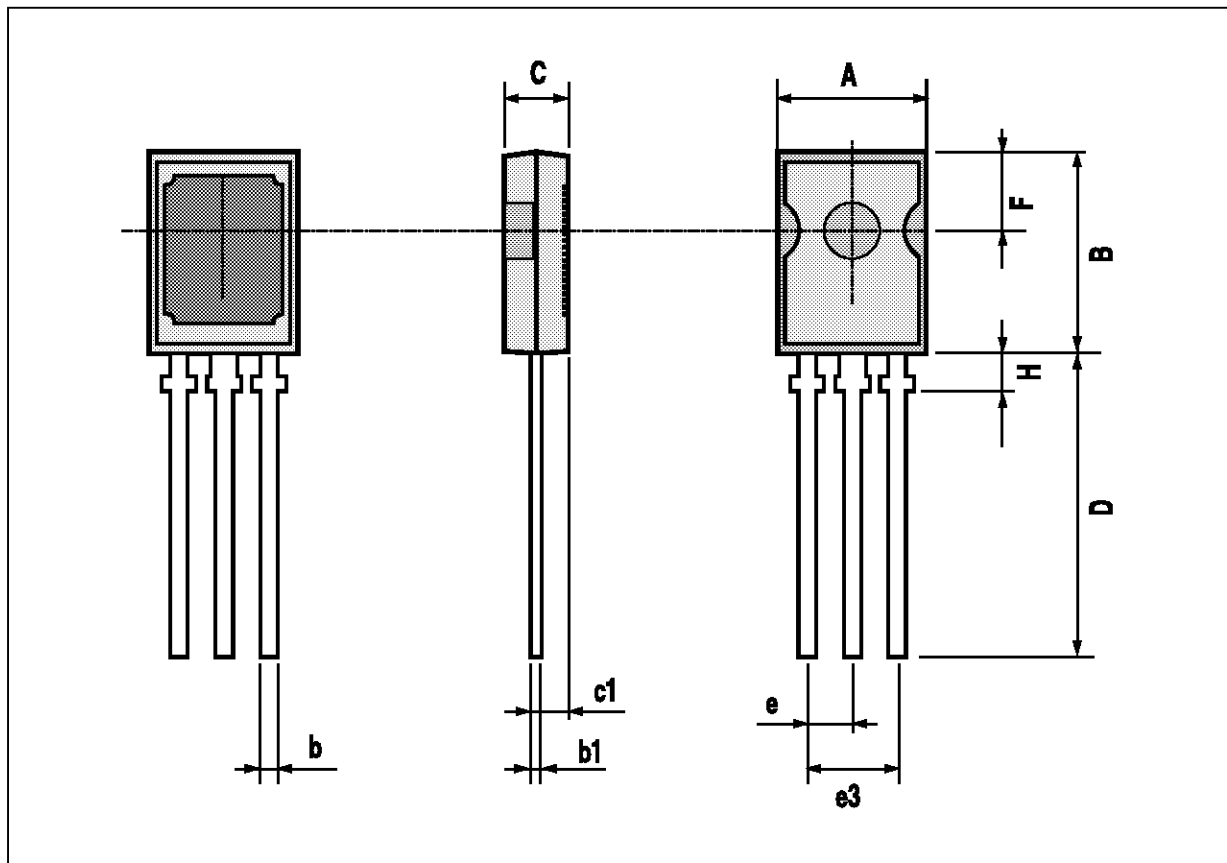


Figure 5: Preregulator for Distributed Supplies



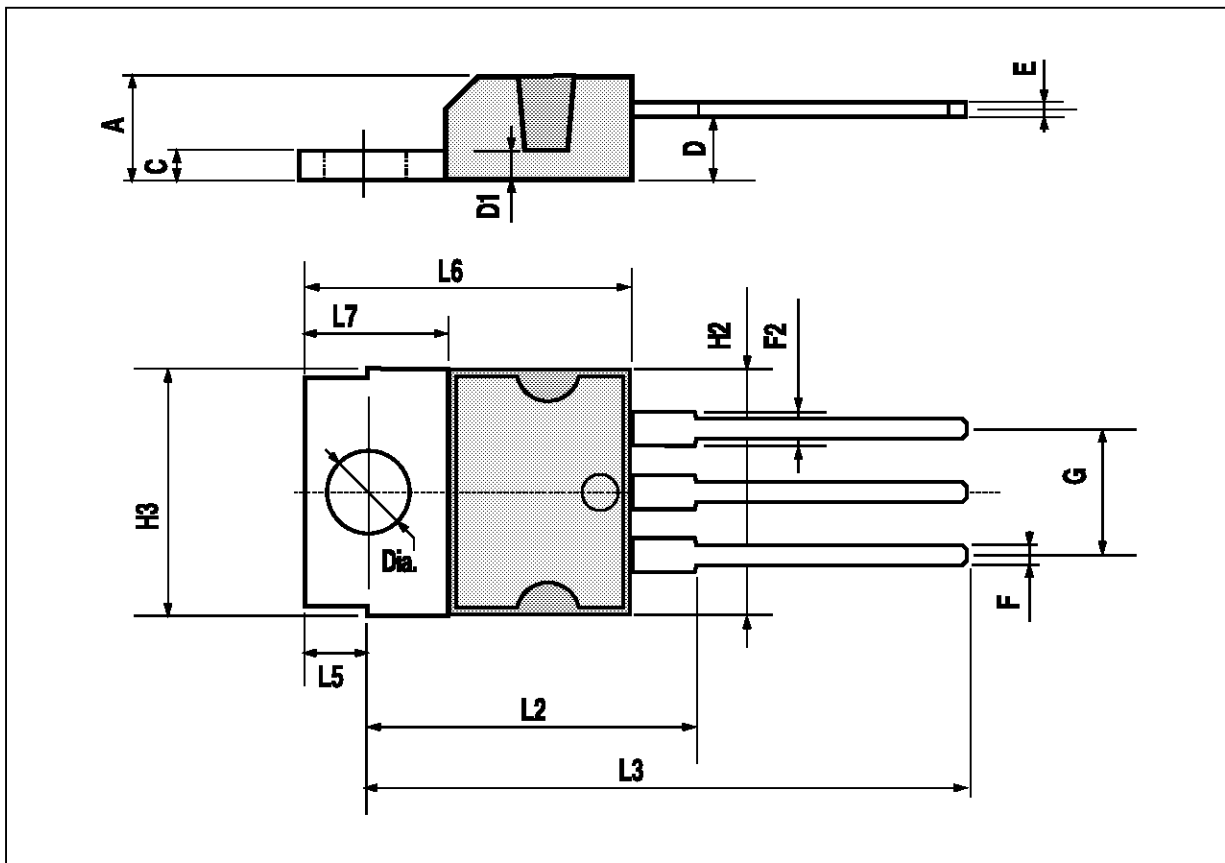
SOT82 PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	7.4		7.8	0.291		0.307
B	10.5		10.8	0.413		0.425
b	0.7		0.9	0.028		0.035
b1	0.49		0.75	0.019		0.030
C	2.4		2.7	0.094		0.106
c1		1.2			0.047	
D		15.7			0.618	
e		2.2			0.087	
e3		4.4			0.173	
F		3.8			0.150	
H			2.54			0.100



TO220 PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			4.8			0.189
C			1.37			0.054
D	2.4		2.8	0.094		0.110
D1	1.2		1.35	0.047		0.053
E	0.35		0.55	0.014		0.022
F	0.8		1.05	0.031		0.041
F2	1.15		1.4	0.045		0.055
G	4.95	5.08	5.21	0.195	0.200	0.205
H2			10.4			0.409
H3	10.05		10.4	0.396		0.409
L2		16.2			0.638	
L3	26.3	26.7	27.1	1.035	1.051	1.067
L5	2.6		3	0.102		0.118
L6	15.1		15.8	0.594		0.622
L7	6		6.6	0.236		0.260
Dia	3.65		3.85	0.144		0.152



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