

Descriptions

The EC5232 series of fixed output low dropout linear regulators are designed to meet the new requirements of high PSRR, fast dynamic response, low noise, low dropout voltage and low power consumption in today's portable battery powered applications such as cellular phones, surveillance system, Bluetooth, wireless and other portable electronic devices. The short-circuit protection has a fold-back current limiter which will reduce the excessive heat during short circuiting. EC5232 also have standard Over-Temperature Protection The EC5232 are available in standard SOT23-5L, SOT89 and DFN1x1 4L packages. Standard products are Halogen-free.

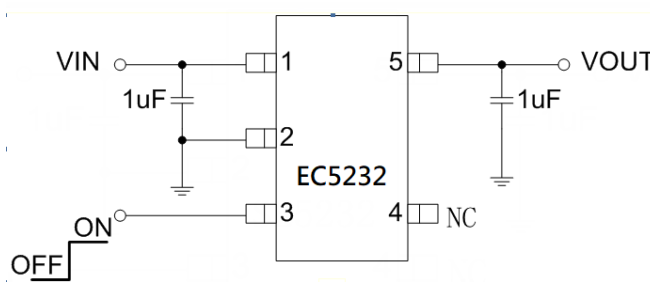
Feature

- ◆ Input voltage : 2.5V~6.5V
- ◆ Output range : 1.0V~3.6V
- ◆ PSRR: 75dB @1KHz
- ◆ Dropout voltage: 220mV @ IO_{UT}=200mA
- ◆ Quiescent current : 35μA Typ.
- ◆ Shut-down current: <1μA
- ◆ Recommend capacitor: 1μF
- ◆ Ultra-low output noise: 20μVRMS
- ◆ Maximum output current: 400mA
- ◆ SOT23-5, SOT89 (Other Pkg available upon request)

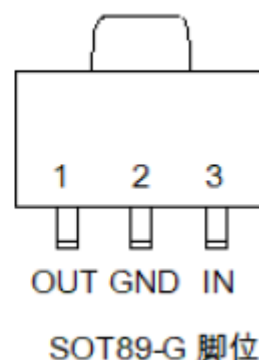
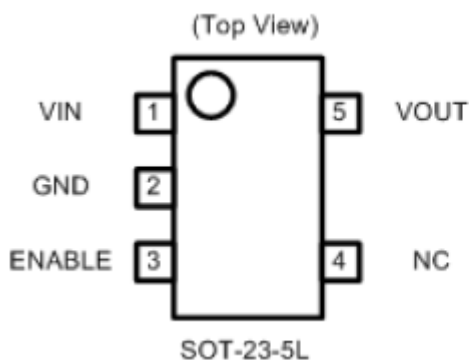
Application

- ◆ USB removable devices
- ◆ Cellphones
- ◆ Hand-Held Instrumentation.
- ◆ Display and TV sets
- ◆ Digital camera

Typical Application

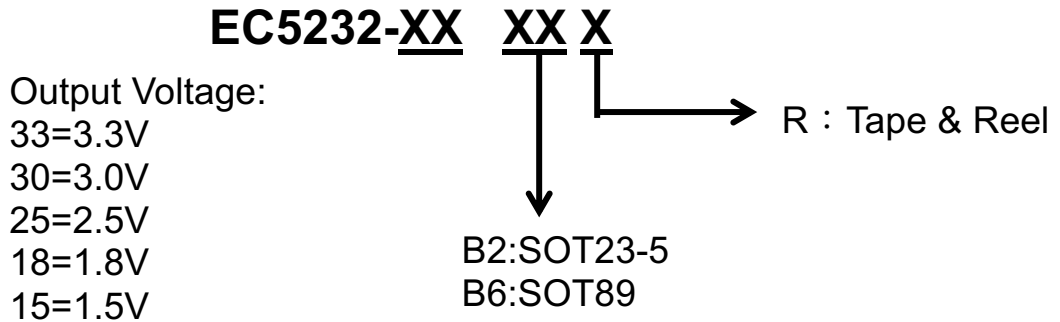


Pin Configuration





Ordering/marketing Information



Part Number	Package	Ordering Information	Marking	Marking Information
EC5232XXB2R	SOT23-5	3.3V	218ALX	HF: Helogan free. 218: Internal Code Starting with 2, a bar on top of 2 is for production year 2001, and underlined 2 is for year 2002. The next character is marked on top for 2003, and underlined for 2004. The naming pattern continues with consecutive characters for later years. The last character is the week code. (A-Z: 1-26, a-z: 27-52) EC5232-SOT89: 成品印章上有两行，第一行代表成品名称，第二行代表年代码和周代码；G 脚位：O - G - I
		3.0V	218BLX	
		2.5V	218CLX	
		1.8V	218DLX	
EC5232XXB6R	SOT89	1.5V	218ELX	
		3.3V	5232AKG YYWW-HF	
		1.8V	5232DKG YYWW-HF	

Pin Description

Pin Name	Description
V _{in}	Power Supply Input Voltage
GND	Power Supply Ground
EN	Shutdown Pin, When not in use, this pin should be connected to V _{in}
V _{out}	Fixed output Voltage
NC	Not Connected

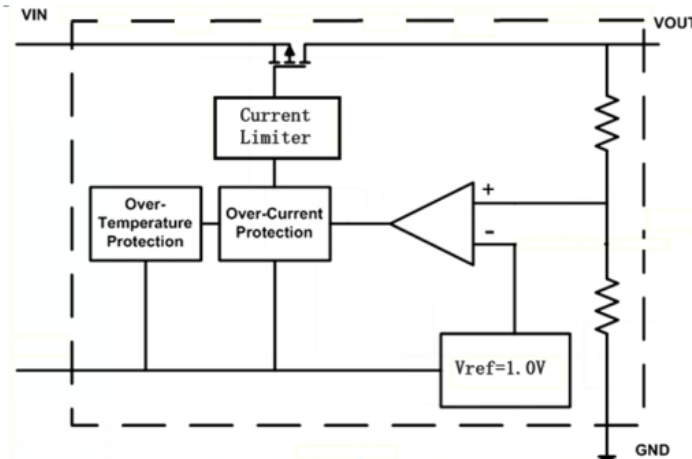
Absolute Maximum Ratings⁽¹⁾

Parameter	Symbol	Value	Units
Input Voltage	V _{IN}	6.5	V
Enable Voltage	V _{EN}	-0.3 to V _{IN}	V
Output Voltage	V _{OUT}	-0.3 to 4.6	V
Power Dissipation	P _D	Internally Limited (3)	
Output Short Circuit Duration		Infinite	
Thermal Resistance, Junction-to-Ambient	Θ _{JA}	230	°C/W
Lead Temperature (Soldering, 10 sec.)		260	°C
Junction Temperature	T _J	0 to +150	°C
Storage Temperature	T _S	-40 to +150	°C

Operating Rating⁽²⁾

Parameter	Symbol	Value	Units
Supply Input Voltage Range	V _{IN}	2.5 ~ 5.5	V
Junction Temperature Range	T _J	-40 to +125	°C

Block Diagram



Electrical Characteristics

(V_{IN} = 5V; V_{EN}=V_{IN}; C_{IN} = 1μF; C_{OUT} = 1μF; I_{OUT} = 10mA; T_J = 25°C; unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{OUT}	Output Voltage Accuracy	EC5232- 1.5 (V _{IN} =1.8V)	1.470	1.5	1.530	V
		EC5232- 1.8 (V _{IN} =3.3V)	1.764	1.8	1.836	
		EC5232- 2.5	2.450	2.5	2.550	
		EC5232- 3.0	2.940	3.0	3.060	
		EC5232- 3.3	3.234	3.3	3.366	
ΔV _{OUT}	Line Regulation	V _{IN} = (V _{OUT} + 0.8)V to 5.5V	-	0.2	-	%/V



Electrical Characteristics (Continued)

$V_{IN} = 5V$; $C_{IN} = 1\mu F$; $C_{OUT} = 1\mu F$; $I_{OUT} = 10mA$; $T_J = 25^\circ C$; unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
ΔV_{OUT}	Load Regulation	$V_{OUT}=2.8V, I_{OUT}=1\sim 300mA$	--	40	70	mV
V_{DROP}	Dropout Voltage	$I_{OUT} = 200mA$	--	220	250	mV
		$I_{OUT} = 300mA$	--	320	350	
$T_{PROTECTION}$	Thermal Protection	Thermal Protection Temperature	--	140	--	$^\circ C$
		Protection Hysterisys	--	30	--	
e_{NO}	Output Noise Voltage	10Hz to 100kHz, $I_{OUT}=200mA, C_{OUT}=1\mu F$	--	20	--	μV_{RMS}
PSRR	Ripple Rejection	$V_{IN}=5V_{DC}+0.5V_{P-P}$ $F=1KHz, I_{OUT}=10mA$	--	75	--	dB
		$V_{IN}=5V_{DC}+0.5V_{P-P}$ $F=1MHz, I_{OUT}=10mA$	--	55	--	
I_Q	Quiescent Current	$V_{EN} = 0.4V$	--	0.1	--	μA
		$V_{EN} = V_{IN}, I_{OUT}=0mA$	--	35	--	
$V_{TH(EN)}$	Enable Input Threshold Voltage	Voltage Raising, Output Turns On, Logic High	1.6	--	--	V
		Voltage Falling, Output Turns Off, Logic Low	--	--	0.4	
I_{LIMIT}	Current Limit		--	500	--	mA
I_{Short}	Fold Back Current	$V_{in}=4V, Short\ Circuit$		160	220	mA

Note 1: Exceeding the absolute maximum rating may damage the device. **Note 2:** The device is not guaranteed to function outside its operating rating.

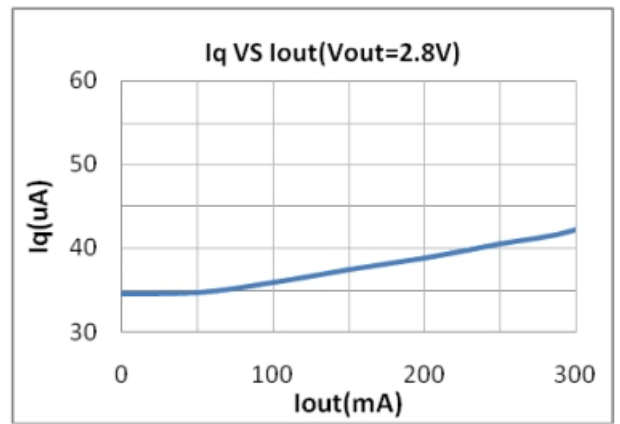
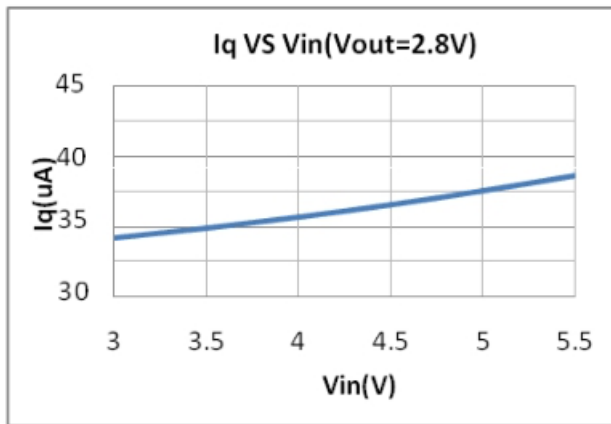
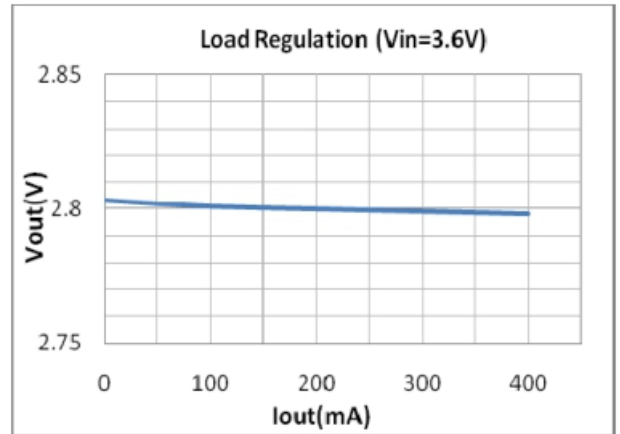
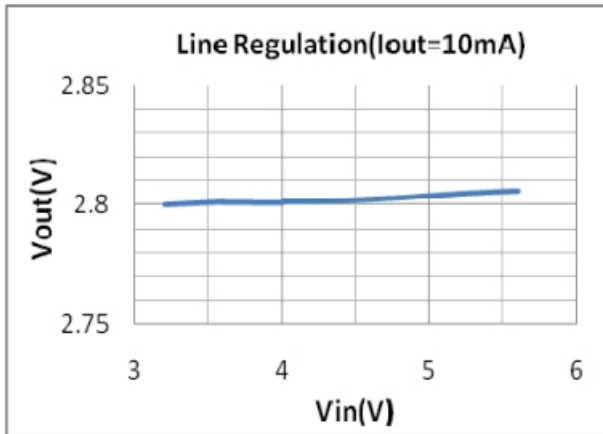
Note 3: The maximum allowable power dissipation at any T_A (ambient temperature) is calculated using: $PD(MAX) = (T_{J(MAX)} - T_A)/\theta_{JA}$. Exceeding the maximum allowable power dissipation will result in excessive die temperature, and the regulator will go into thermal shutdown. See "Thermal Consideration" section for details

Note 4: Output voltage temperature coefficient is the worst case voltage change divided by the total temperature range.

Note 5: Regulation is measured at constant junction temperature using low duty cycle pulse testing. Parts are tested for load regulation in the load range from 0.1mA to 300mA. Changes in output voltage due to heating effects are covered by the thermal regulation specification.

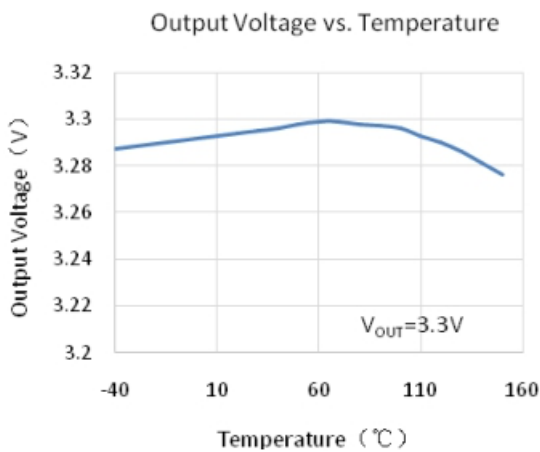
Note 6: Dropout voltage is defined as the input to output differential at which the output voltage drops 100mV below its nominal value measured at 0.8V differential.

Note 7: The C_{in} or C_{out} should be chosen carefully. Please refer to the Application Hints



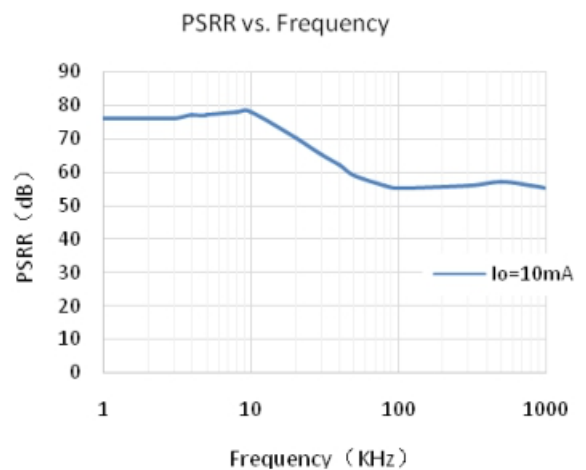
Vout vs Temperature

Vin=3.6V to 5V

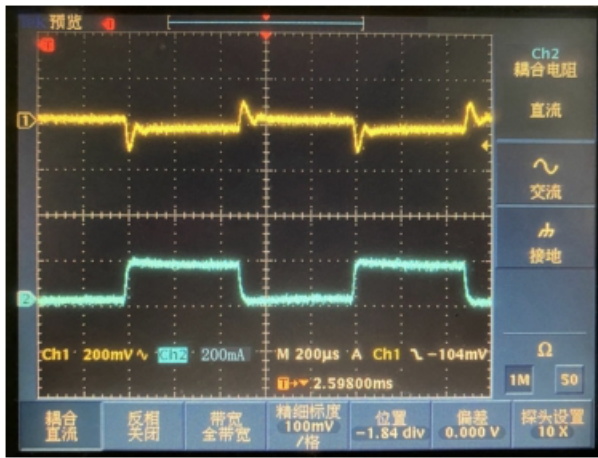


PSRR

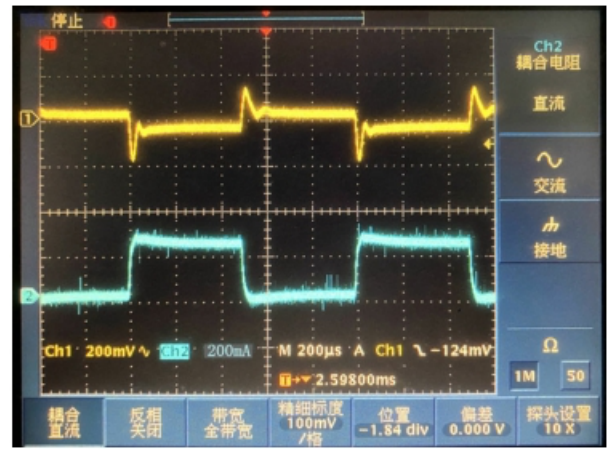
I_{out}=10mA, V_{in}=V_{out}+1V+1V p-p



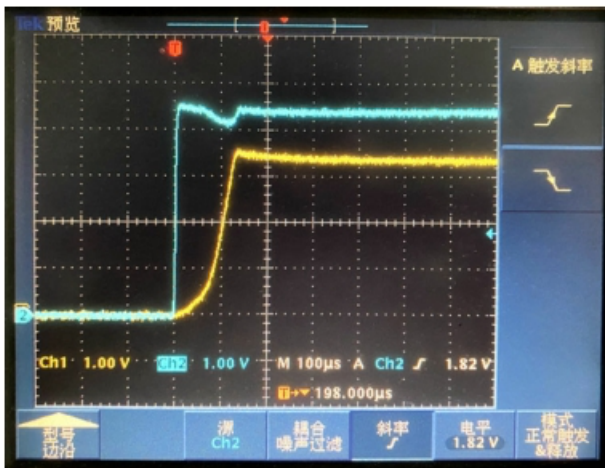
Load Transient Response
I_{out}=10mA to 200mA



Load Transient Response
I_{out}=10mA to 300mA

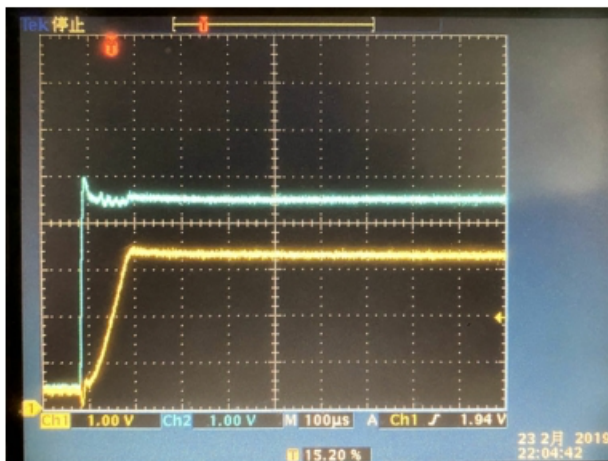


EN Turning ON



EN Turning OFF
Discharge

VCC Turning ON



Applications Information

Application Hints

EC5232 requires external capacitors to ensure stability. The external capacitors must be carefully selected to ensure performance.

Input Capacitor

An input capacitor of at least 1μF is required. Both Ceramic or Electrolytic capacitor is accepted. It is preferred to place the capacitor as close to V_{IN} as possible. The value can be increased without upper limit. The larger the value, typically the smaller the ripple.

Output Capacitor

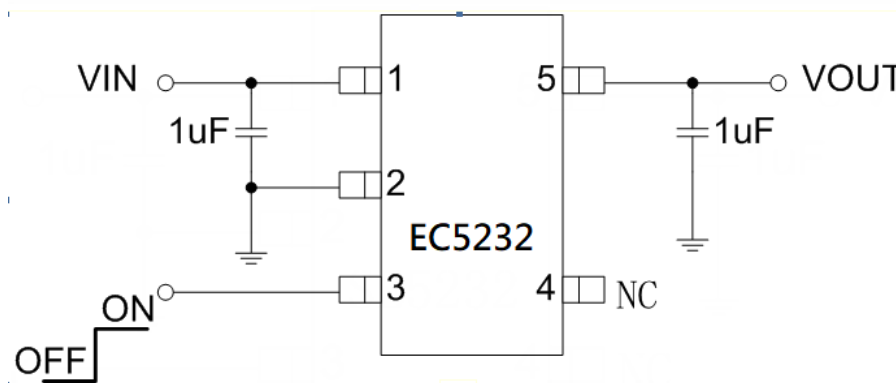
An output capacitor is required for stability. It should be placed as close as possible between V_{OUT} and GND pins. Both Ceramic or Electrolytic capacitor is accepted. The minimum value is 1μF but may be increased without limit.

Thermal Considerations

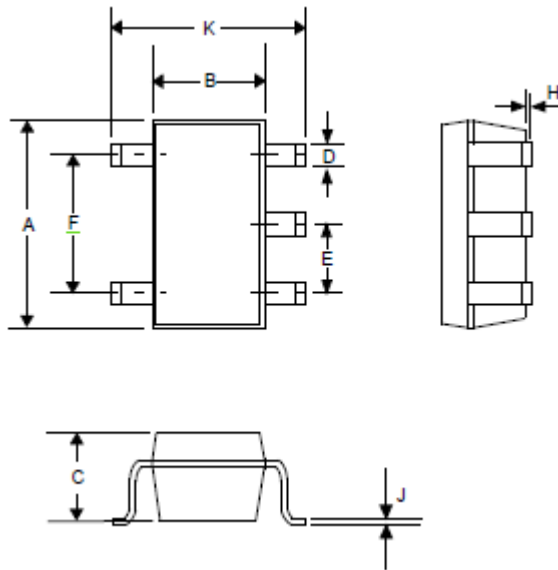
It is important that the thermal limit of the package is not exceeded. The EC5232 has built-in thermal protection. When the thermal limit is exceeded, the IC will enter protection, and V_{OUT} will be pulled to ground. The power dissipation for a given application can be calculated as following:

The power dissipation (P_D) is $P_D = I_{OUT} * [V_{IN} - V_{OUT}]$

The thermal limit of the package is then limited to $P_{D(MAX)} = [T_J - T_A] / \theta_{JA}$ where T_J is the junction temperature, T_A is the ambient temperature, and θ_{JA} is around 230°C/W for EC5232. EC5232 is designed to enter thermal protection at 150°C. For example, if T_A is 25°C then the maximum P_D is limited to about 0.6W. In other words, if $I_{OUT(MAX)} = 300mA$, then $[V_{IN} - V_{OUT}]$ cannot exceed 2V.

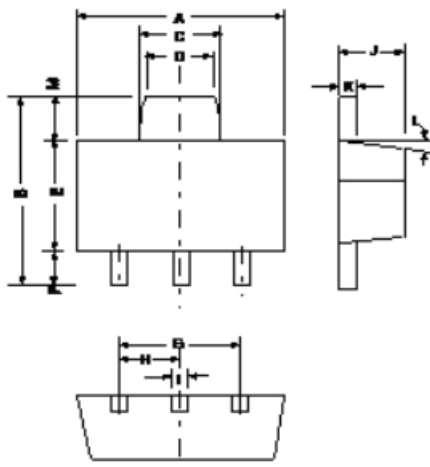


Outline Drawing For SOT23-5



DIMENSIONS				
DIMN	INCHES		MM	
	MIN	MAX	MIN	MAX
A	0.110	0.120	2.80	3.05
B	0.059	0.070	1.50	1.75
C	0.036	0.051	0.90	1.30
D	0.014	0.020	0.35	0.50
E	-	0.037	-	0.95
F	-	0.075	-	1.90
H	-	0.006	-	0.15
J	0.0035	0.008	0.090	0.20
K	0.102	0.118	2.60	3.00

Outline Drawing SOT89-3L



DIMENSIONS				
DIMN	INCHES		MM	
	MIN	MAX	MIN	MAX
A	0.173	0.181	4.400	4.600
B	0.159	0.167	4.050	4.250
C	0.067	0.075	1.700	1.900
D	0.051	0.059	1.300	1.500
E	0.094	0.102	2.400	2.600
F	0.035	0.047	0.890	1.200
G	0.118REF		3.00REF	
H	0.059REF		1.50REF	
I	0.016	0.020	0.400	0.520
J	0.055	0.063	1.400	1.600
K	0.014	0.016	0.350	0.410
L	10°TYP		10°TYP	
M	0.028REF		0.70REF	