CM2865(A)E5
350mA CMOS LDO
HIGH ACCURACY VOUT 1.0%

GENERAL DESCRIPTION

The CM2865/A family is a positive voltage linear regulator developed utilizing CMOS technology featured low quiescent current (30μA typ.), low dropout voltage, and high output voltage accuracy. Built-in low on-resistance transistor provides low dropout voltage and large output current. A 1.0μF or greater can be used as an output capacitor.

The SOT-89 and SOT-223 packages are attractive for "Pocket" and "Hand Held" applications.

These robust devices are designed to prevent device failure under the worst operation condition with both Thermal Shutdown and Current Fold-back.

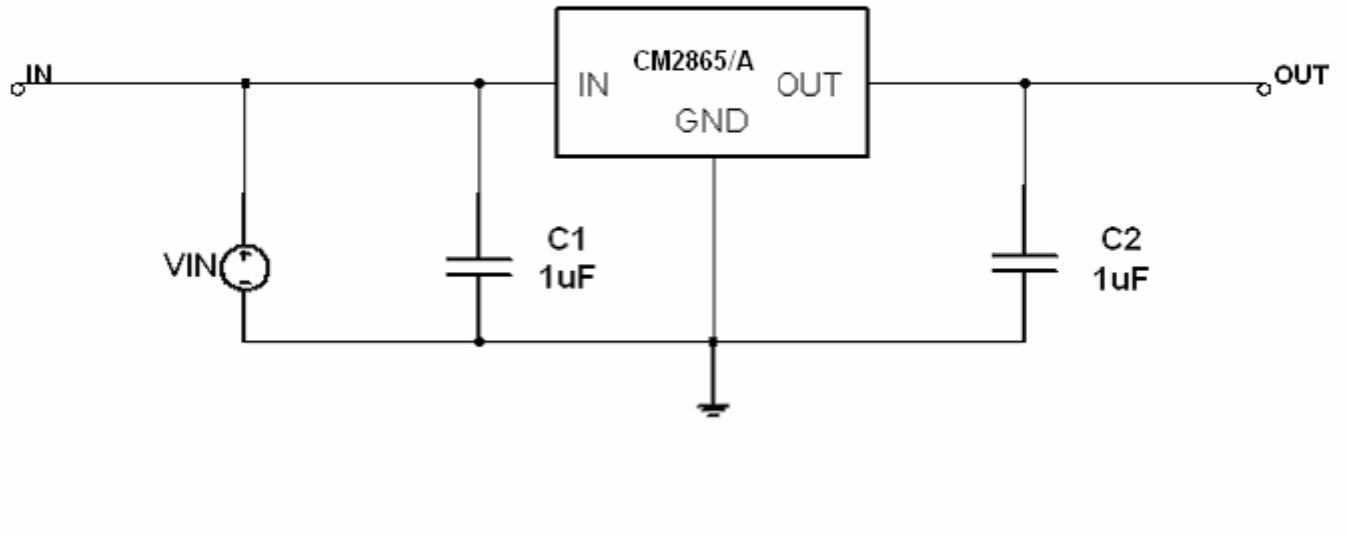
FEATURES

- Very Low Dropout Voltage
- Low Current Consumption: Typ. 30μA, Max. 35μA
- High Accuracy Output Voltage: +/- 1.0%
- Guaranteed 350mA Output
- Thermal Shutdown
- Current Limiting
- Reverse battery protection
- Compact Package: SOT-89 and SOT-223
- Factory Pre-set Output Voltages
- Low Temperature Coefficient

APPLICATIONS

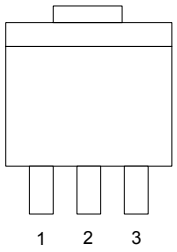
- Battery-powered devices
- Personal communication devices
- Home electric/electronic appliances
- PC peripherals

TYPICAL APPLICATIONS



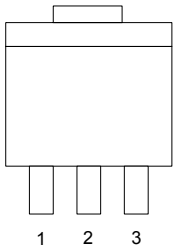
PIN CONFIGURATION

SOT-89
Top View



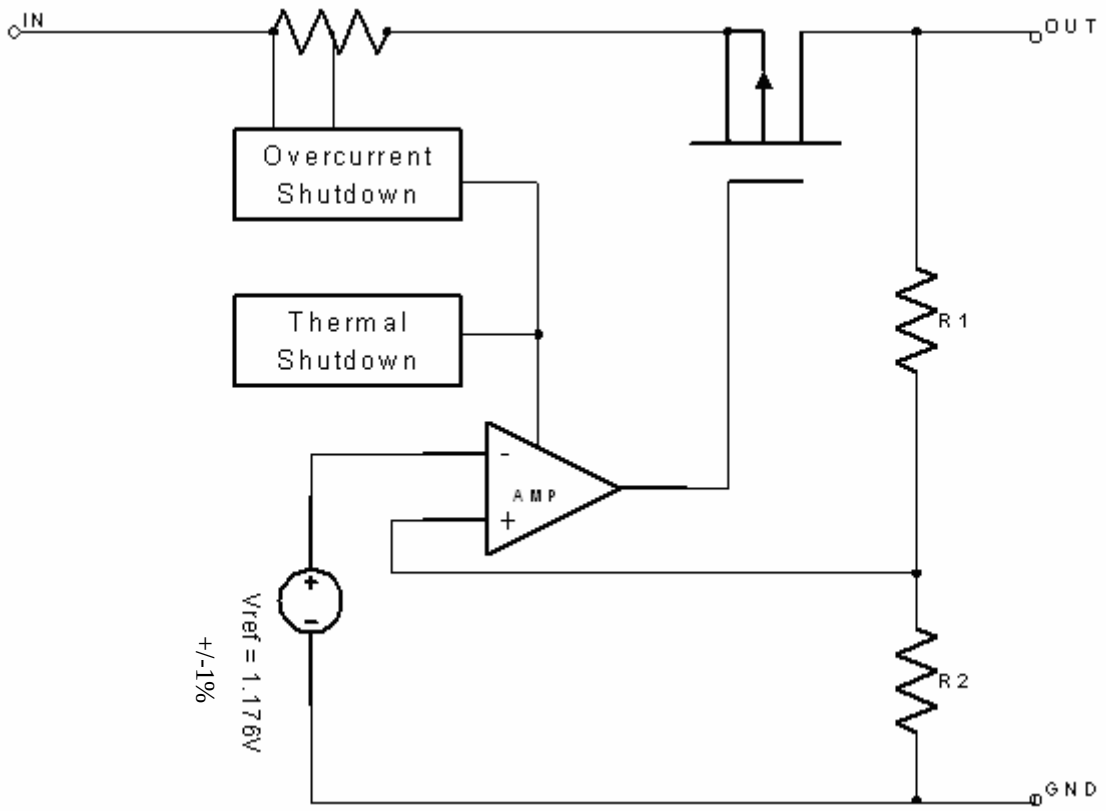
	2865
Pin 1	GND
Pin 2	VIN
Pin 3	VOUT

SOT-223
Top View



	2865	2865A
Pin 1	VIN	GND
Pin 2	GND	VOUT
Pin 3	VOUT	VIN

BLOCK DIAGRAM



ORDERING INFORMATION

Part Number	Output Voltage	Temperature Range	Package
CM2865E5IM89	1.95V	-40℃ ~ +85℃	SOT-89
CM2865GE5IM89	1.95V	-40℃ ~ +85℃	SOT-89
CM2865E5IM223	1.95V	-40℃ ~ +85℃	SOT-223
CM2865GE5IM223	1.95V	-40℃ ~ +85℃	SOT-223
CM2865AE5IM223	1.95V	-40℃ ~ +85℃	SOT-223
CM2865AGE5IM223	1.95V	-40℃ ~ +85℃	SOT-223

Note: For other pre-set output voltage, please contact Champion Sales office.

ABSOLUTE MAXIMUM RATINGS

Input Voltage ..... +7V

Output Current 1A

Output Voltage ..... GND-0.3V to V_{IN}+0.3V

ESD Classification ..... B

OPERATING RATINGS

Ambient Temperature Range (T_A) ..... -40℃ to +85℃

Junction Temperature Range ..... -40℃ to +125℃

THERMAL INFORMATION

Parameter		Maximum	Unit
Thermal Resistance (Θ_{jc})	SOT-89	100	℃/W
	SOT-223	50	
Thermal Resistance (Θ_{ja})	SOT-89	180	℃/W
	SOT-223	100	
Internal Power Dissipation (P_D) (ΔT = 100℃, No Heatsink)	SOT-89	400	mW
	SOT-223	900	
Maximum Junction Temperature		150	℃
Maximum Lead Temperature (10 Sec)		300	℃

Caution: Stress above the listed absolute rating may cause permanent damage to the device.

ELECTRICAL CHARACTERISTICS

T_A = +25℃; V_{IN} = $V_{IN(MIN)}$ unless otherwise noted

Parameter	Symbol	Test Conditions		CM2865(A)E5			Unit
				Min.	Typ.	Max.	
Input Voltage	V_{IN}			Note 1		7	V
Output Voltage Accuracy	V_{OUT}	I_O = 1mA		-1.0		1.0	%
Dropout Voltage	$V_{DROPOUT}$	I_O = 350mA, V_{OUT}=$V_{O(NOM)}$-1.5%,	1.5V<$V_{O(NOM)}$<=2.0V			1000	mV
			2.0V<$V_{O(NOM)}$<=2.8V			800	
			2.8V<$V_{O(NOM)}$<3.8V			660	mV
Output Current	I_O	V_{OUT} > 1.2V		350			mA
Current Limit	I_{LIM}	V_{OUT} > 1.2V, V_{IN} = $V_{IN(MIN)}$		350	1000		mA
Short Circuit Current	I_{SC}	V_{OUT} < 0.8V			250		mA
Quiescent Current	I_Q	I_O = 0mA			30	50	μA
Ground Pin Current	I_{GND}	I_O = 1mA to 350mA			30	50	μA
Line Regulation	REG_{LINE}	I_{OUT}=5mA, V_{IN}=V_{OUT}+1 to V_{OUT}+2	V_{OUT} <= 2.0V			0.15	%
			V_{OUT} > 2.0V		0.02	0.1	%
Load Regulation	REG_{LOAD}	I_O=1mA to 350mA			0.2	1	%
Over Temperature Shutdown	OTS				175		℃
Over Temperature Hystersis	OTH				30		℃
V_{OUT} Temperature Coefficient	TC				30		ppm/℃
Power Supply Rejection	PSRR	I_O = 100mA, C_O=2.2μF ceramic	f=1kHz		50		dB
			f=10kHz		20		
			f=100kHz		15		
Output Voltage Noise	eN	f=10Hz to 100kHz, I_O = 10mA, C_{VBG}=0μF	C_O=2.2μF		30		μVrms
			C_O=100μF		20		

Note 1. $V_{IN(MIN)}$ = V_{OUT} + $V_{DROPOUT}$

Note 2. As V_{IN} is larger than $V_{IN(MIN)}$, the Current Limit and output short current Spec value will increase

DETAILED DESCRIPTION

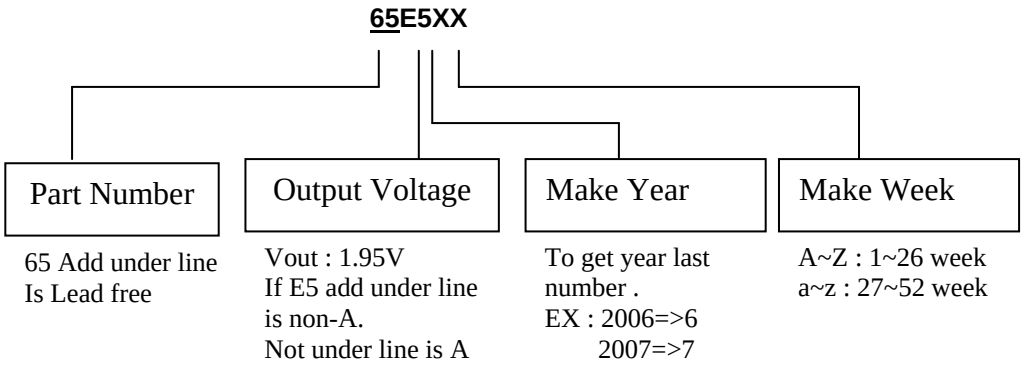
The CM2865 family of CMOS regulators contain a PMOS pass transistor, voltage reference, error amplifier, over-current protection and thermal shutdown.

The P-channel pass transistor receives data from the error amplifier, over-current shutdown, and thermal protection circuits. During normal operation, the error amplifier compares the output voltage to a precision reference. Over-current and Thermal shutdown circuits become active when the junction temperature exceeds 175℃, or the current exceeds 350mA. During thermal shutdown, the output voltage remains low. Normal operation is restored when the junction temperature drops below 120℃.

EXTERNAL CAPACITOR

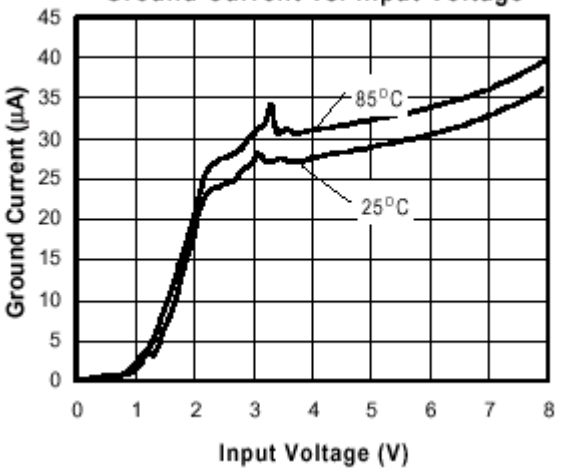
The CM2865 is stable with an output capacitor to ground of 1.0μF or greater. It can keep stable even with higher or poor ESR capacitors. A second capacitor is recommended between the input and ground to stabilize VIN. The input capacitor should be larger than 0.1μF to have a beneficial effect. All capacitors should be placed in close proximity to the pins. A “quiet” ground termination is desirable.

MARKING INFORMATION

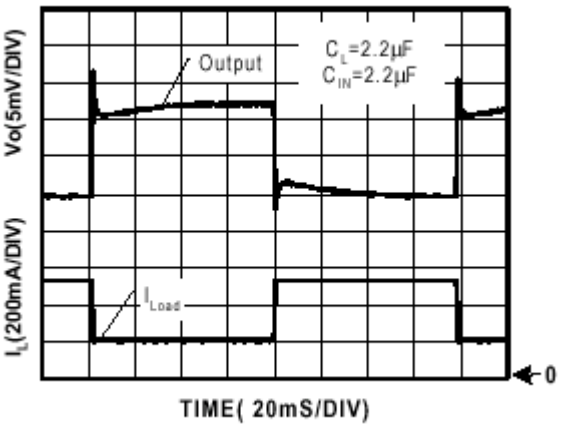


TYPICAL ELECTRICAL CHARACTERISTICS

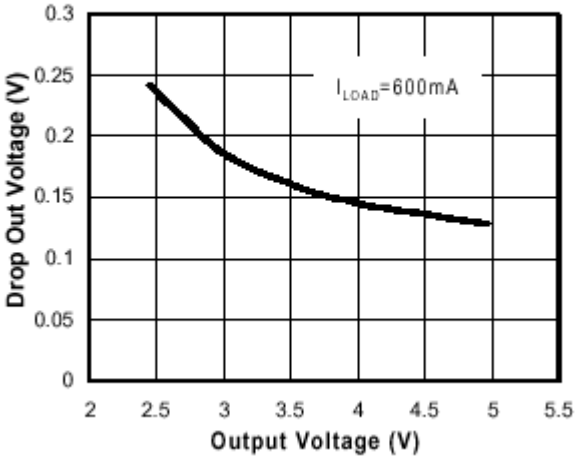
Ground Current vs. Input Voltage



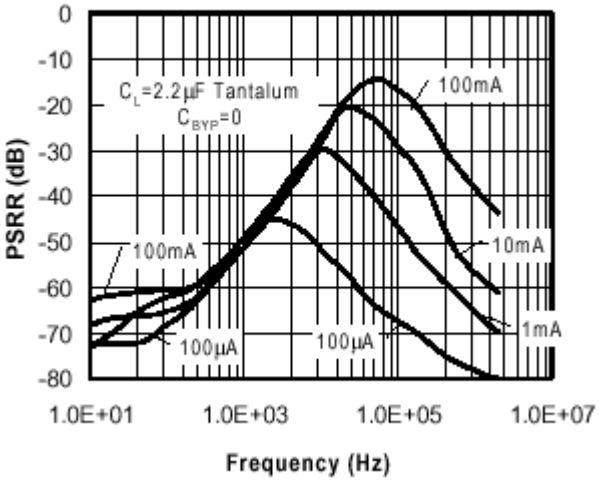
Load Step (1mA-300mA)



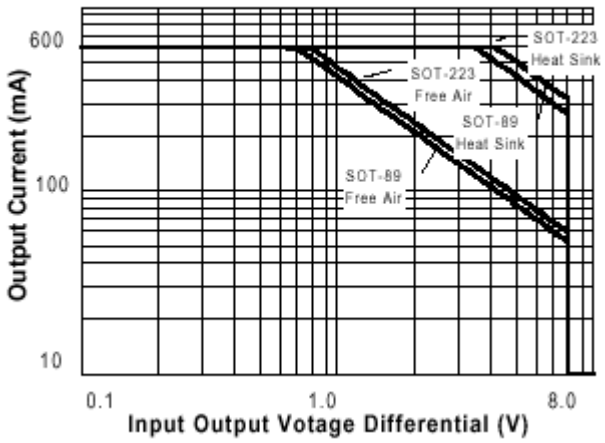
Drop Out Voltage vs. Output Voltage



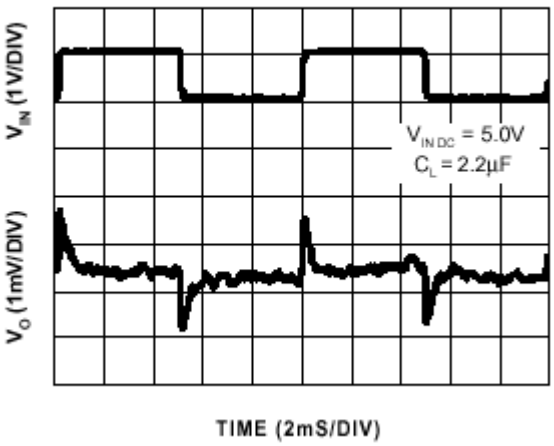
Power Supply Rejection Ratio



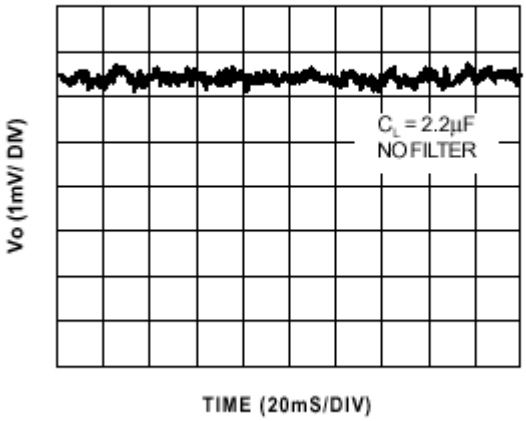
Safe Operating Area



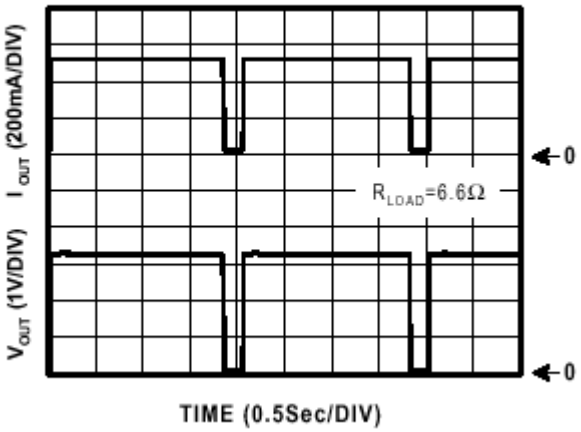
Transient Line Response



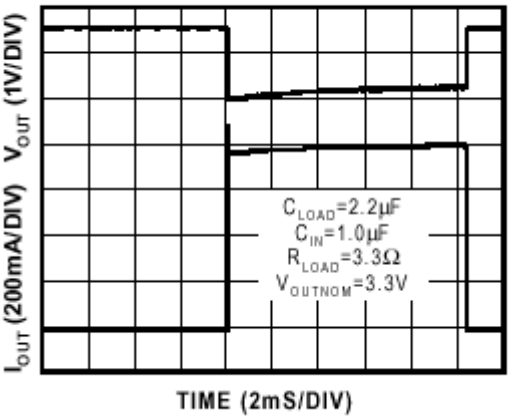
Noise Measurement



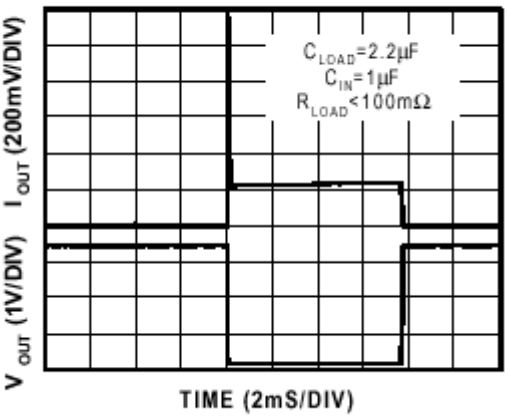
Overtemperature Shutdown



Current Limit Response

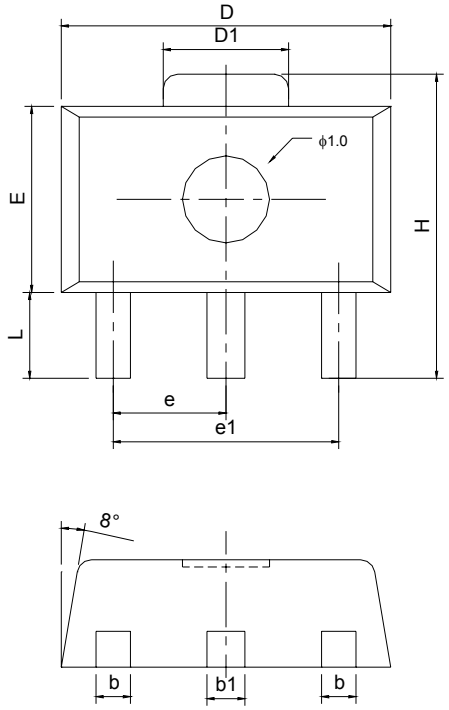


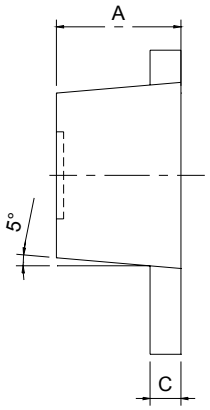
Short Circuit Response



PACKAGE DIMENSION

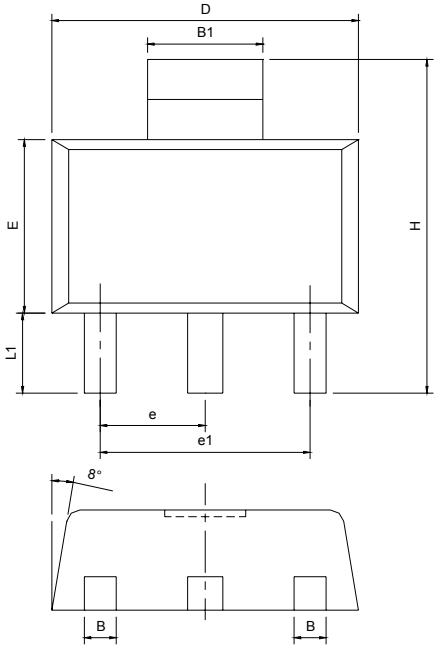
SOT-89 (M89)

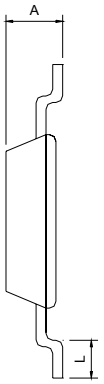




SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.40	1.50	1.60	0.055	0.059	0.063
L	0.80	---	1.20	0.031	---	0.047
b	0.36	0.42	0.48	0.014	0.016	0.018
b1	0.41	0.47	0.53	0.016	0.018	0.020
C	0.38	0.40	0.43	0.014	0.015	0.017
D	4.40	4.50	4.60	0.173	0.177	0.181
D1	1.40	1.60	1.75	0.055	0.062	0.069
H	3.94	---	4.25	0.155	---	0.167
E	2.40	2.50	2.60	0.094	0.098	0.102
e1	2.90	3.00	3.10	0.114	0.118	0.122
e	1.45	1.50	1.55	0.057	0.059	0.061

SOT-223 (M223)





SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.50	---	1.80	0.0591	---	0.0709
B	0.60	---	0.836	0.0236	---	0.033
B1	2.895	---	3.15	0.114	---	0.124
D	6.299	---	6.706	0.248	---	0.264
E	3.30	---	3.708	0.1299	---	0.146
e	---	2.30BSC	---	---	0.090BC	---
e1	---	4.60BSC	---	---	0.181BSC	---
H	6.70	---	7.30	0.2638	---	0.2874
L	---	0.91MIN	---	---	0.036MIN	---
L1	---	2.00MAX	---	---	0.0787MAX	---
θ	---	---	13°	---	---	13°

NUMBERING SCHEME

Ordering Number: CM2865(A)**XXYZ (note1)**
Ordering Number: CM2865(A)**GXXYZGXYZ (note2)**

note1:
CM2865(A)E5: 350mA CMOS LDO
XX : Suffix for voltage output (note 3)
Y : Suffix for Temperature Range (note 4)
Z : Suffix for Package Type (note 5)

note2:
CM2865(A)E5: 350mA CMOS LDO
G : Suffix for Pb Free Product
XX : Suffix for voltage output (note 3)
Y : Suffix for Temperature Range (note 4)
Z : Suffix for Package Type (note 5)

note 3: see CMOS LDO Voltage Suffix Table

note 4:
Y= I : -40℃~+85℃ (only I grade support for all CMOS LDOs)

note 5:
Z is single alphabet with or without digits
M223 : SOT-223 (TR only)
M89 : SOT-89 (TR only)

CMOS LDO Voltage Suffix Table

Output Voltage	Suffix
1.95V	E5

IMPORTANT NOTICE

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