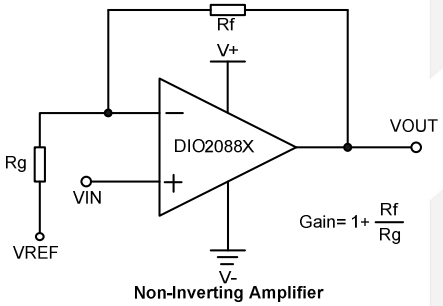
DIO20881/1D/2/4

600nA，Rail-to-Rail Input/ Output Low Power Amplifier

Features

- Ultra low power: 600nA per channel
- Unity Gain Stable
- Gain Bandwidth Product: 14kHz
- Wide supply range: 1.4V to 5.5V
- Available in SOT23-5, SOT23-6, SOIC-8, MSOP-8, SOP-14 and TSSOP-14 packages
- Temperature Range:
  -Industrial: -40°C to +85°C
  -Extended: -40°C to +125°C

Typical Applications



Non-Inverting Amplifier

Descriptions

DIO2088x is a family of ultra low power operational amplifier, with rail-to-rail CMOS input/output and single/dual channels selectable. DIO2088x family has a gain-bandwidth product of 14kHz, wide operating supply voltage from 1.4V to 5.5V and broad output voltage swing.

DIO2088x consumes ultra low power, with each channel 600nA of bias current, which makes DIO2088x be ideal for battery powered device, temperature-sense device, etc.

The DIO2088x operational amplifier family is available in single (DIO20881/1D), and dual (DIO20882), and quad (DIO20884) configurations. Furthermore, the DIO20881 is offered in the 5-lead SOT23 package. All types of amplifiers are fully specified over the extended -40°C to +125°C temperature range.

Applications

- Portable Equipment
- Active Filters
- Data Acquisition
- Portable Equipment
- Test Equipment
- Broadband Communication
- Process Control
- Audio and Video Processing

Ordering Information

Order Part Number	Top Marking		T_A	Package	
DIO20881ST5	YW(X)Z	Green or RoHS	-40 to +125°C	SOT23-5	Tape & Reel, 3000
DIO20881SO8	DIO2081	Green or RoHS	-40 to +125°C	SOIC-8	Tape & Reel, 2500
DIO20881MP8	DIO2081	Green or RoHS	-40 to +125°C	MSOP-8	Tape & Reel, 3000
DIO20881DST6	YWDL	Green or RoHS	-40 to +125°C	SOT23-6	Tape & Reel, 3000
DIO20881DSO8	D20881D	Green or RoHS	-40 to +125°C	SOIC-8	Tape & Reel, 2500
DIO20881DMP8	D20881D	Green or RoHS	-40 to +125°C	MSOP-8	Tape & Reel, 3000
DIO20882SO8	DIO2082	Green or RoHS	-40 to +125°C	SOIC-8	Tape & Reel, 2500
DIO20882MP8	DIO2082	Green or RoHS	-40 to +125°C	MSOP-8	Tape & Reel, 3000
DIO20884CS14	DIO2084	Green or RoHS	-40 to +125°C	SOP-14	Tape & Reel, 2500
DIO20884TP14	DIO2084	Green or RoHS	-40 to +125°C	TSSOP-14	Tape & Reel, 2500

© 2018 DIOO MICROCIRCUITS CO., LTD

Pin Assignments

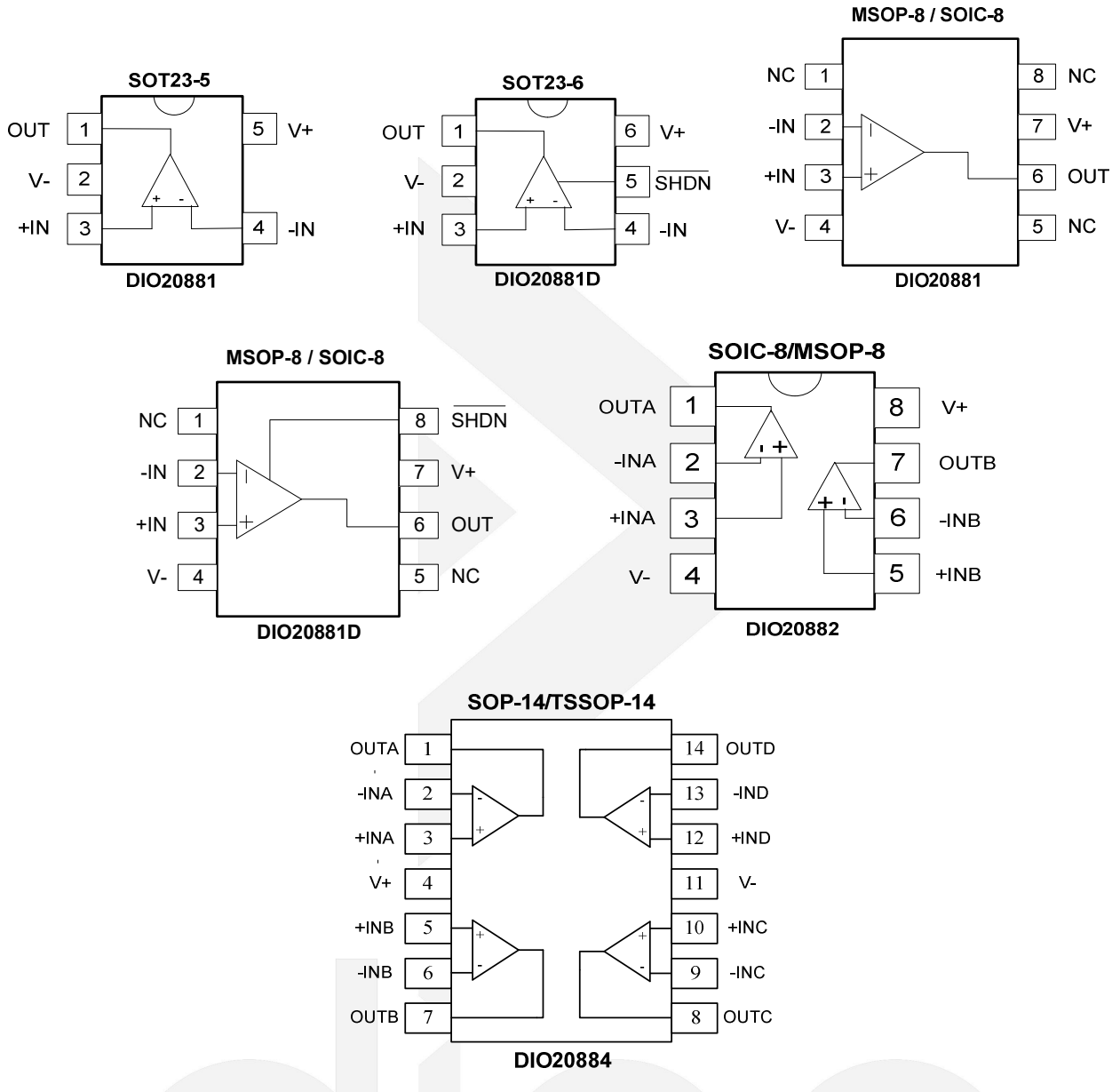


Figure 1 Top View

Pin Description

Pin name	Description
V+	Positive supply
V-	Negative supply
+INX	Positive Input
-INX	Negative Input
OUTX	Output
SHDN	Active Low Shutdown

© 2018 DIOO MICROCIRCUITS CO., LTD

Absolute Maximum Ratings

Stresses beyond those listed under “Absolute Maximum Rating” may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other condition beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maxim rating conditions for extended periods may affect device reliability.

Parameter		Rating	Unit
Supply Voltage (V+ – V-)		7	V
Input Voltage		(V-)-0.3V to (V+)+0.3V	V
Difference Input Voltage		|V+ – V-|	V
Storage Temperature Range		-65 to 150	°C
Junction Temperature		150	°C
Lead Temperature Range		260	°C
ESD	HBM, JEDEC: JESD22-A114	8	kV
	CDM, JEDEC: JESD22-C101	2	

Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation to ensure optimal performance to the datasheet specifications. DIOO does not recommend exceeding them or designing to Absolute Maximum Ratings.

Parameter	Rating	Unit
Supply Voltage	1.4 to 5.5	V
Input Voltage	0 to 5	V
Operating Temperature Range	-40 to 125	°C

© 2018 DIOO MICROCIRCUITS CO., LTD

Electrical Characteristics

Typical value: V+=5V, R_L=1MΩ to V+/2, V_{CM}=1/2V+, T_A = 25°C, unless otherwise specified.

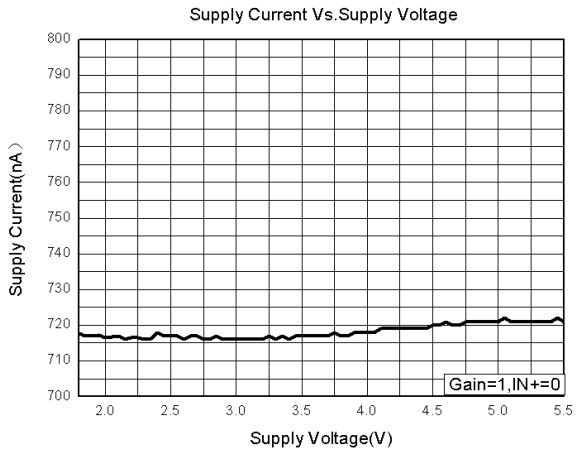
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
INPUT CHARACTERISTICS						
V_{OS}	Input Offset Voltage	-40°C≤T_A≤125°C, V+=1.4V to 5.5V	-2		+2	mV
I_B	Input Bias Current	V+=1.4V to 5.5V		1		pA
I_{OS}	Input Offset Current	V+=1.4V to 5.5V		1		pA
V_{CM}	Common Mode Voltage Range		-0.1		(V+) +0.1	V
CMRR	Common Mode Rejection Ratio	-40°C≤T_A≤125°C,	100			dB
A_{OL}	Open Loop Voltage Gain	R_L=50kΩ, V_O= 0.1 to (V+)-0.1	70	87		dB
$\Delta V_{OS}/\Delta_T$	Input Offset Voltage Drift	-40°C≤T_A≤125°C		±5		μV/°C
OUTPUT CHARACTERISTICS						
V_{OH}	Output Voltage High	R_L=50kΩ -40°C≤T_A≤125°C		4.992		V
V_{OL}	Output Voltage Low	R_L=50kΩ -40°C≤T_A≤125°C		8	15	mV
I_{SC}	Output Short Circuit Current	Source I_{SC}, V+=5V		30		mA
		Sink I_{SC}, V+=5V		30		
POWER SUPPLY						
PSRR	Power Supply Rejection Ration		100			dB
I_Q	Supply Current per Channel/Amp	-40°C≤T_A≤125°C		600	1000	nA
$I_{Q(off)}$	Supply Current in Shutdown	V_{SHDN}=0V		3		nA
I_{SHDN}	Shutdown Pin Current			-10		pA
I_{LEAK}	Output Leakage Current in Shutdown	V_{SHDN}=0V		3.6		pA
V_{IL}	SHDN Input Low Voltage	Disable			0.5	V
V_{IH}	SHDN Input High Voltage	Enable	1.1			V
DYNAMIC PERFORMANCE						
GBP	Gain Bandwidth Product	C_L=60pF		14		kHz
SR	Slew Rate	G=1, 2V Output Step		3.5		V/ms
t_S	Setting Time	G=1, 2V Output Step		150		μs
Θm	Phase Margin			49		Deg
tr	Overload Recovery Time			110		μs
NOISE PERFORMANCE						
THD	Total Harmonic Distortion	f=100Hz, 4V_{PP}, R_L=50kΩ,		0.09		%
e_n	Voltage Noise Density	f=1kHz		190		nV/√Hz

Specifications subject to change without notice.

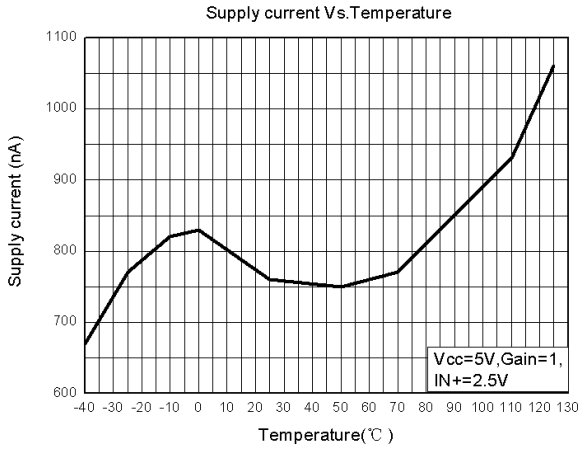
© 2018 DIOO MICROCIRCUITS CO., LTD

Typical Performance Characteristics

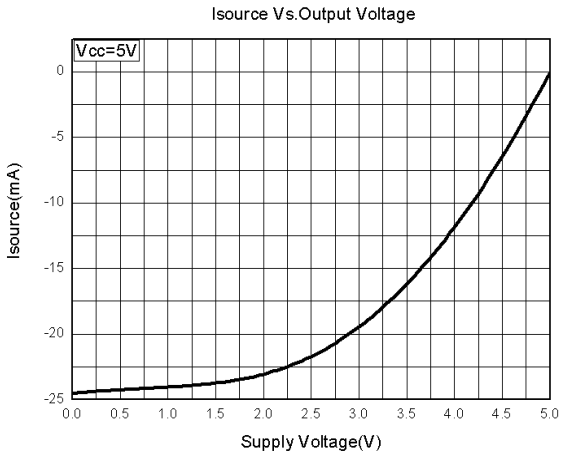
Supply Current vs. Supply Voltage



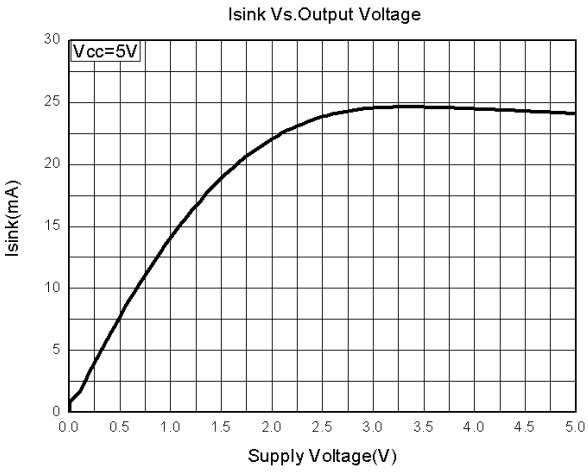
Supply Current vs. Temperature



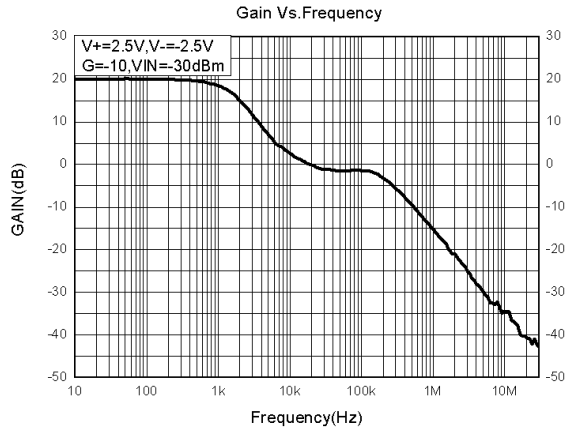
I_{SOURCE} vs. Output Voltage



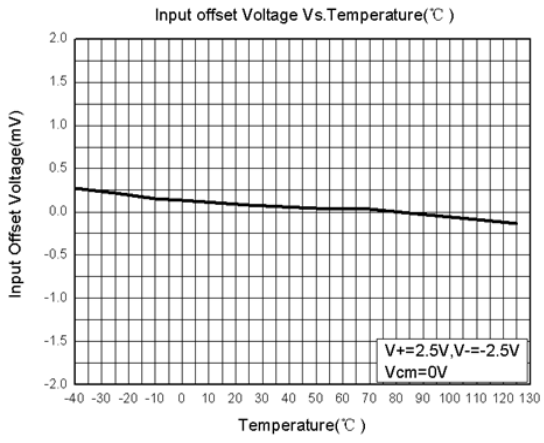
I_{SINK} vs. Output Voltage



Gain vs. Frequency

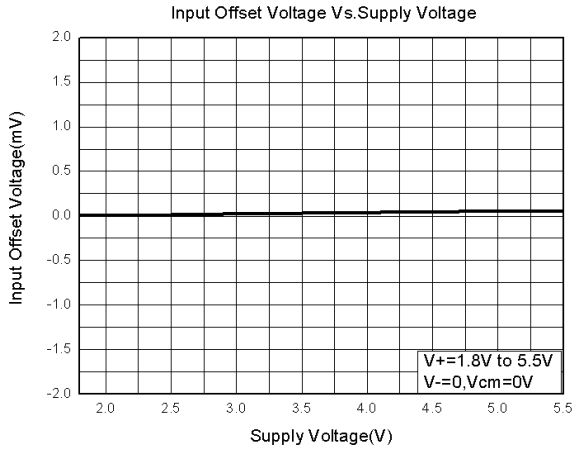


Input Offset Voltage vs. Temperature

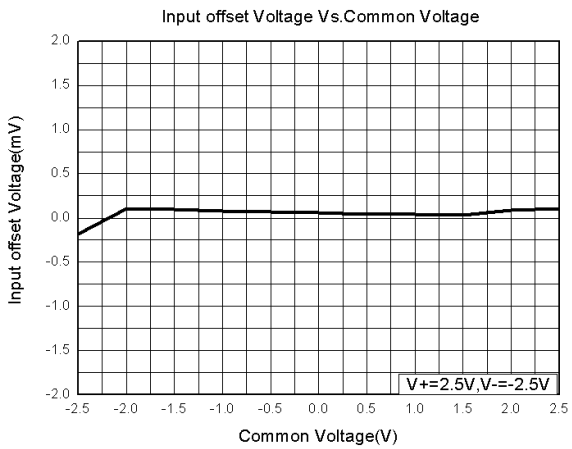


© 2018 DIOO MICROCIRCUITS CO., LTD

Input Offset Voltage vs. Supply Voltage

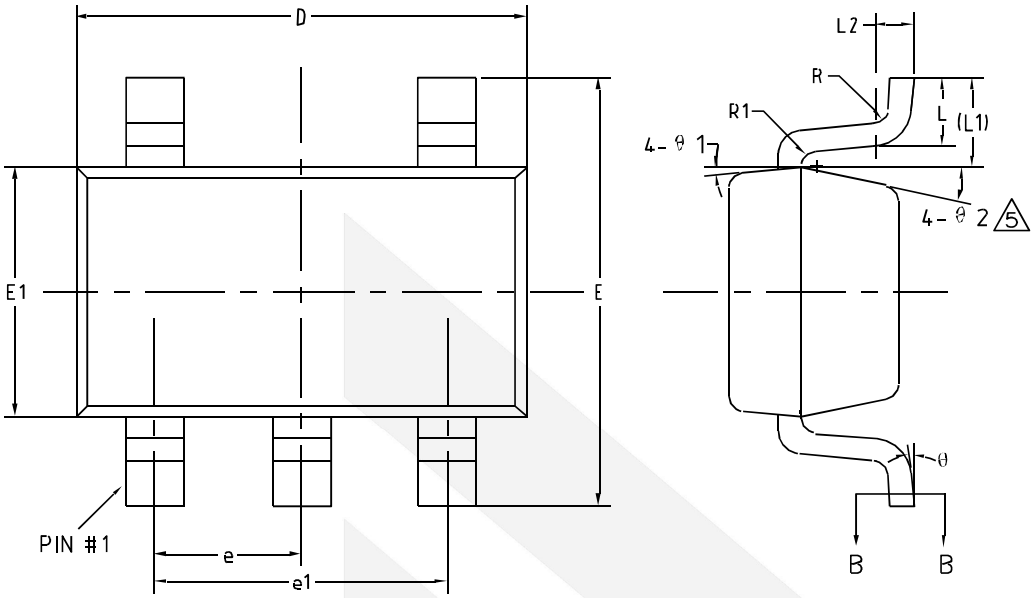


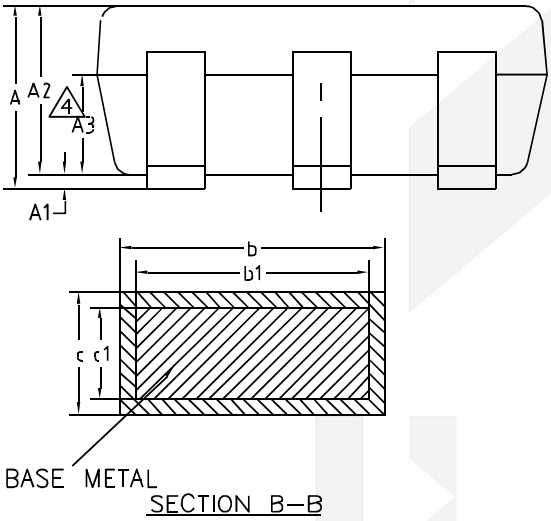
Input Offset Voltage vs. Common Voltage



© 2018 DIOO MICROCIRCUITS CO., LTD

Physical Dimensions: SOT23-5

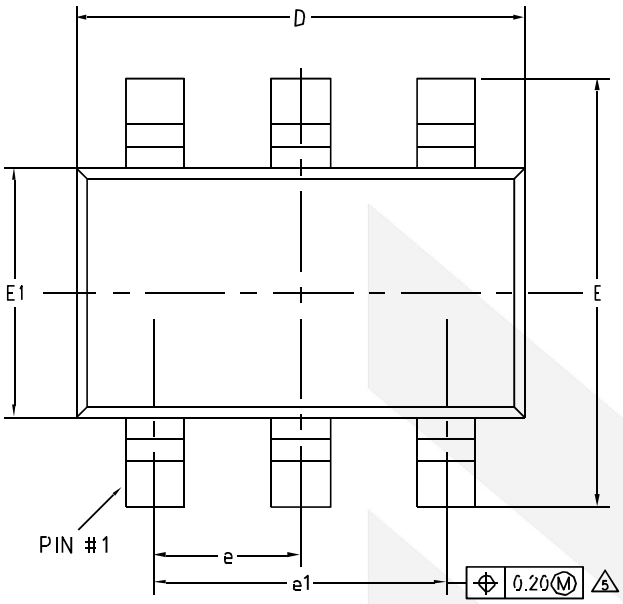


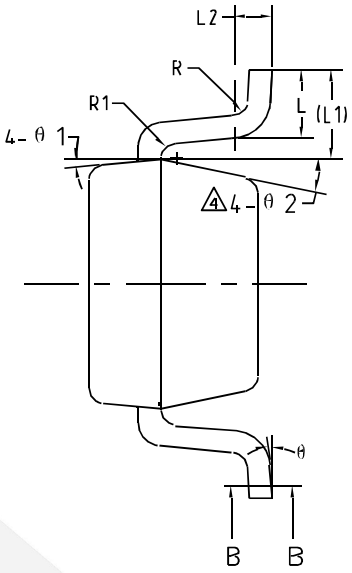


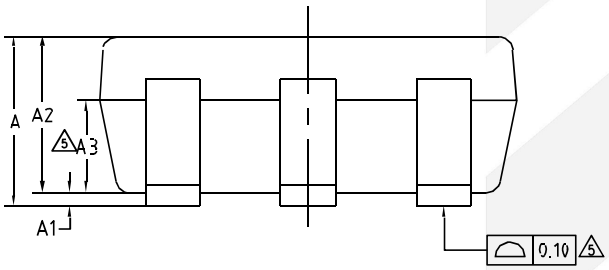
COMMON DIMENSIONS (UNITS OF MEASURE=MILLIMETER)			
Symbol	**MIN**	**NOM**	**MAX**
A	-	-	1.25
A1	0	-	0.15
A2	1.00	1.10	1.20
A3	0.60	0.65	0.70
b	0.36	-	0.50
b1	0.36	0.38	0.45
c	0.14	-	0.20
c1	0.14	0.15	0.16
D	2.826	2.926	3.026
E	2.60	2.80	3.00
E1	1.526	1.626	1.726
e	0.90	0.95	1.00
e1	1.80	1.90	2.00
L	0.35	0.45	0.60
L1	0.59REF		
L2	0.25BSC		
R	0.10	-	-
R1	0.10	-	0.25
Θ	0°	-	8°
Θ1	3°	5°	7°
Θ2	6°	-	14°

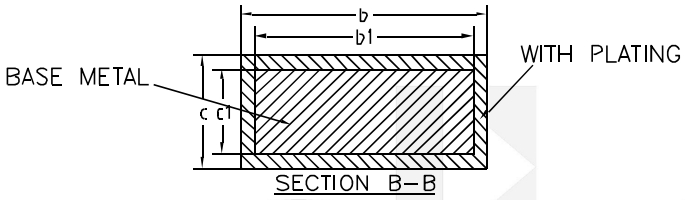
© 2018 DIOO MICROCIRCUITS CO., LTD

Physical Dimensions: SOT23-6





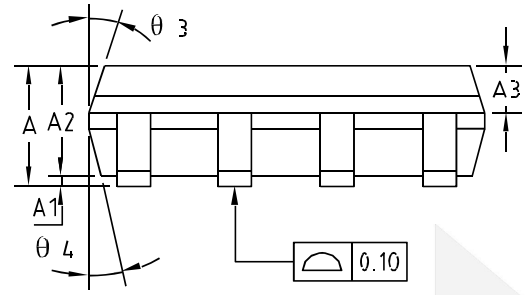


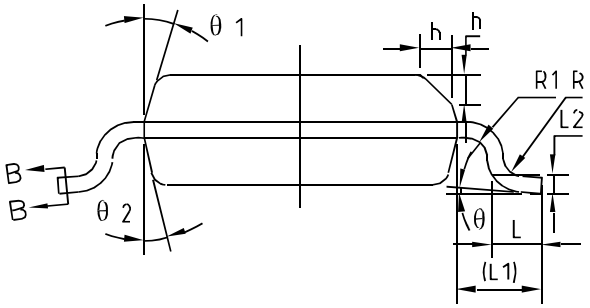


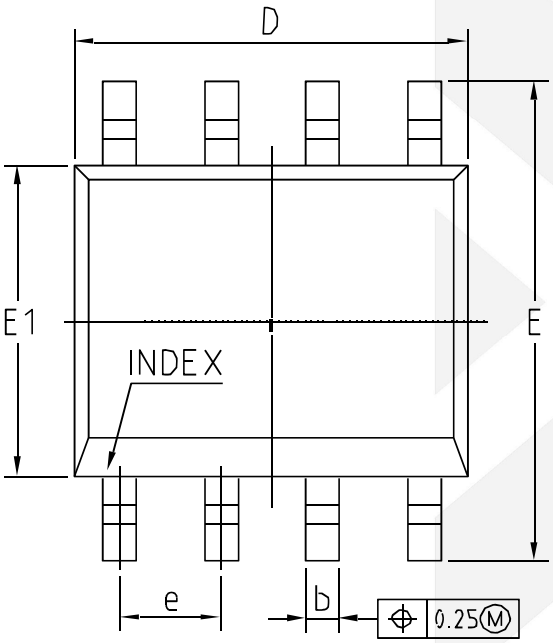
COMMON DIMENSIONS (UNITS OF MEASURE=MILLIMETER)			
Symbol	**MIN**	**NOM**	**MAX**
A	-	-	1.25
A1	0	-	0.15
A2	1.00	1.10	1.20
A3	0.60	0.65	0.70
b	0.36	-	0.50
b1	0.36	0.38	0.45
c	0.14	-	0.20
c1	0.14	0.15	0.16
D	2.826	2.926	3.026
E	2.60	2.80	3.00
E1	1.526	1.626	1.726
e	0.90	0.95	1.00
e1	1.80	1.90	2.00
L	0.35	0.45	0.60
L1	0.59REF		
L2	0.25BSC		
R	0.10	-	-
R1	0.10	-	0.25
Θ	0°	-	8°
Θ1	3°	5°	7°
Θ2	6°	-	14°

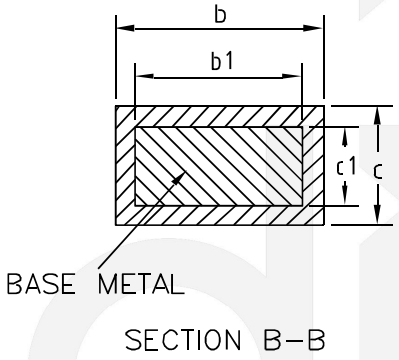
© 2018 DIOO MICROCIRCUITS CO., LTD

Physical Dimensions: SOIC-8







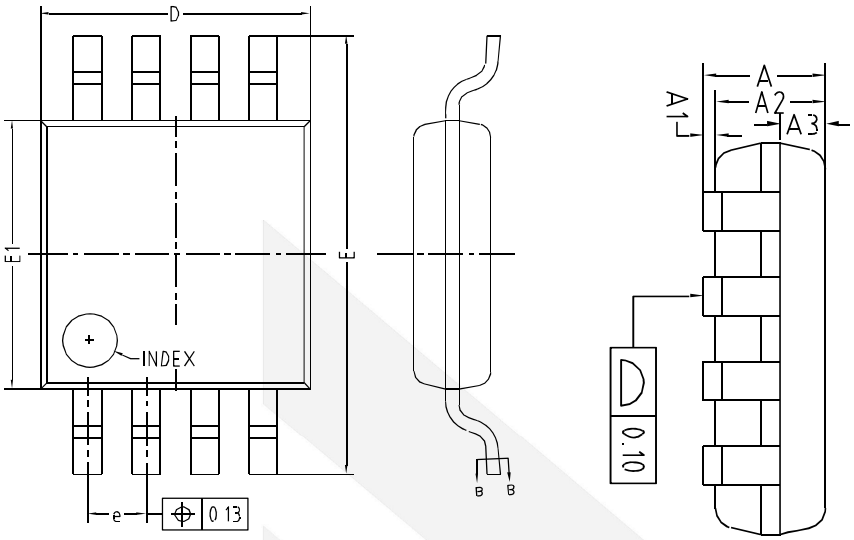


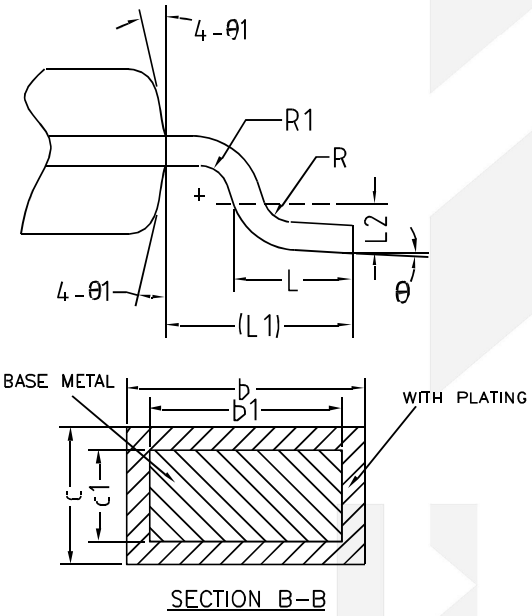
SECTION B–B

COMMON DIMENSIONS (UNITS OF MEASURE=MILLIMETER)			
Symbol	**MIN**	**NOM**	**MAX**
A	1.35	1.55	1.75
A1	0.10	0.15	0.25
A2	1.25	1.40	1.65
A3	0.50	0.60	0.70
b	0.38	-	0.51
b1	0.37	0.42	0.47
c	0.17	-	0.25
c1	0.17	0.20	0.23
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e		1.27BSC	
L	0.45	0.60	0.80
L1		1.04REF	
L2		0.25BSC	
R	0.07	-	-
R1	0.07	-	-
h	0.30	0.40	0.50
Θ	0°	-	8°
Θ1	15°	17°	19°
Θ2	11°	13°	15°
Θ3	15°	17°	19°
Θ4	11°	13°	15°

© 2018 DIOO MICROCIRCUITS CO., LTD

Physical Dimensions: MSOP-8

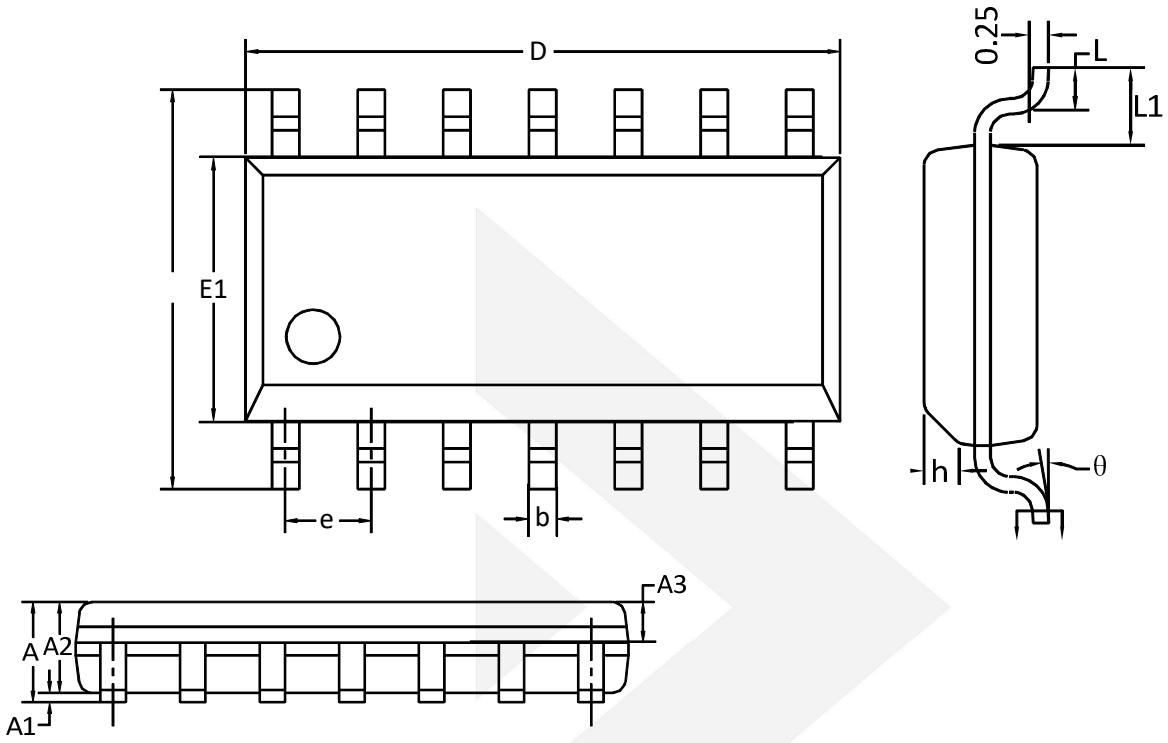


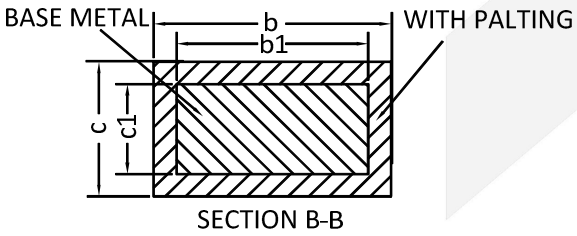


COMMON DIMENSIONS (UNITS OF MEASURE=MILLIMETER)			
Symbol	**MIN**	**NOM**	**MAX**
A	-	-	1.10
A1	0	-	0.15
A2	0.75	0.85	0.95
A3	0.25	0.35	0.39
b	0.28	-	0.37
b1	0.27	0.30	0.33
c	0.15	-	0.20
c1	0.14	0.15	0.16
D	2.90	3.00	3.10
E	4.70	4.90	5.10
E1	2.90	3.00	3.10
e	0.55	0.65	0.75
L	0.40	0.60	0.80
L1	0.95REF		
L2	0.25BSC		
R	0.07	-	-
R1	0.07	-	-
Θ	0°	-	8°
Θ1	9°	12°	15°

© 2018 DIOO MICROCIRCUITS CO., LTD

Physical Dimensions: SOP-14

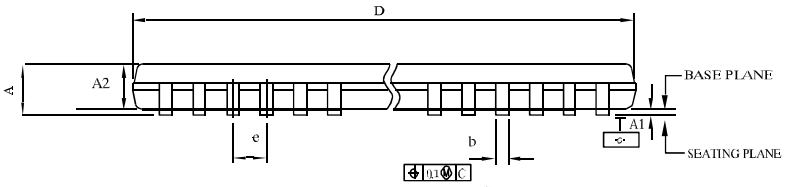


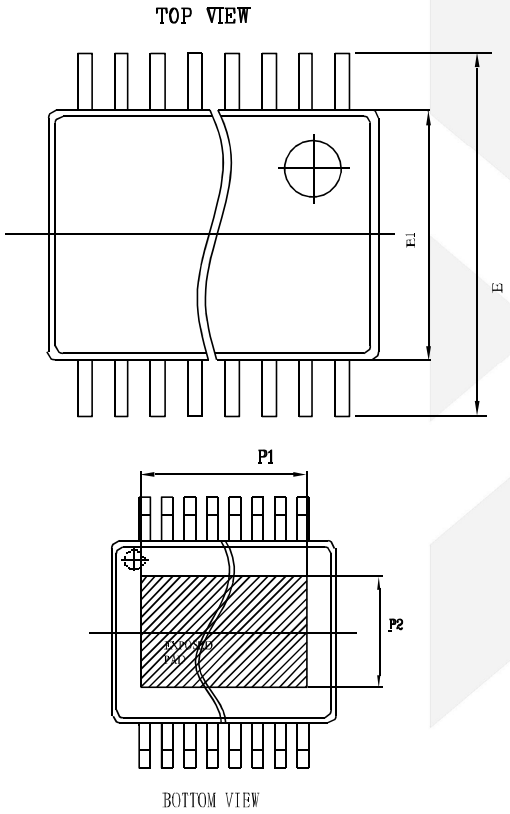


COMMON DIMENSIONS (UNITS OF MEASURE=MILLIMETER)			
Symbol	**MIN**	**NOM**	**MAX**
A	1.35	1.60	1.75
A1	0.10	0.15	0.25
A2	1.25	1.45	1.65
A3	0.55	0.65	0.75
b	0.36	-	0.49
b1	0.35	0.40	0.45
c	0.17	-	0.25
c1	0.17	0.20	0.23
D	8.45	8.65	8.85
E	5.80	6.00	6.20
E1	3.70	3.90	4.10
e	1.27BSC		
h	0.25	-	0.50
L	0.45	0.60	0.80
L1	1.05BSC		
Θ	0°	-	8°

© 2018 DIOO MICROCIRCUITS CO., LTD

Physical Dimensions: TSSOP-14





COMMON DIMENSIONS (UNITS OF MEASURE=MILLIMETER)		
Symbol	**Min**	**Max**
A		1.2
A1	0.05	0.15
A2	0.8	1.05
E	6.25	6.55
E1	4.3	4.5
D	4.9	5.1
L		1
L1	0.45	0.75
e	0.65	
b	0.19	0.3
R1	0.15TYP	
R2	0.15TYP	
A-A	0.09	0.2
θ1	12° TYP	
θ2	12° TYP	
θ3	0°	8°

© 2018 DIOO MICROCIRCUITS CO., LTD

CONTACT US

Dioo is a professional design and sales corporation for high-quality and performance analog semiconductors. The company focuses on industry markets, such as, cell phone, handheld products, laptop, and medical equipment and so on. Dioo's product families include analog signal processing and amplifying, LED drivers and charger IC. Go to http://www.dioo.com for a complete list of Dioo product families.

For additional product information, or full datasheet, please contact with our Sales Department or Representatives.

© 2018 DIOO MICROCIRCUITS CO., LTD

LifeElectronics
Живое партнерство

ООО «ЛайфЭлектроникс» **“LifeElectronics” LLC**

ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- *Конкурентоспособные цены и скидки постоянным клиентам.*
- *Специальные условия для постоянных клиентов.*
- *Подбор аналогов.*
- *Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.*

- *Приемлемые сроки поставки, возможна ускоренная поставка.*
- *Доставку товара в любую точку России и стран СНГ.*
- *Комплексную поставку.*
- *Работу по проектам и поставку образцов.*
- *Формирование склада под заказчика.*

- *Сертификаты соответствия на поставляемую продукцию (по желанию клиента).*
- *Тестирование поставляемой продукции.*
- *Поставку компонентов, требующих военную и космическую приемку.*
- *Входной контроль качества.*
- *Наличие сертификата ISO.*

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- *Регистрацию проекта у производителя компонентов.*
- *Техническую поддержку проекта.*
- *Защиту от снятия компонента с производства.*
- *Оценку стоимости проекта по компонентам.*
- *Изготовление тестовой платы монтаж и пусконаладочные работы.*

Тел: +7 (812) 336 43 04 (многоканальный)
Email: org@lifeelectronics.ru

www.lifeelectronics.ru