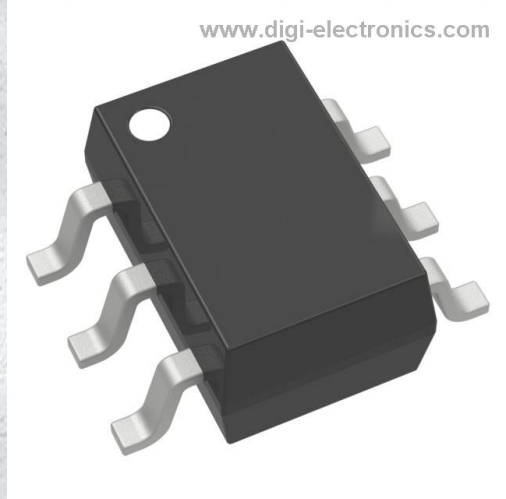
AP4306BUKTR-G1 Datasheet



https://www.DiGi-Electronics.com

DiGi Electronics Part Number	AP4306BUKTR-G1-DG
Manufacturer	Diodes Incorporated
Manufacturer Product Number	AP4306BUKTR-G1
Description	IC CURR SENSE 1 CIRCUIT SOT23-6
Detailed Description	Current Sense Amplifier 1 Circuit SOT-23-6

Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
AP4306BUKTR-G1	Diodes Incorporated
Series:	Product Status:
-	Obsolete
Amplifier Type:	Number of Circuits:
Current Sense	1
Output Type:	Slew Rate:
-	-
Current - Input Bias:	Current - Supply:
50 nA	500µA
Current - Output / Channel:	Voltage - Supply Span (Min):
50 mA	2.5 V
Voltage - Supply Span (Max):	Operating Temperature:
18 V	-40°C ~ 105°C
Mounting Type:	Package / Case:
Surface Mount	SOT-23-6
Supplier Device Package:	Base Product Number:
SOT-23-6	AP4306

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8542.33.0001	

Lead-free Green

AP4306

CONSTANT VOLTAGE AND CONSTANT CURRENT CONTROLLER

Description

The AP4306 is a highly integrated solution for a constant voltage/constant current mode SMPS application.

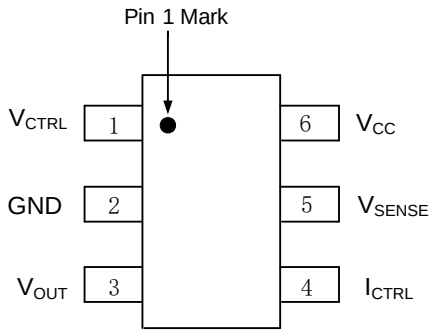
The AP4306 contains one 1.21V voltage reference, one low voltage reference used in current sensing circuit and two operational amplifiers. The 1.21V voltage reference, combined with one operational amplifier, makes of an ideal voltage controller for use in adapters and battery chargers. The low voltage reference, combined with another operational amplifier, makes of an ideal current limiter for output low side current sensing.

The AP4306 is fully compatible with AP4305 in functionality and electrical characteristics except its lower reference voltage for current control loop, thus higher power efficiency in SMPS applications such as low power charger can be realized with AP4306 compared to AP4305.

The AP4306 is available in SOT26 package.

Pin Assignments

(Top View)



SOT26 (K Package)

Features

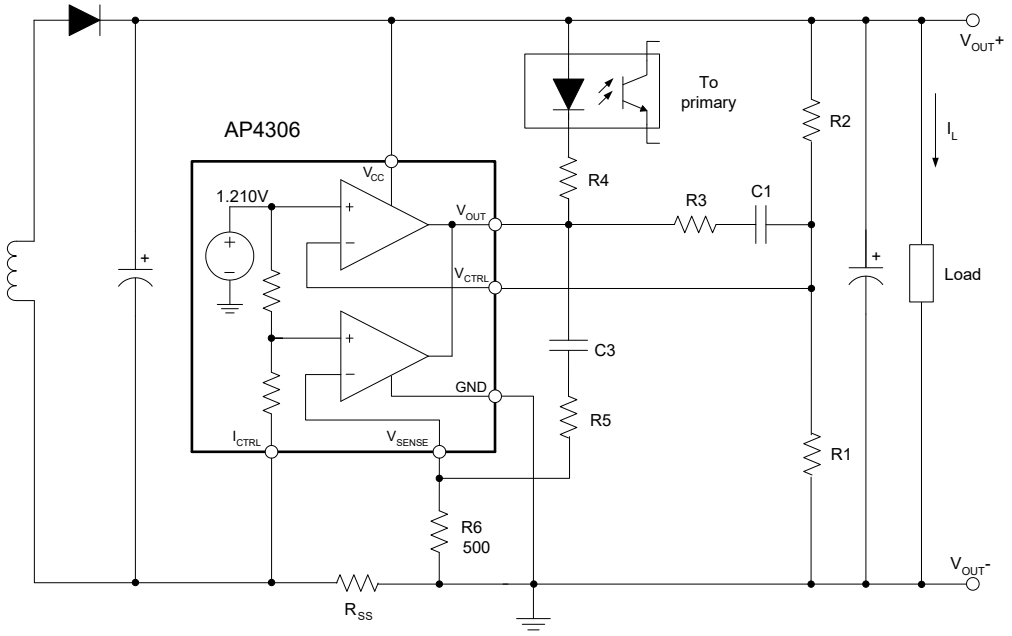
- Constant Voltage and Constant Current Control
- Precision Internal Voltage Reference
- Low External Component Count
- Easy Compensation
- Low Supply Current: 0.5mA
- Current Control Loop Reference
  - A Version: 70mV
  - Operating Temperature Range: -40 to +105°C
- Operating Supply Voltage: 2.5V to 18V
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

Applications

- Adapters
- Battery chargers

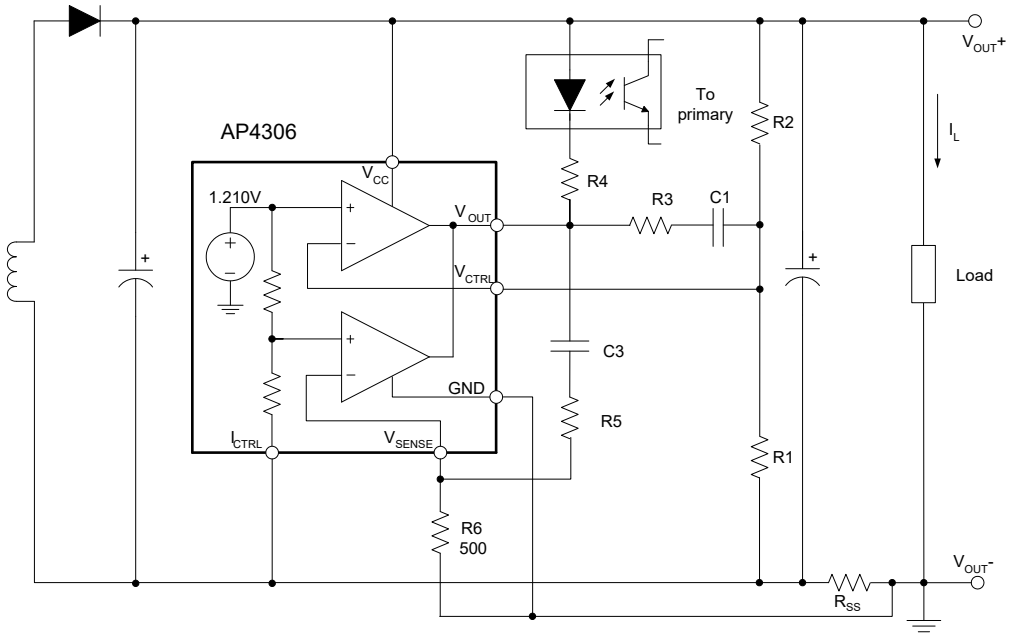
Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

Typical Applications Circuit



$$V_{OUT} = V_{REF} \times \frac{R1+R2}{R1} \qquad CurrentLimit = \frac{V_{SENSE}}{R_{SS}}$$

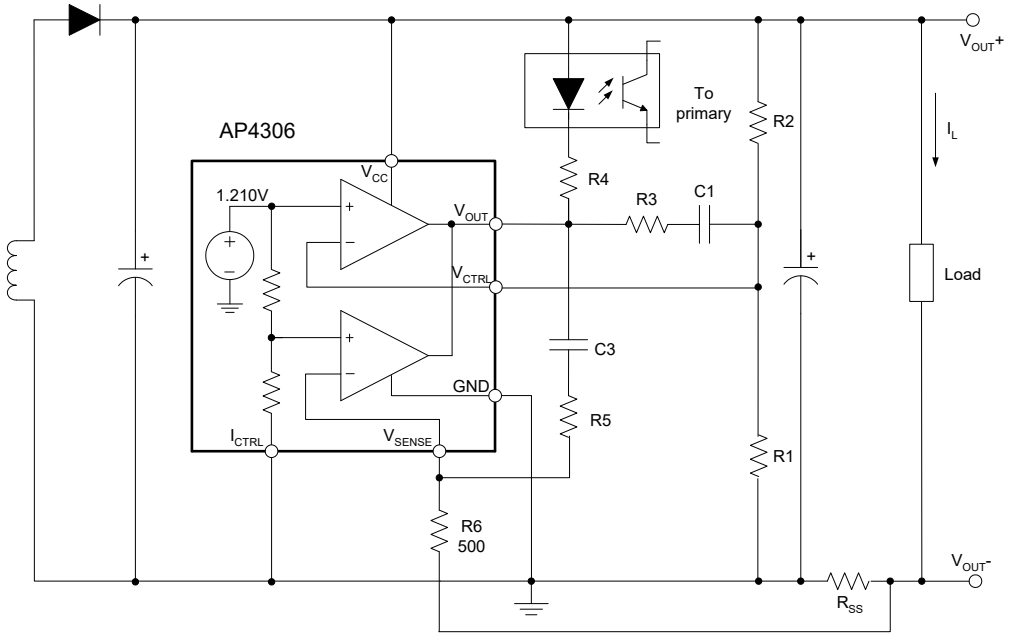
Typical Application 1



$$V_{OUT} = [V_{REF} + (I_L \times R_{SS})] \times \frac{R1+R2}{R1} - (I_L \times R_{SS}) \qquad CurrentLimit = \frac{V_{SENSE}}{R_{SS}}$$

Typical Application 2

Typical Applications Circuit (continued)



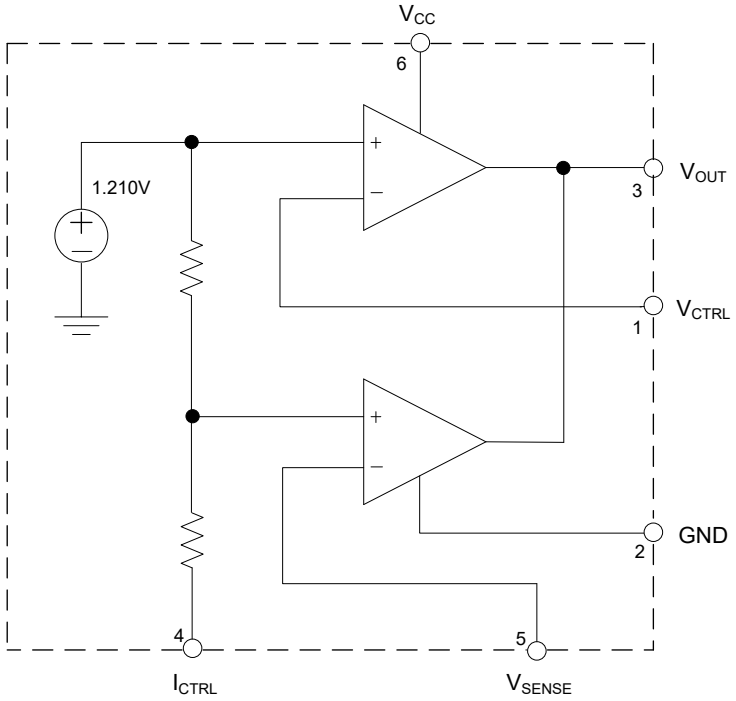
$$V_{OUT} = V_{REF} \times \frac{R1 + R2}{R1} - (I_L \times R_{SS}) \qquad CurrentLimit = \frac{V_{SENSE} \times V_{REF}}{(V_{SENSE} + V_{REF}) \times R_{SS}}$$

Typical Application 3

Pin Descriptions

Pin Number	Pin Name	Function
1	V_{CTRL}	Input pin of the voltage control loop
2	GND	Ground
3	V_{OUT}	Output pin. Sinking current only
4	I_{CTRL}	Input pin of the current control loop
5	V_{SENSE}	Input pin of the current control loop
6	V_{CC}	Power supply

Functional Block Diagram



Absolute Maximum Ratings (Note 4)

Symbol	Parameter	Rating	Unit
V_{CC}	Power Supply Voltage	20	V
V_{IN}	Input Voltage	-0.3 to V_{CC}	V
T_J	Junction Temperature	+150	°C
T_{STG}	Storage Temperature	-65 to +150	°C
T_{LEAD}	Lead Temperature (Soldering, 5sec)	+260	°C
θ_{JA}	Thermal Resistance (Junction to Ambient)	250	°C/W

Note: 4. Stresses greater than those listed under *Absolute Maximum Ratings* can cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions* is not implied. Exposure to *Absolute Maximum Ratings* for extended periods can affect device reliability.

Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
V_{CC}	Power Supply Voltage	2.5	18	V
T_A	Operating Temperature Range	-40	+105	°C

Electrical Characteristics (@V_{CC}=5V, T_A=+25°C, unless otherwise specified.)

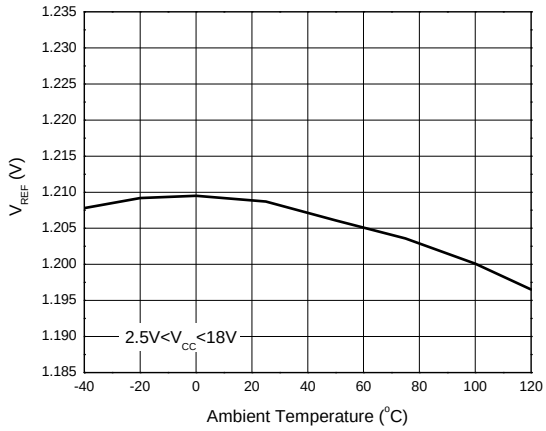
Symbol	Parameters	Conditions		Min	Typ	Max	Unit
TOTAL CURRENT CONSUMPTION							
I_{CC}	Total Supply Current Not Including the Output Sinking	T_A=+25ºC		—	0.5	1	mA
		-40ºC<T_A <+105ºC		—	0.6	—	
VOLTAGE CONTROL LOOP							
Gmv	Transconduction Gain (V_{CTRL}). Sink Current Only	T_A=+25ºC		1	3.5	—	mA/mV
		-40ºC<T_A <+105ºC		—	2.5	—	
V_{REF}	Voltage Control Loop Reference	A Version	T_A=+25ºC	1.198	1.21	1.222	V
			-40ºC<T_A <+105ºC	1.162		1.258	
I_{IBV}	Input Bias Current (V_{CTRL})	T_A=+25ºC		—	50	—	nA
		-40ºC<T_A <+105ºC		—	100	—	
CURRENT CONTROL LOOP							
Gmi	Transconduction Gain (I_{CTRL}). Sink Current Only	T_A=+25ºC		1.5	7	—	mA/mV
		-40ºC<T_A <+105ºC		1.5	7	—	
V_{SENSE}	Current Control Loop Reference	A Version	T_A=+25ºC	66.5	70	73.5	mV
			-40ºC<T_A <+105ºC	63		77	
I_{IBI}	Current Out of Pin I_{CTRL} at V_{SENSE}	A Version	T_A=+25ºC	—	18	—	µA
			-40ºC<T_A <+105ºC	—	35	—	
OUTPUT STAGE							
V_{OL}	Low Output Voltage at 10mA Sinking Current	T_A=+25ºC		—	100	—	mV
		-40ºC<T_A <+105ºC		—	100	—	
I_{OS}	Output Short Circuit Current. Output to $V_{CC.}$ Sink Current Only	T_A=+25ºC		—	27	50	mA
		-40ºC<T_A <+105ºC		—	35	—	

Thermal Impedance

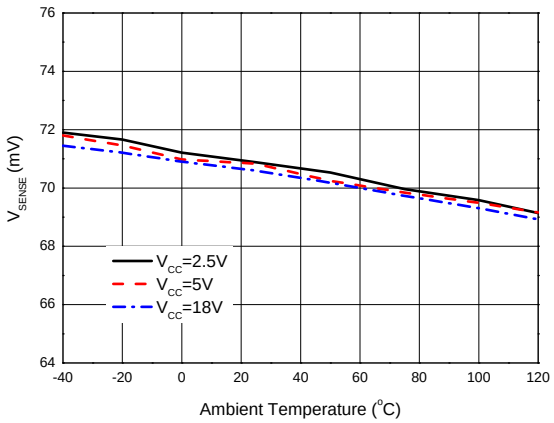
Symbol	Parameters	Value	Unit
θ_{JC}	Thermal Resistance (Junction to Case)	84	°C/W

Performance Characteristics

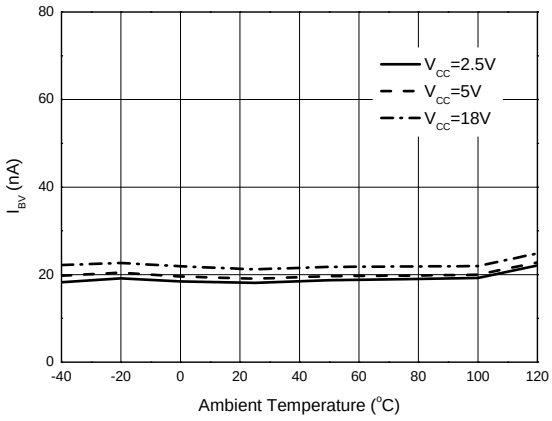
V_{REF} vs. Ambient Temperature



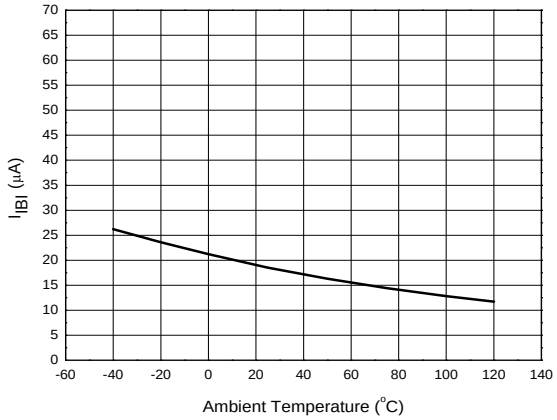
V_{SENSE} vs. Ambient Temperature



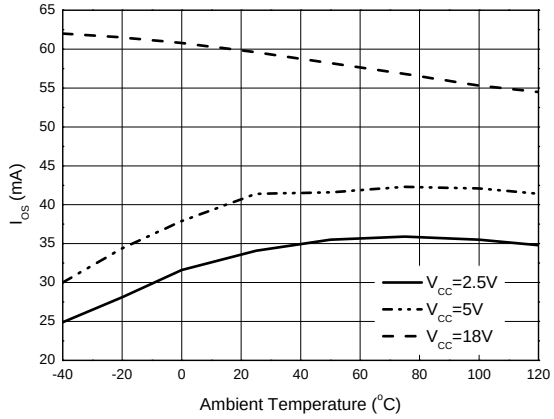
I_{IBV} vs. Ambient Temperature



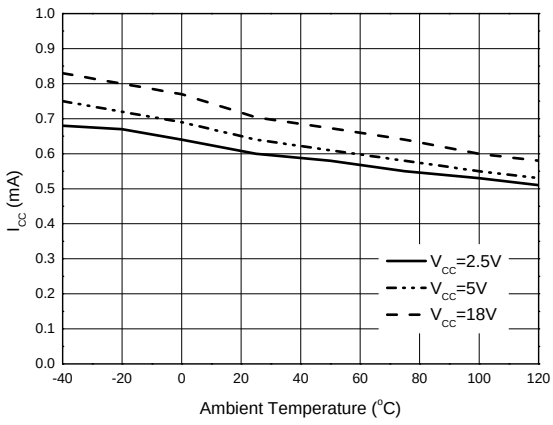
I_{IBI} vs. Ambient Temperature



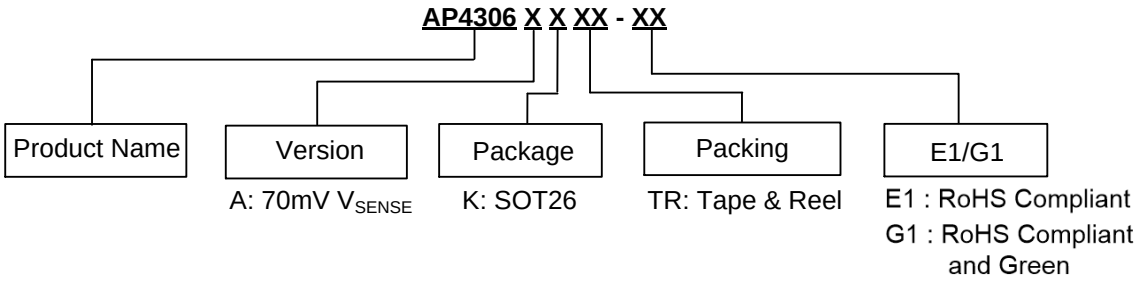
I_{OS} vs. Ambient Temperature



I_{CC} vs. Ambient Temperature

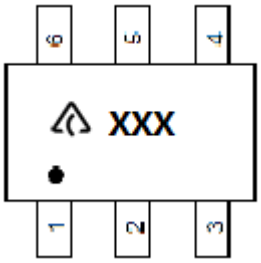


Ordering Information



Part Number		Marking ID		Version	Package	Packing	
RoHS Compliant	RoHS Compliant and Green	RoHS Compliant	RoHS Compliant and Green			Qty.	Carrier
AP4306AKTR-E1	AP4306AKTR-G1	E7L	G7L	70mV V_{SENSE}	SOT26	3000	Tape & Reel

Marking Information

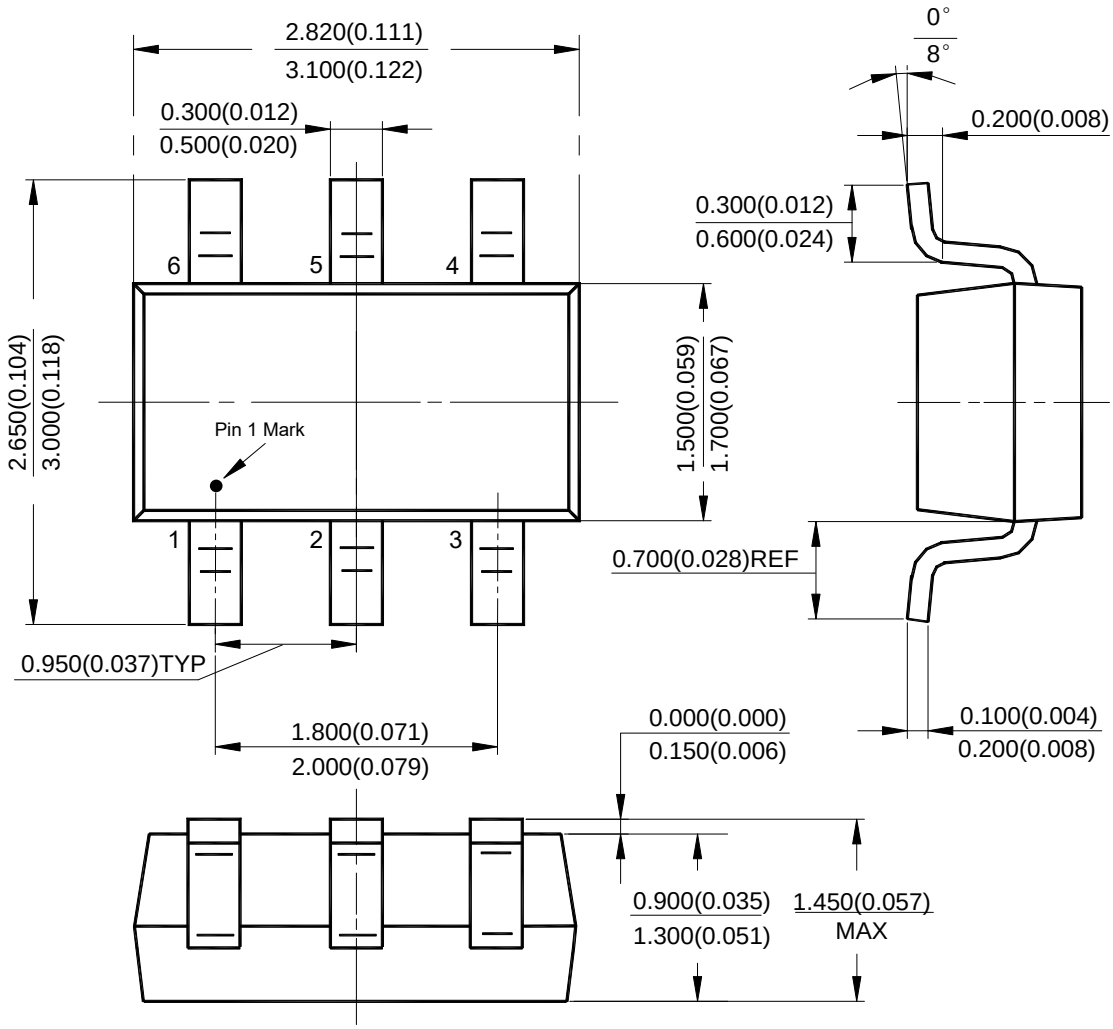


: Logo
XXX: Marking ID (See ordering information)

Package Outline Dimensions (All dimensions in mm(inch).)

Please see http://www.diodes.com/package-outlines.html for the latest version.

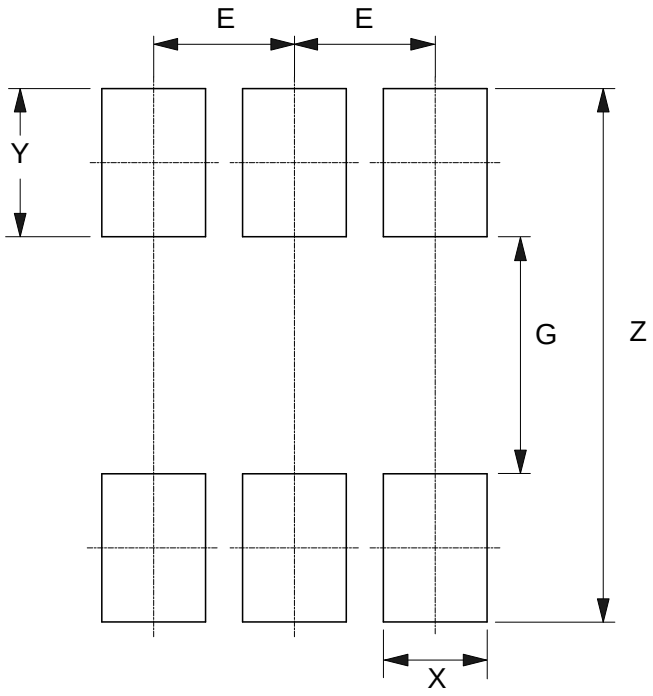
(1) Package Type: SOT26



Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

(1) Package Type: SOT26



Dimensions	Z (mm)/(inch)	G (mm)/(inch)	X (mm)/(inch)	Y (mm)/(inch)	E (mm)/(inch)
Value	3.600/0.142	1.600/0.063	0.700/0.028	1.000/0.039	0.950/0.037

Mechanical Data

- Moisture Sensitivity: Level 1 per JESD22-A113
- Terminals: Finish – Matte Tin Plated Leads, Solderable per JESD22-B102 (e3)
- Weight: 0.016 grams (Approximate)

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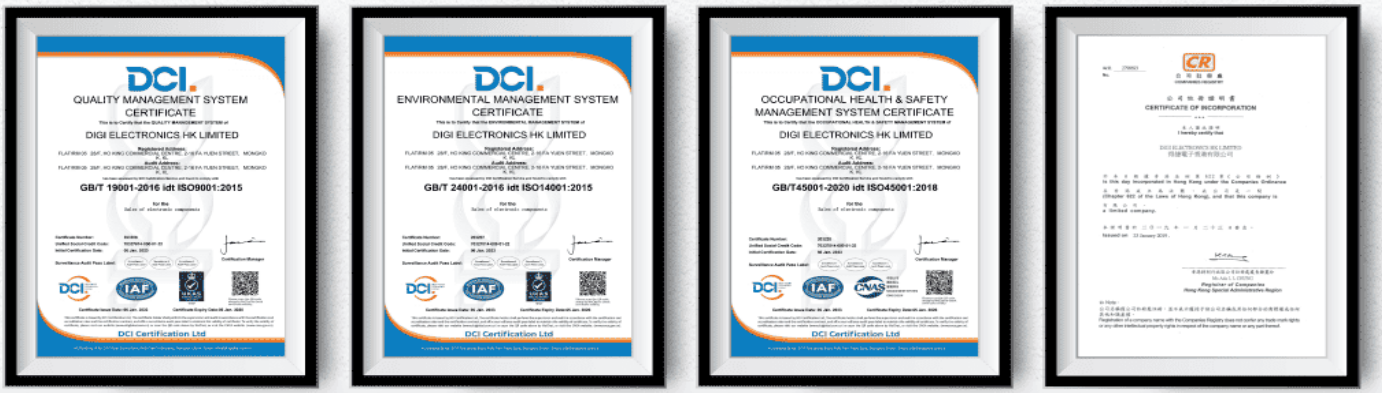

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