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Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



SI-3000KD Series Surface-Mount, Low Current Consumption, Low Dropout Voltage

Features

- Compact surface-mount package (TO263-5)
- Output current: 1.0A
- Low dropout voltage: $V_{DIF} \leq 0.6V$ (at $I_o = 1.0A$)
- Low circuit current consumption: $I_q \leq 350 \mu A$ (600 μA for SI-3010KD, SI-3050KD)
- Low circuit current at output OFF: $I_q (OFF) \leq 1 \mu A$
- Built-in overcurrent, thermal protection circuits
- Compatible with low ESR capacitors (SI-3012KD and SI-3033KD)

Absolute Maximum Ratings

(T_a=25°C)

Parameter	Symbol	Ratings		Unit
		SI-3012KD/3033KD	SI-3010KD/3050KD	
DC Input Voltage	V _{IN}	17	35 ^{*1}	V
Output Control Terminal Voltage	V _c	V _{IN}		V
DC Output Current	I _o	1.0		A
Power Dissipation	P _D ^{*2}	3		W
Junction Temperature	T _j	-30 to +125		°C
Storage Temperature	T _{stg}	-30 to +125		°C
Thermal Resistance (Junction to Ambient Air)	θ _{JA}	33.3		°C/W
Thermal Resistance (Junction to Case)	θ _{JC}	3		°C/W

*1: A built-in input-overvoltage-protection circuit shuts down the output voltage at the Input Overvoltage Shutdown Voltage of the electrical characteristics.

*2: When mounted on glass-epoxy board of 1600mm² (copper laminate area 100%).

Applications

- Secondary stabilized power supply (local power supply)

Electrical Characteristics 1 (Low Input Voltage type compatible with low ESR output capacitor)

(T_a=25°C, V_c=2V, unless otherwise specified)

Parameter	Symbol	Ratings						Unit
		SI-3012KD (Variable type)			SI-3033KD			
		min.	typ.	max.	min.	typ.	max.	
Input Voltage	V _{IN}	2.4 ^{*3}		*4	*3		*4	V
Output Voltage (Reference Voltage for SI-3012KD)	V _O (V _{ADJ})	1.24	1.28	1.32	3.234	3.300	3.366	V
Line Regulation	ΔV _{OLINE}	V _{IN} =3.3V, I _o =10mA			V _{IN} =5V, I _o =10mA			mV
	Conditions	V _{IN} =3.3 to 8V, I _o =10mA (V _O =2.5V)			V _{IN} =5 to 10V, I _o =10mA			
Load Regulation	ΔV _{OLOAD}				15			mV
	Conditions	V _{IN} =3.3V, I _o =0 to 1A (V _O =2.5V)			V _{IN} =5V, I _o =0 to 1A			
Dropout Voltage	V _{DIF}	0.4			0.4			V
	Conditions	I _o =0.5A (V _O =2.5V)			I _o =0.5A			
	Conditions	I _o =1A (V _O =2.5V)			I _o =1A			
Quiescent Circuit Current	I _q	350			350			μA
	Conditions	V _{IN} =3.3V, I _o =0A, V _c =2V, R ₂ =2.4kΩ			V _{IN} =5V, I _o =0A, V _c =2V			
Circuit Current at Output OFF	I _q (OFF)	1			1			μA
	Conditions	V _{IN} =3.3V, V _c =0V			V _{IN} =5V, V _c =0V			
Temperature Coefficient of Output Voltage	ΔV _O /ΔT _a	±0.3			±0.3			mV/°C
	Conditions	T _j =0 to 100°C (V _O =2.5V)			T _j =0 to 100°C			
Ripple Rejection	R _{REJ}	55			55			dB
	Conditions	V _{IN} =3.3V, f=100 to 120Hz, I _o =0.1A (V _O =2.5V)			V _{IN} =5V, f=100 to 120Hz, I _o =0.1A			
Overcurrent Protection Starting Current ^{*1}	I _{S1}	1.1			1.1			A
	Conditions	V _{IN} =3.3V			V _{IN} =5V			
V _c Terminal	Control Voltage (Output ON) ^{*2}	2			2			V
	Control Voltage (Output OFF)			0.8			0.8	
	Control Current (Output ON)			40			40	μA
	Conditions	V _c =2V			V _c =2V			
Control Current (Output OFF)		-5	0		-5	0		μA
Conditions	V _c =0V			V _c =0V				

*1: I_{S1} is specified at the 5% drop point of output voltage V_O under the condition of Output Voltage parameter.

*2: Output is OFF when the output control terminal (V_c terminal) is open. Each input level is equivalent to LS-TTL level. Therefore, the device can be driven directly by LS-TTLs.

*3: Refer to the Dropout Voltage parameter.

*4: V_{IN} (max) and I_o (max) are restricted by the relation P_D = (V_{IN} - V_O) × I_o. Please calculate these values referring to the Copper laminate area vs. Power dissipation data.

■Electrical Characteristics 2 (High Input Voltage Type)

Parameter	Symbol	Ratings						Unit
		SI-3010KD (Variable type)			SI-3050KD			
		min.	typ.	max.	min.	typ.	max.	
Input Voltage	V_{IN}	2.4 ^{*1}		27 ^{*5}	^{*1}			V
Output Voltage (Reference Voltage V_{ADJ} for SI-3010KD)	V_O (V_{ADJ})	0.98	1.00	1.02	4.90	5.00	5.10	V
	Conditions	$V_{IN}=7V, I_O=10mA$			$V_{IN}=7V, I_O=10mA$			
Line Regulation	ΔV_{OLINE}			30			30	mV
	Conditions	$V_{IN}=6$ to 11V, $I_O=10mA$ ($V_O=5V$)			$V_{IN}=6$ to 11V, $I_O=10mA$			
Load Regulation	ΔV_{OLOAD}			75			75	mV
	Conditions	$V_{IN}=7V,$ $I_O=0$ to 1A ($V_O=5V$)			$V_{IN}=7V, I_O=0$ to 1A			
Dropout Voltage	V_{DIF}			0.3			0.3	V
	Conditions	$I_O=0.5A$ ($V_O=5V$)			$I_O=0.5A$			
	Conditions	$I_O=1A$ ($V_O=5V$)			$I_O=1A$			
Quiescent Circuit Current	I_q			600			600	μA
	Conditions	$V_{IN}=7V, I_O=0A, V_C=2V$ $R_2=10k\Omega$			$V_{IN}=7V, I_O=0A,$ $V_C=2V$			
Circuit Current at Output OFF	I_q (OFF)			1			1	μA
	Conditions	$V_{IN}=7V, V_C=0V$			$V_{IN}=7V, V_C=0V$			
Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T_a$		± 0.5			± 0.5		mV/ $^{\circ}C$
	Conditions	$T_j=0$ to 100 $^{\circ}C$ ($V_O=5V$)			$T_j=0$ to 100 $^{\circ}C$			
Ripple Rejection	RREJ		75			75		dB
	Conditions	$V_{IN}=7V,$ $f=100$ to 120Hz, $I_O=0.1A$ ($V_O=5V$)			$V_{IN}=7V,$ $f=100$ to 120Hz, $I_O=0.1A$			
Overcurrent Protection Starting Current ^{*2}	I_{S1}	1.1			1.1			A
	Conditions	$V_{IN}=7V$			$V_{IN}=7V$			
Vc Terminal	Control Voltage (Output ON) ^{*3}	V_C, I_H	2.0		2.0			V
	Control Voltage (Output OFF) ^{*3}	V_C, I_L					0.8	V
	Control Current (Output ON)	I_C, I_H			40		40	μA
	Control Current (Output OFF)	I_C, I_L	-5	0		-5	0	μA
	Conditions	$V_C=2V$			$V_C=2V$			
	Conditions	$V_C=0V$			$V_C=0V$			
Input Overvoltage Shutdown Voltage	V_{OVP}	33			26			V
	Conditions	$I_O=10mA$			$I_O=10mA$			

*1: Refer to the Dropout Voltage parameter.

*2: I_{S1} is specified at the 5% drop point of output voltage V_O under the condition of Output Voltage parameter.

*3: Output is OFF when the output control terminal (V_C terminal) is open. Each input level is equivalent to LS-TTL level. Therefore, the device can be driven directly by LS-TTLs.

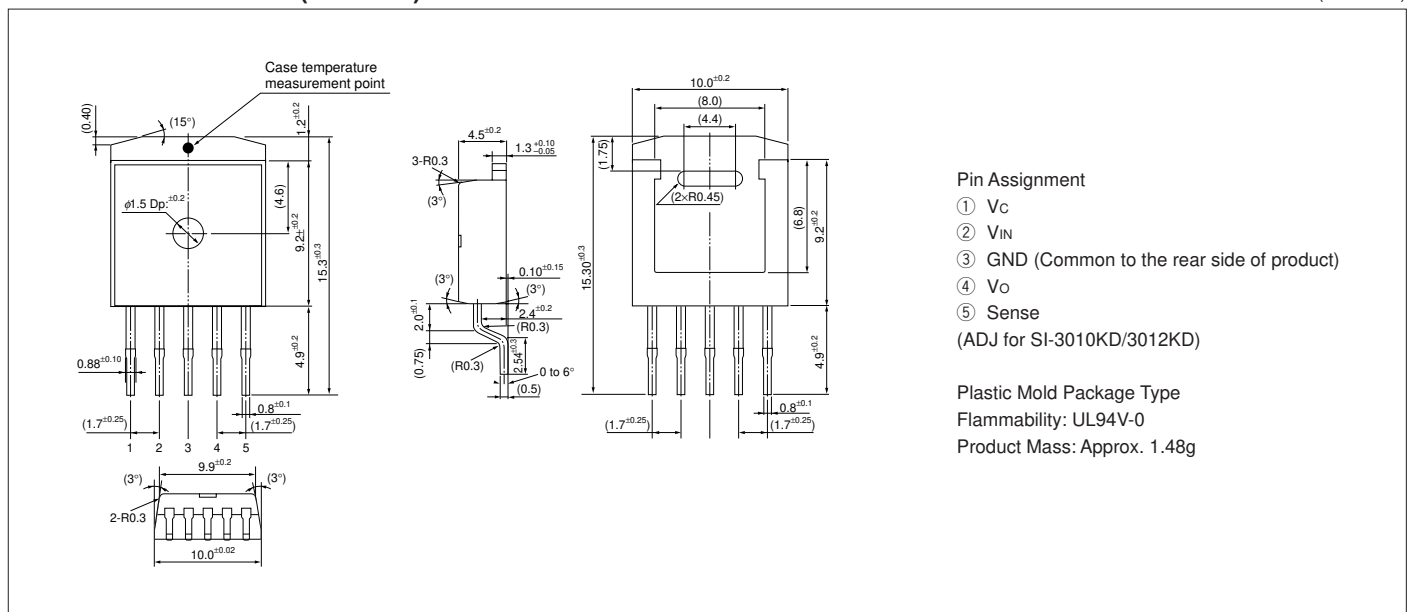
*4: SI-3010KD, SI-3050KD, cannot be used in the following applications because the built-in foldback-type overcurrent protection may cause errors during start-up stage.

(1) Constant current load (2) Positive and negative power supply (3) Series-connected power supply (4) V_O adjustment by raising ground voltage

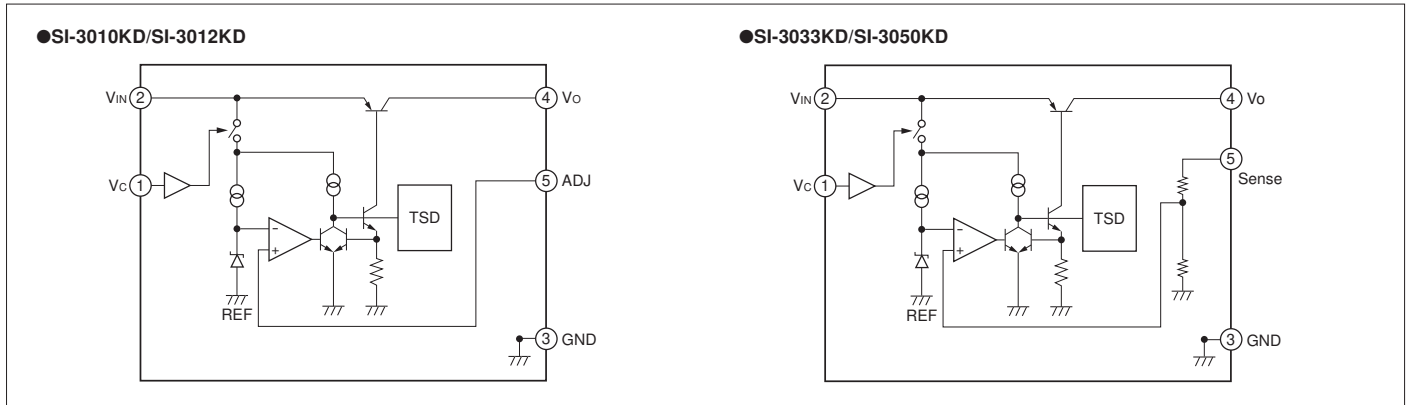
*5: V_{IN} (max) and I_O (max) are restricted by the relation $P_D = (V_{IN} - V_O) \times I_O$. Please calculate these values referring to the Copper laminate area vs. Power dissipation data as shown hereinafter.

■External Dimensions (TO263-5)

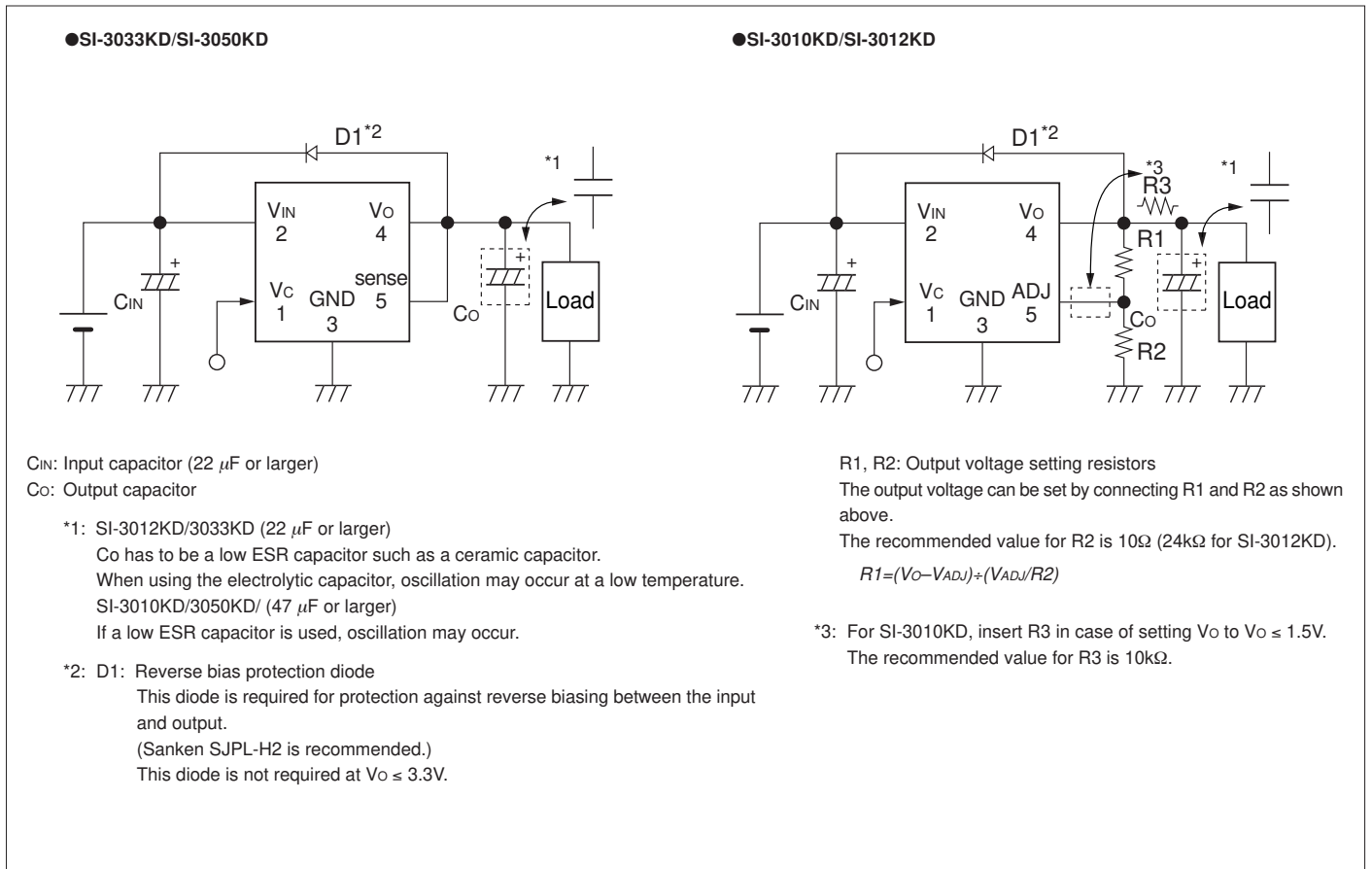
(unit : mm)



■Block Diagram



■Typical Connection Diagram



■Reference Data

