DIO6100
High-Efficiency 1.5MHz, 1A Output Synchronous Step Down Converter

Features

- Low $R_{DS(ON)}$ for internal switches (top/bottom) 230mΩ/170mΩ, 1.0A
- 2.5-5.5V input voltage range
- 40μA typical quiescent current
- High light load efficiency
- High switching frequency 1.5MHz minimizes the external components
- Internal soft start limits the inrush current
- 100% dropout operation
- Reliable no latch off output over voltage protection
- Green package:
  SOT23-5, DFN-6 is pin compatible

Applications

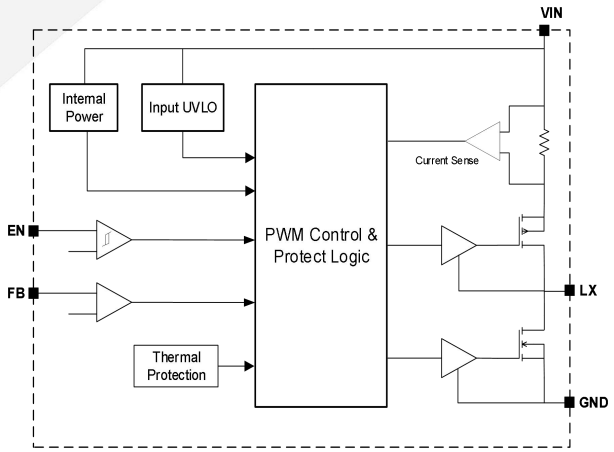
- Portable Navigation Device
- Set Top Box
- USB Dongle
- Media Player
- Smart phone

Descriptions

The DIO6100 is high-efficiency, high frequency synchronous step-down DC-DC regulator ICs capable of delivering up to 1A output currents. The DIO6100 family operate over a wide input voltage range from 2.5V to 5.5V and integrate main switch and synchronous switch with very low $R_{DS(ON)}$ to minimize the conduction loss.

Low output voltage ripple and small external inductor and capacitor sizes are achieved with greater than 1.5MHz switching frequency.

Function Block

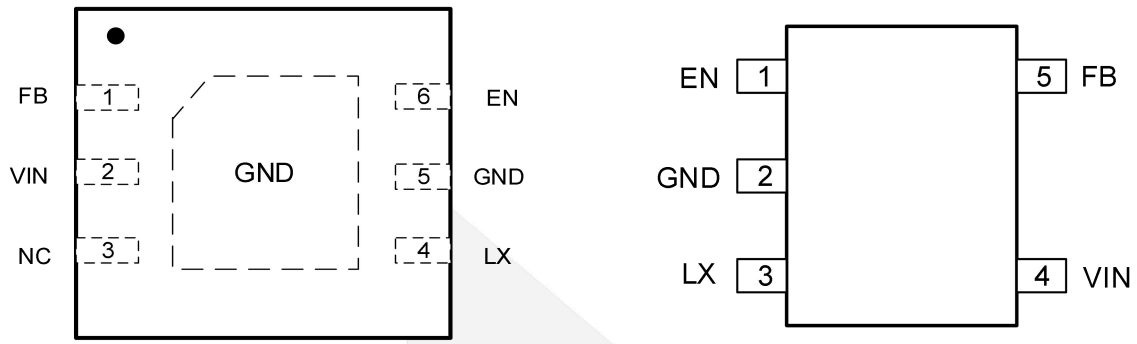


Ordering Information

Order Part Number	Top Marking		T_A	Package	
DIO6100CD6	6011	Green	-40 to 85°C	DFN-6	Tape & Reel, 3000
DIO6100ST5	CYWN	Green	-40 to 85°C	SOT23-5	Tape & Reel, 3000

Marking Definition

Pin Assignments



DFN-6 **SOT23-5**

Figure 1 Pin Assignment (Top View)

Pin Definitions

Pin Name	Description
EN	Enable control. Pull high to turn on. Do not float.
GND	Power Ground.
LX	Inductor pin. Connect this pin to the switching node of inductor.
VIN	Power Input.
FB	Output Feedback Pin. Connect this pin to the center point of the output resistor divider (as shown in Figure 1) to program the output voltage: V_{OUT}=0.6*(1+R1/R2).Add optional C1 (10pF~47pF) to speed up the transient response.
NC	No connect.

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 maximum rating conditions for extended periods may affect device reliability.

Parameter		Rating	Unit
Supply Voltage (V+ – V-)		-0.3 to 6.0	V
Enable/FB Voltage		-0.3 to V_{IN}+0.2	V
Power Dissipation, P_D @ T_A = 25°C, SOT23-5		0.6	W
Package Thermal Resistance	Θ_{JA}	170	°C/W
	Θ_{JC}	130	
Storage Temperature Range		-65 to 150	°C
Junction Temperature Range		150	°C
Lead Temperature Range		260	°C
ESD	HBM, JEDEC: JESD22-A114	4000	V
	MM, JEDEC: JESD22-A115	200	
Dynamic LX Voltage in 50ns Duration		V_{IN}+3 to GND-4	V

Recommend Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended Operating conditions are specified 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	2.5 to 5.5	V
Junction Temperature Range	-40 to 125	°C
Ambient Temperature Range	-40 to 85	°C

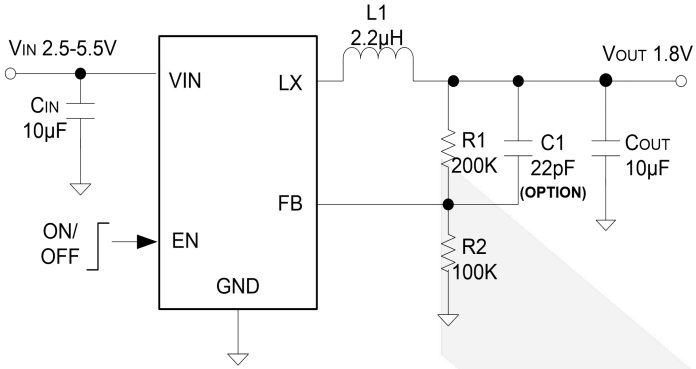
Electrical Characteristics

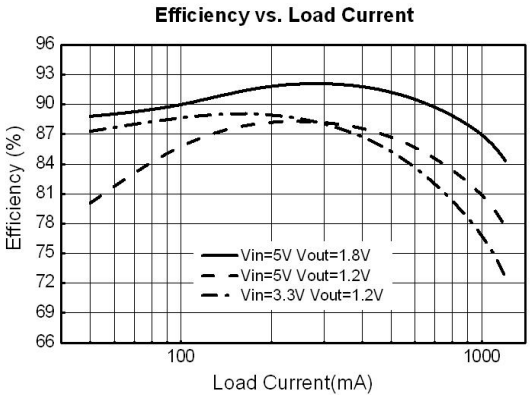
V_{IN} = 5V, V_{OUT} = 1.8V, L = 2.2μH, C_{OUT} = 10μF, T_A = 25°C, unless otherwise specified.

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_{IN}	Input Voltage Range		2.5		5.5	V
I_Q	Quiescent Current	I_{OUT}=0		40		μA
I_{SHDN}	Shutdown Current	EN=0		0.1	1	μA
V_{REF}	Feedback Reference Voltage		0.588	0.6	0.612	V
$R_{DS(ON)}$,P	PFET R_{ON}			230		mΩ
$R_{DS(ON)}$,N	NFET R_{ON}			170		mΩ
I_{LIM}	PFET Current Limit		1.8			A
V_{ENH}	EN Rising Threshold		1.5			V
V_{ENL}	EN Falling Threshold				0.4	V
V_{UVLO}	Input UVLO Threshold				2.4	V
V_{HYS}	UVLO Hysteresis			0.3		V
V_{OVP}	Over voltage protection threshold		0.64	0.66	0.68	V
F_{OSC}	Oscillator Frequency	I_{OUT}=500mA,		1.5		MHz
	Min ON Time			80		ns
	Max Duty Cycle		100			%
T_{SS}	Soft Start Time			1		ms
T_{SD}	Thermal Shutdown Temperature			150		°C
T_{HYS}	Thermal Shutdown Hysteresis			20		°C

Specifications subject to change without notice.

Typical Application



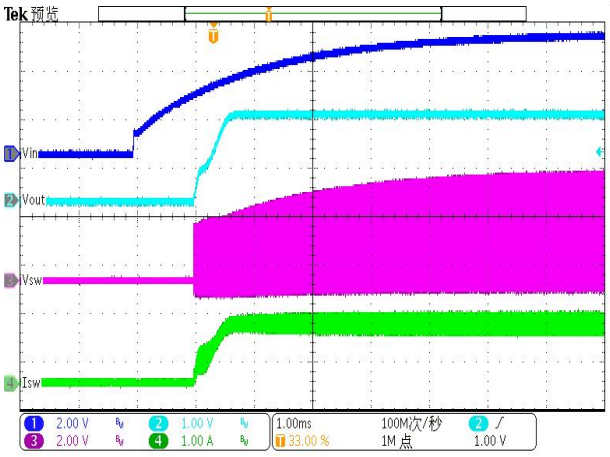


Typical Performance Characteristics

V_{IN} = 5V, V_{OUT} = 1.8V, L = 2.2μH, C_{IN}=10μF, C_{OUT} = 10μF, T_A = 25°C, unless otherwise noted.

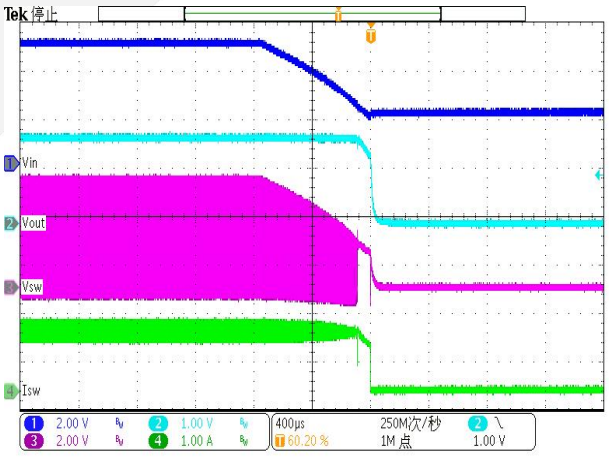
Start up from VIN

(V_{IN}=5V, V_{OUT}=1.8V, Load=1.2A)



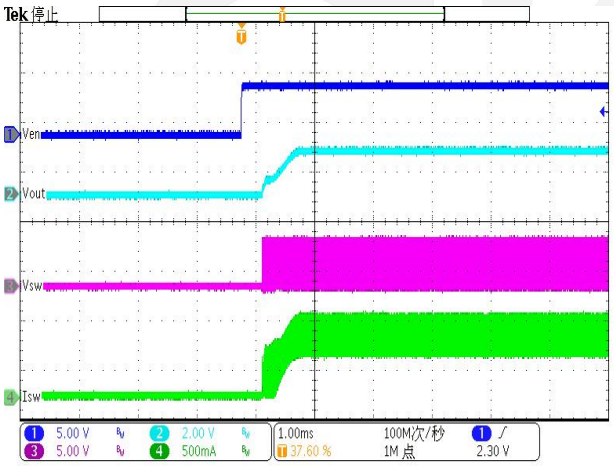
Shut down from VIN

(V_{IN}=5V, V_{OUT}=1.8V, Load=1.2A)



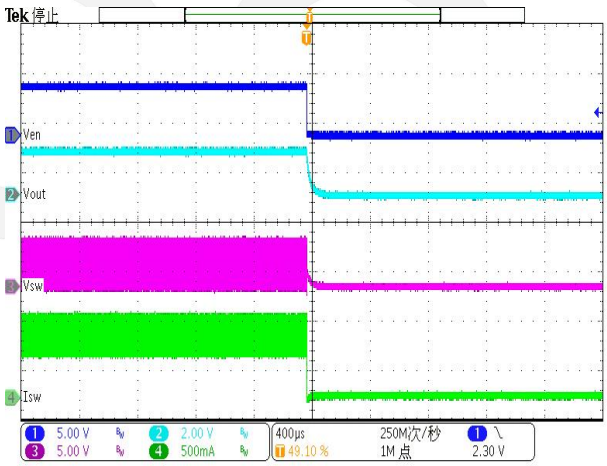
Start up from Enable

(V_{IN}=5V, V_{OUT}=1.8V, Load=0.6A)



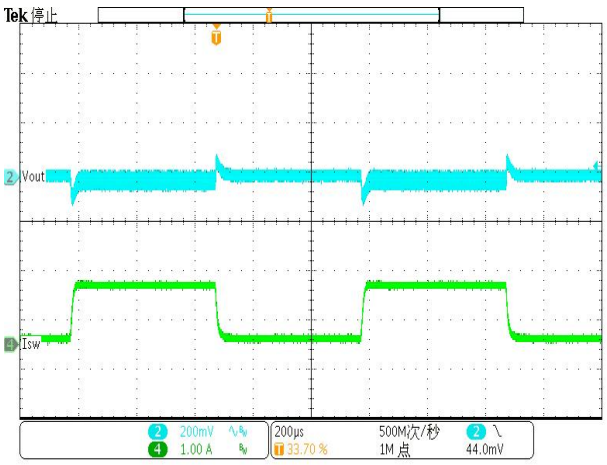
Shut down from Enable

(V_{IN}=5V, V_{OUT}=1.8V, Load=0.6A)



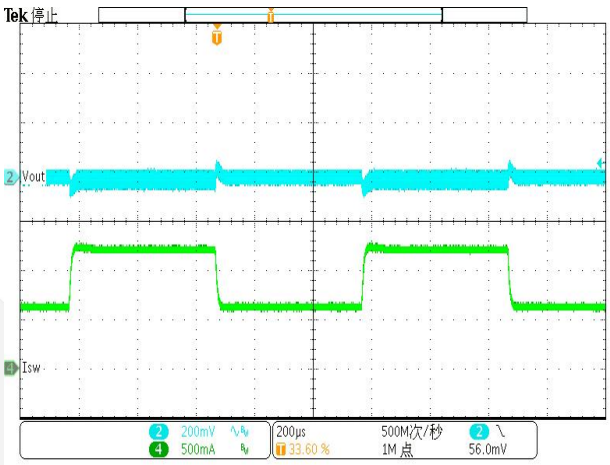
Load Transient

(V_{IN}=5V, V_{OUT}=1.8V, Load=0.1-1.2A)



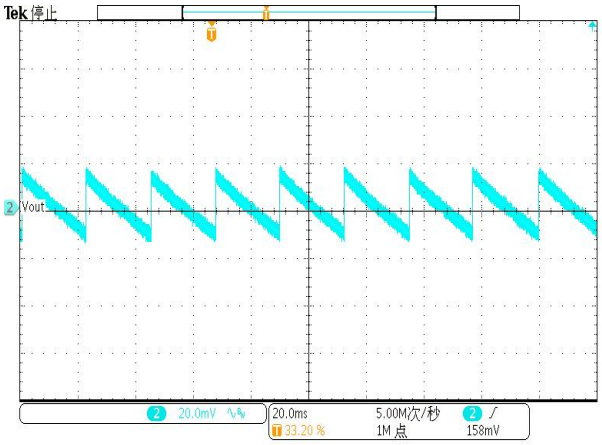
Load Transient

(V_{IN}=5V, V_{OUT}=1.8V, Load=0.6-1.2A)



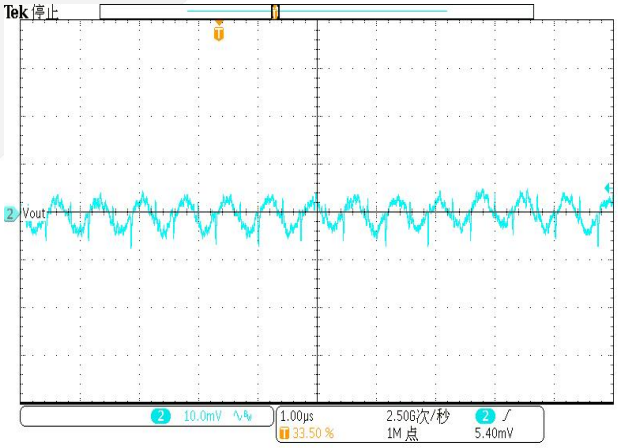
Ripple

(V_{IN}=5V, V_{OUT}=1.8V, Load=0A)



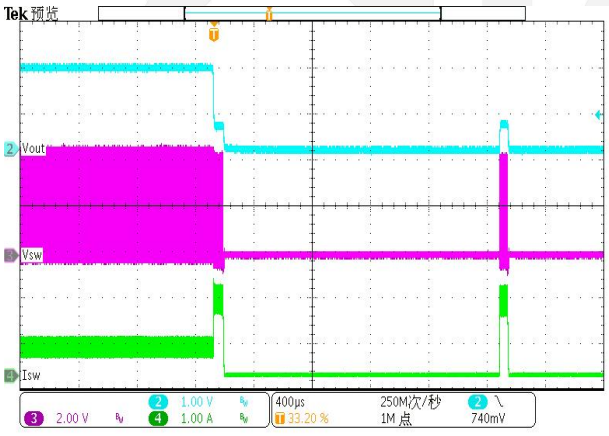
Ripple

(V_{IN}=5V, V_{OUT}=1.8V, Load=1.2A)



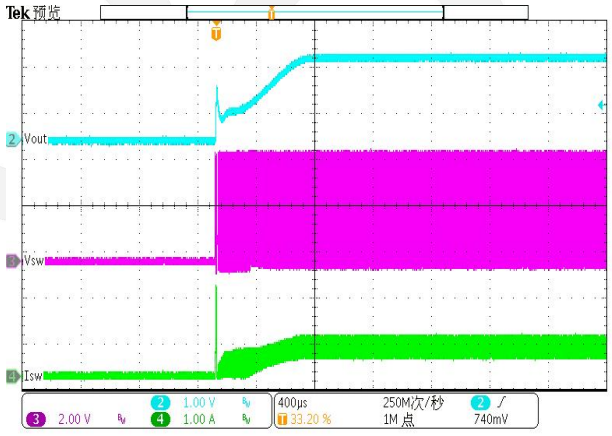
Short Circuit Protection

(V_{IN}=5V, V_{OUT}=1.8V)

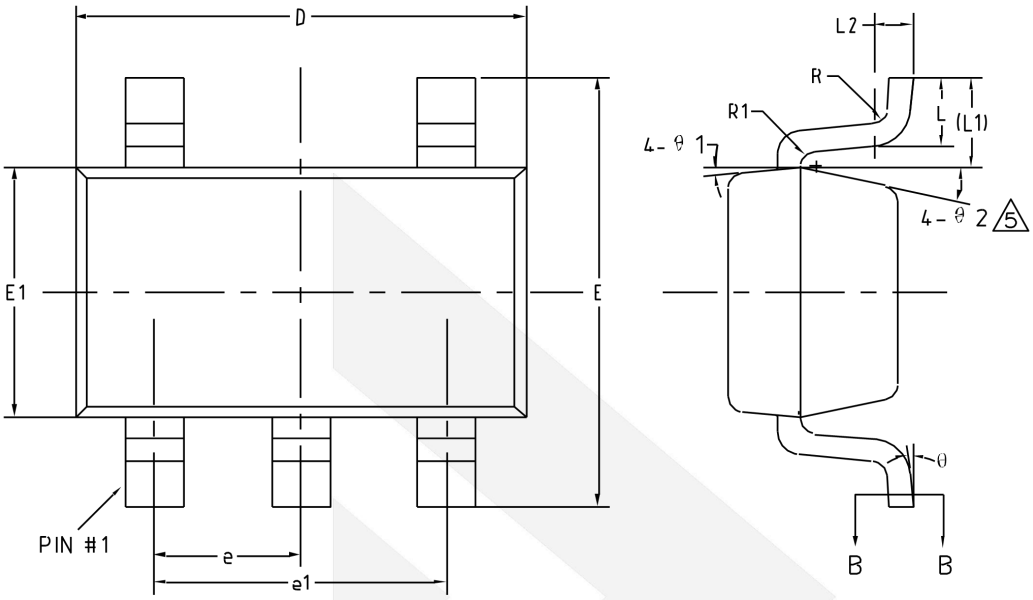


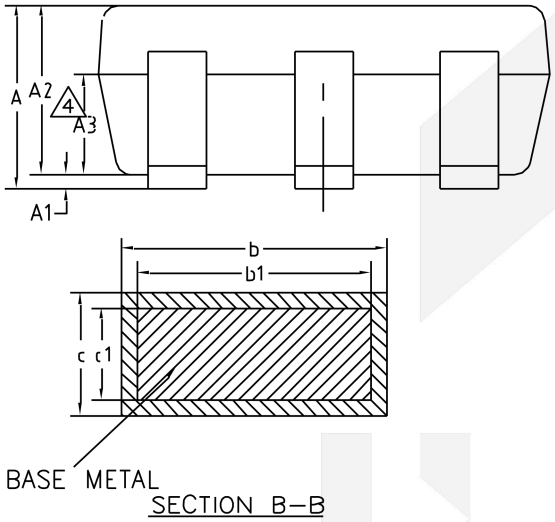
Short Circuit Recovery

(V_{IN}=5V, V_{OUT}=1.8V)



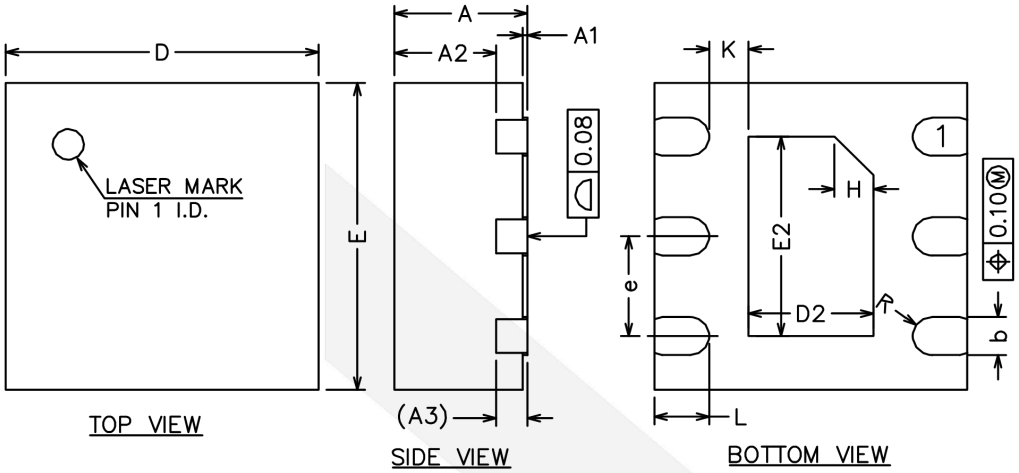
Physical Dimensions: SOT23-5

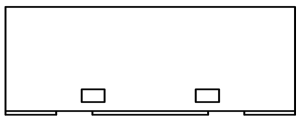




COMMON DIMENSIONS (UNITS OF MEASURE=MILLIMETER)			
Symbol	**MIN**	**NOM**	**MAX**
A	-	-	1.25
A1	0	-	0.15
A2	1.00	1.10	1.20
A3	0.60	0.65	0.70
b	0.36	-	0.50
b1	0.36	0.38	0.45
c	0.14	-	0.20
c1	0.14	0.15	0.16
D	2.826	2.926	3.026
E	2.60	2.80	3.00
E1	1.526	1.626	1.726
e	0.90	0.95	1.00
e1	1.80	1.90	2.00
L	0.35	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°

Physical Dimensions: DFN-6





SIDE VIEW

COMMON DIMENSIONS (UNITS OF MEASURE=MILLIMETER)			
Symbol	**MIN**	**NOM**	**MAX**
A	0.80	0.85	0.90
A1	0.00	0.02	0.05
A2	0.60	0.65	0.70
A3		0.20REF	
b	0.18	0.25	0.30
D	1.90	2.00	2.10
E	1.90	2.00	2.10
D2	0.70	0.80	0.90
E2	1.20	1.30	1.40
e	0.55	0.65	0.75
H		0.25REF	
K	0.20	-	-
L	0.30	0.35	0.40
R	0.11	-	-

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.

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