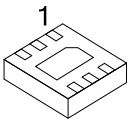
1.5A, LOW NIOSE 1.5MHZ SYNCHRONOUS STEP-DOWN CONVERTER



DFN2020-6

■ DESCRIPTION

The UTC **UD05158** is a high-frequency, synchronous, rectified, step-down, switch-mode converter with internal power MOSFETs.

It offers a very compact solution to achieve a 1.5A continuous output current over from 2.7V to 5.5V input supply range, with excellent load and line regulation.

The output voltage is adjustable from 0.6V to the input voltage. During shutdown, the input is disconnected from the output and the shutdown current is less than 1uA. Other key features include over-temperature and short circuit protection, and under-voltage lockout to prevent deep battery discharge.

The UTC **UD05158** at 1.5A maximum output current while consuming only 200μA of no-load quiescent current. Ultra-low $R_{DS(ON)}$ integrated MOSFET$_s$ and 100% duty cycle operation make the UTC **UD05158** an ideal choice for high-output voltage, high-current applications which require a low dropout threshold.

■ APPLICATIONS

* Cellular and Smart Phones
* Microprocessors and DSP Core Supplies
* Set Top Box
* USB Dongle
* Digital Still and Video Cameras
* Portable Navigation Device

■ FEATURES

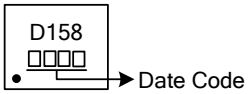
* Output Current : Up to 1.5A
* Output Voltage : 0.6V to V_{IN}
* Input Voltage : 2.7V to 5.5V
* Low-$R_{DS(ON)}$ Internal Power MOSFETs.
* High-Efficiency Synchronous-Mode Operation, up to 95%
* 200uA (typ.) No Load Quiescent Current
* Shutdown Current < 1μA
* 100% Duty Cycle Operation
* Fixed 1.5MHz Switching Frequency.
* Current Mode Operation
* Internal Soft-Start.
* Current Limit Protection
* Over-temperature Protection.
* Input Under Voltage Lockout (UVLO)

■ ORDERING INFORMATION

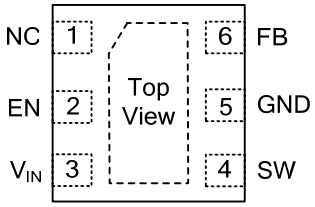
Ordering Number		Package	Packing
Lead Free	Halogen Free		
UD05158L-K06-2020-R	UD05158G-K06-2020-R	DFN2020-6	Tape Reel

UD05158G-K06-2020-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) K06-2020: DFN2020-6 (3) G: Halogen Free and Lead Free

■ MARKING



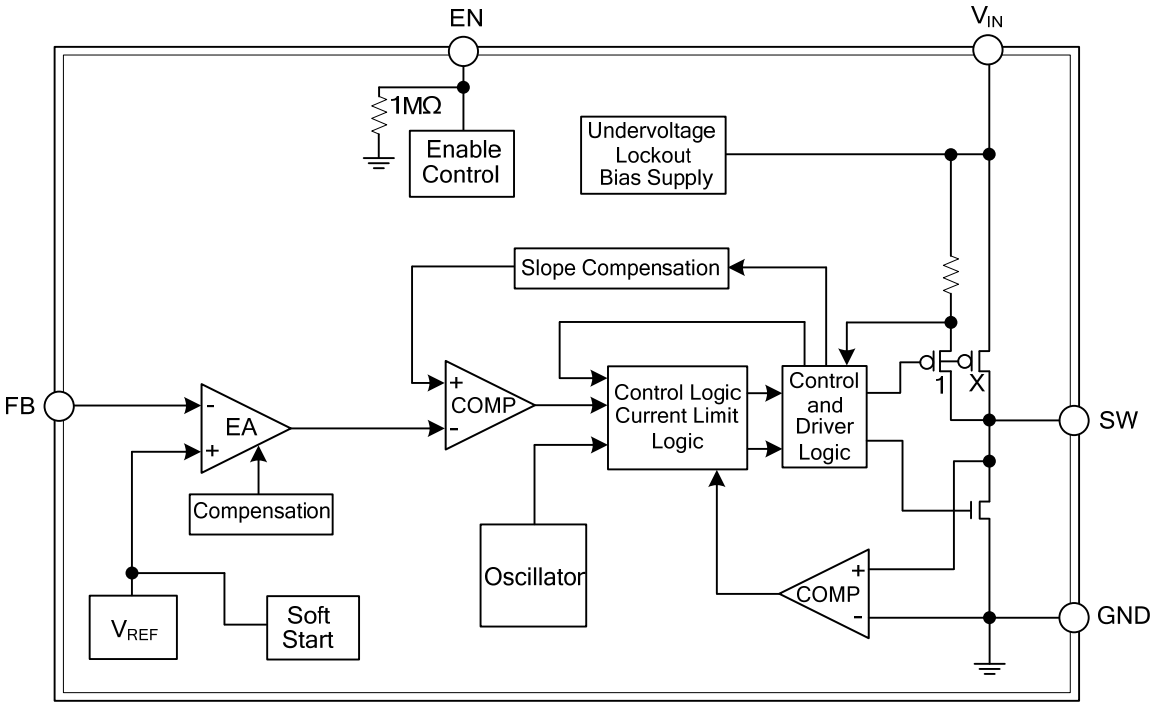
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	NC	No Internal Connection (Floating or Connecting to GND).
2	EN	On/Off Control Input. Pull EN above 1.5V to turn the device on.
3	V_{IN}	Power Supply Input. Drive 2.5V to 5.5V voltage to this pin to power on this chip. Connecting a 10uF ceramic bypass capacitor between V_{IN} and GND to eliminate noise
4	SW	Switch Output. Connect this pin to the switching end of the inductor.
5	GND	Ground. This pin is the voltage reference for the regulated output voltage. For this reason care must be taken in its layout.
6	FB	Feedback Input. Connect FB to the center point of the external resistor divider. The feedback threshold voltage is 0.6V.

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Input Voltage	V_{IN}	6.0	V
SW Pin Voltage	V_{SW}	V_{IN}+0.3	V
EN Pin Voltage	V_{EN}	6.0	V
Power Dissipation	P_D	0.7	W
Junction Temperature	T_J	+150	°C
Storage Temperature	T_{STG}	-65 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Input Voltage	V_{IN}	2.7 ~ 5.5	V
Output Voltage	V_{OUT}	0.6 ~ V_{IN}	V
Operating Junction Temperature	T_J	-40 ~ +125	°C
Operating Ambient Temperature	T_A	-40 ~ +85	°C

■ THERMAL RESISTANCES CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Junction To Ambient	θ_{JA}	120	°C/W
Junction to Case	θ_{JC}	22	°C/W

■ ELECTRICAL CHARACTERISTICS

(V_{IN}=5.0V, T_A=25°C, V_{OUT} = 2.5V, C_{IN} = 4.7uF, C_{OUT} = 10uF, L = 2.2uH, I_{MAX}=1A, unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Voltage Range	V_{IN}		2.7		5.5	V
Shutdown Current	I_{SHDN}	V_{EN} = 0V		0.1	1	μA
HS Switch-On Resistance (Note 1, 2)	HS_{RDS-ON}	I_{SW} = 0.2A , V_{IN} =3.6V		280		mΩ
LS Switch-On Resistance (Note 1, 2)	LS_{RDS-ON}	I_{SW} = 0.2A , V_{IN} =3.6V		250		mΩ
HS Switch Current Limit (Note 1, 2)	$I_{LIMIT(HS)}$		1.4	1.5		A
Oscillation frequency	F_{SW}	V_{IN} =3.6V , I_{OUT}=100mA	1.2	1.5	1.8	MHz
Feedback Voltage	V_{FB}	T_A = 25°C	0.588	0.6	0.612	V
EN Rising Threshold	V_{EN_RISING}		1.5			V
EN Falling Threshold	$V_{EN\_FALLING}$				0.4	V
EN Input Current	I_{EN}	V_{IN} = V_{EN} = 0V.	-1.0		1.0	uA
V_{IN} UVLO Threshold-Rising	V_{UVLO-H}	V_{IN} Rising			2.6	V
V_{IN} UVLO Threshold Hysteresis	$V_{UVLO-HYS}$			0.2		V
Soft-Start Period	T_{SS}			1.5		mS
Thermal Shutdown (Note 1)	T_{SD}			160		°C

Notes: 1. Guaranteed by design.
2. Not tested in production and guaranteed by over-temperature correlation.

■ TYPICAL APPLICATION CIRCUIT