Advanced Monolithic Systems

AMS36063

DC-TO-DC CONVERTER CONTROL CIRCUIT

PRELIMINARY INFORMATION

FEATURES

- **Wide Input Voltage Operating Range from 2.5V to 60V**
- **Low Standby Current**
- **Current Limiting**
- **Output Switch Current of 1.5A**
- **Output Voltage Adjustable from 1.25 to 40V**
- **Frequency of Operation to 100kHz**
- **Thermal Protection**
- **Enable Input Pin**

APPLICATIONS

- **Step-Up Converter**
- **Step-Down Converter**
- **Voltage Inverting Application**
- **Telephone Circuits**
- **Monitors**
- **Battery Chargers**
- **Portable Equipment**

GENERAL DESCRIPTION

The AMS36063 series is a control circuit containing the basic functions required for DC-to-DC converters. The device consists of an internal temperature compensated reference, a comparator, a controlled duty cycle oscillator with an active current limit circuit, a driver, a high current output switch, a thermal protection circuit and a converter enable input. Designed specifically to be incorporated in Step-Up, Step-Down and Voltage -Inverting applications, the AMS36063 requires a minimum number of external components.

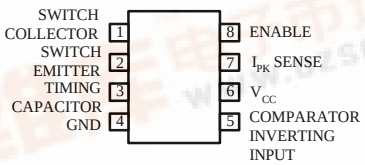
The AMS36063 is available in the 8-lead plastic SOIC and 8-lead plastic DIP packages.

ORDERING INFORMATION

PACKAGE TYPE		OPER. TEMP RANGE
8 LEAD PDIP	8 LEAD SOIC	
AMS36063P	AMS36063S	-40°C to +85°C

PIN CONNECTIONS

8 LEAD SOIC/ 8 LEAD PDIP



Top View

ABSOLUTE MAXIMUM RATINGS (Note 1)

Power Supply Voltage, V_{CC}	60V	Driver Collector Voltage, $V_{C(driver)}$	60V
Comparator Input Voltage Range, V_{IR}	-0.3V to +60V	Switch Current, I_{SW}	1.5A
Switch Collector Voltage, $V_{C(switch)}$	60V	Power Dissipation	(Note 3)
Switch Emitter Voltage, $V_{E(switch)}$	60V	Maximum Junction Temperature	+125°C
Switch Collector to Emitter Voltage, $V_{CE(switch)}$	60V	Storage Temperature	-65°C to +150°C

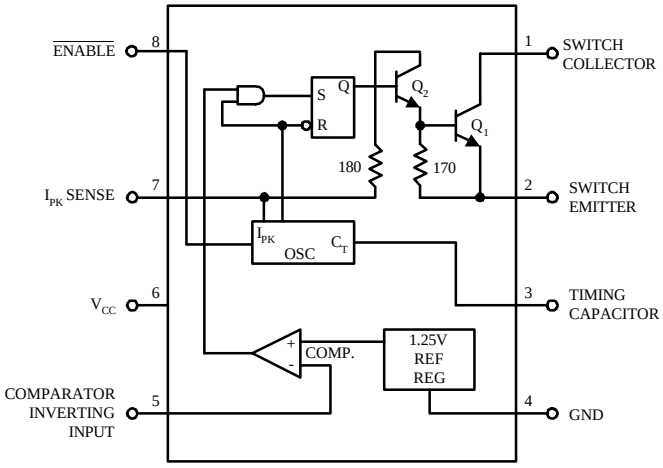
ELECTRICAL CHARACTERISTICS

Electrical Characteristics at V_{CC} = 5.0V, -40°C ≤T_A ≤+85°C, unless otherwise noted.

PARAMETER	CONDITIONS	AMS36063 Min.	AMS36063 Typ.	AMS36063 Max.	Units
Oscillator					
Charging Current	5.0V ≤ V_{CC} ≤ 60V, T_A= 25°C	20	35	50	µA
Discharge Current	5.0V ≤ V_{CC} ≤ 60V, T_A= 25°C	150	200	250	µA
Voltage Swing	T_A= 25°C		0.5		V_{P-P}
Discharge to Charge Current Ratio	$I_{PK(sense)}$ = V_{CC}, T_A= 25°C		6.0		–
Current Limit Sense Voltage	I_{CHG} = I_{DISCHG}, T_A= 25°C	250	300	350	mV
Output Switch (Note 2)					
Saturation Voltage, Darlington Connection	I_{SW} = 1.0A, $V_{C(driver)}$ = $V_{C(switch)}$		1.0	1.3	V
Saturation Voltage	I_{SW} = 1.0A, $I_{C(driver)}$ = 50mA, (Forced β ≈ 20)		0.45	0.7	V
DC Current Gain	I_{SW} = 1.0A, V_{CE} = 5.0V, T_A= 25°C		35	120	
Collector Off-State Current	V_{CE} = 60V, T_A= 25°C		10		nA
Comparator					
Threshold Voltage		1.18	1.25	1.32	V
Threshold Voltage Line Regulation	3.0V ≤ V_{CC} ≤ 60V		0.04	0.2	mV/V
Input Bias Current	V_{IN} = 0V		40	400	nA
Total Device					
ENABLE Low	3.0V ≤ V_{CC} ≤ 60V		2.15	1.90	V
ENABLE Low	3.0V ≤ V_{CC} ≤ 60V	2.50	2.26		V
Supply Current	5.0V ≤ V_{CC} ≤ 60V, $I_{PK(sense)}$ = V_{CC} , C_T = 0.001µF, V pin 5 > V_{th}, Pin 2 = Gnd, Remaining pins open		2.4	4.0	mA

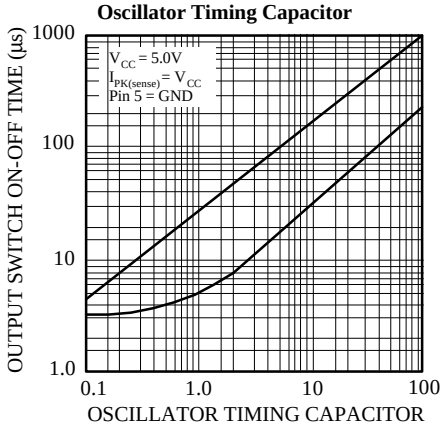
Note 1: Absolute Maximum Ratings are limits beyond which damage to the device may occur. For guaranteed performance limits and associated test conditions, see the Electrical Characteristics tables.
Note 2: To minimize power dissipation, low duty cycle pulse testing is used.
Note 3: Power dissipation at T_A = 25°C is equal to 1.0W for the 8 lead P DIP package and 625mW for the SO-8 package. For operation at temperatures above T_A = 25°C derate the power dissipation at 10mW/°C.

FUNCTIONAL BLOCK DIAGRAM

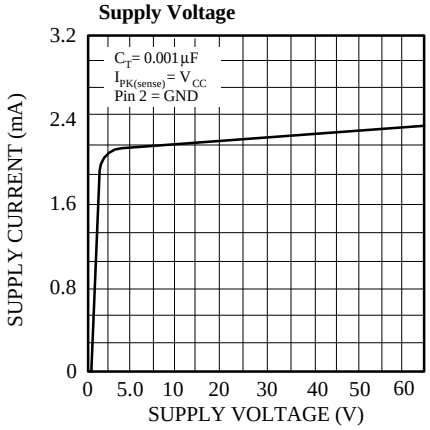


TYPICAL PERFORMANCE CHARACTERISTICS

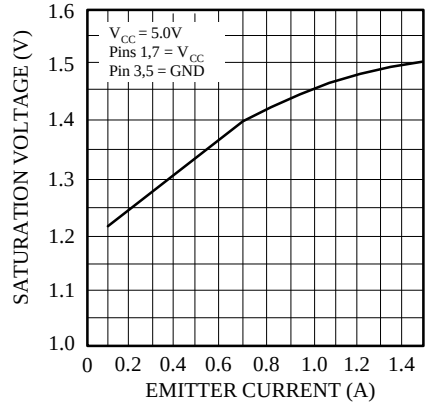
Output Switch On-Off Time vs Oscillator Timing Capacitor



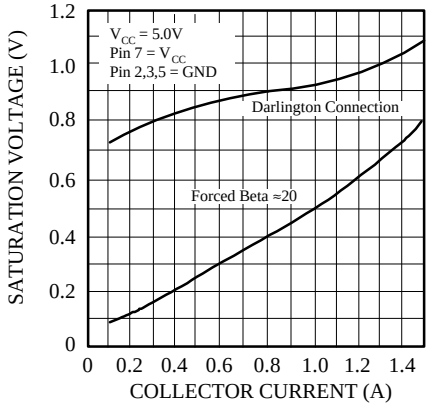
Standby Supply Current vs Supply Voltage



Emitter-Follower Configuration Output Switch Saturation Voltage vs Emitter Current

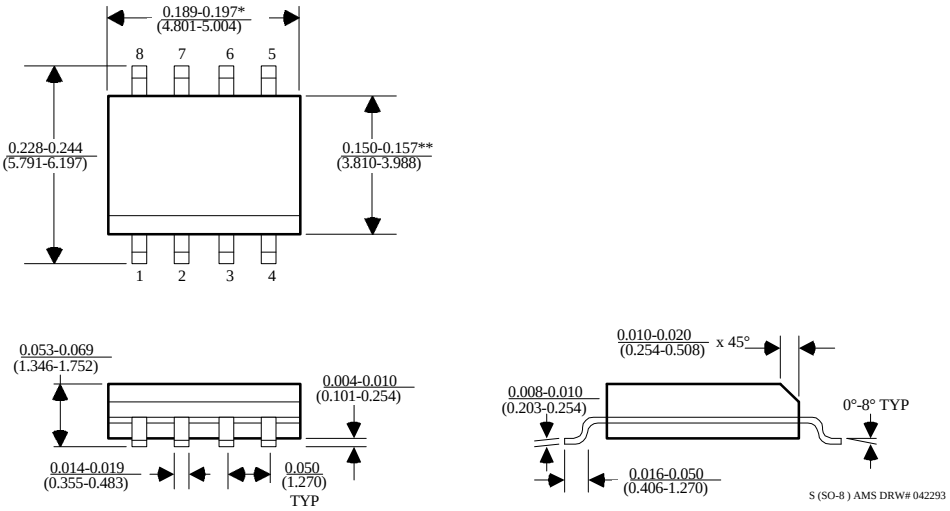


Common-Emitter Configuration Output Switch Saturation Voltage vs Collector Current



PACKAGE DIMENSIONS inches (millimeters) unless otherwise noted.

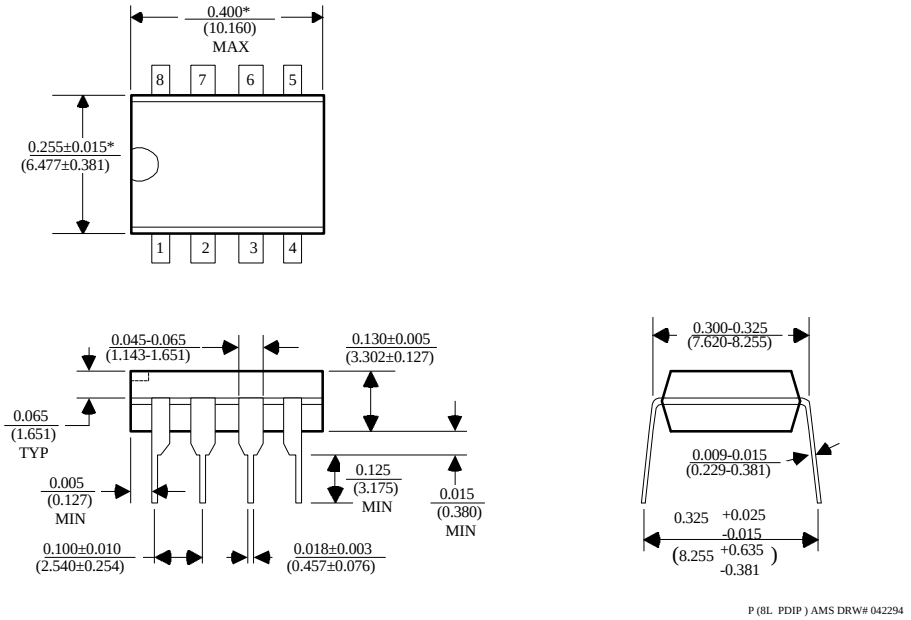
8 LEAD SOIC PLASTIC PACKAGE (S)



*DIMENSION DOES NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.006" (0.152mm) PER SIDE

**DIMENSION DOES NOT INCLUDE INTERLEAD FLASH. INTERLEAD FLASH SHALL NOT EXCEED 0.010" (0.254mm) PER SIDE

8 LEAD PLASTIC DIP PACKAGE (P)



*DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTUSIONS. MOLD FLASH OR PROTUSIONS SHALL NOT EXCEED 0.010" (0.254mm)