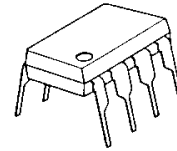


## PWM DC/DC Converter IC with Standby Function

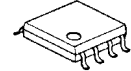
### ■GENERAL DESCRIPTION

The NJM2345 is a step down PWM DC/DC converter IC. An internal 1.5A power transistor, a pulse-by pulse current limit circuit and a 1% precision reference make the NJM2345 suitable for a wide range of voltage converter needs. The NJM2345 features a standby function that can be used for both power saving and safety operation.

### ■PACKAGE OUTLINE



**NJM2345D**

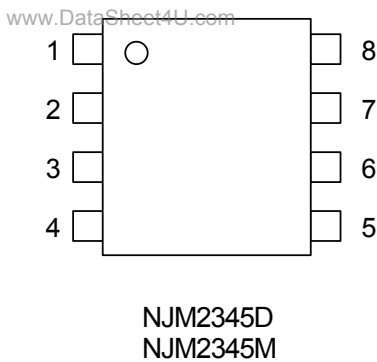


**NJM2345M**

### ■FEATURES

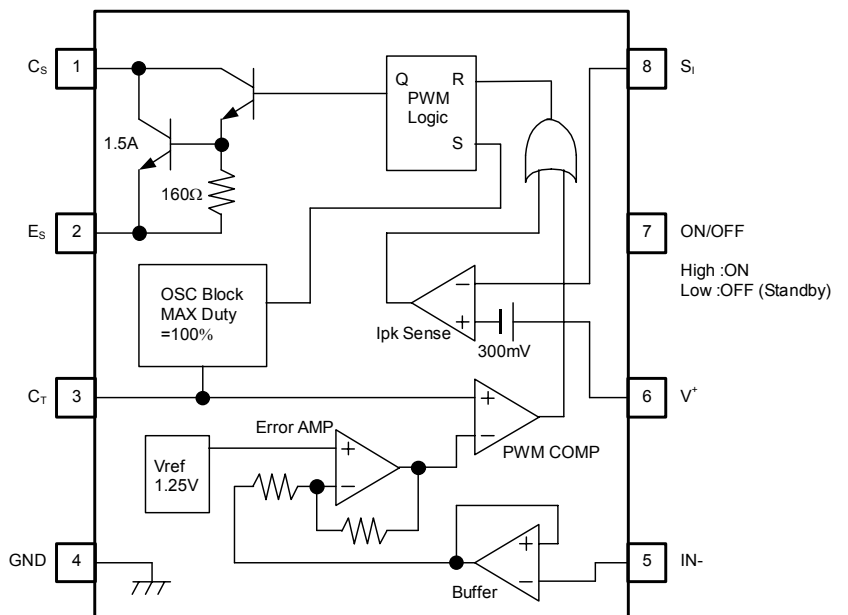
- Operating Voltage 3.0V to 40V
- Wide Oscillator Frequency 1kHz to 150kHz
- Maximum duty ratio 100%
- Precision Reference Voltage  $V_{th}=1.25V \pm 1\%$
- Internal High Power Transistor 1.5A max.
- Internal Over Current Limit Circuit
- PWM switching control
- Standby Function 9 $\mu$ A typ.
- Bipolar Technology
- Package Outline NJM2345D : DIP8  
 NJM2345M : DMP8

### ■PIN CONFIGURATION



- PIN FUNCTION**
1.  $C_S$
  2.  $E_S$
  3.  $C_T$
  4. GND
  5. IN-
  6.  $V^+$
  7. ON/OFF
  8.  $S_I$

### ■BLOCK DIAGRAM



■ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

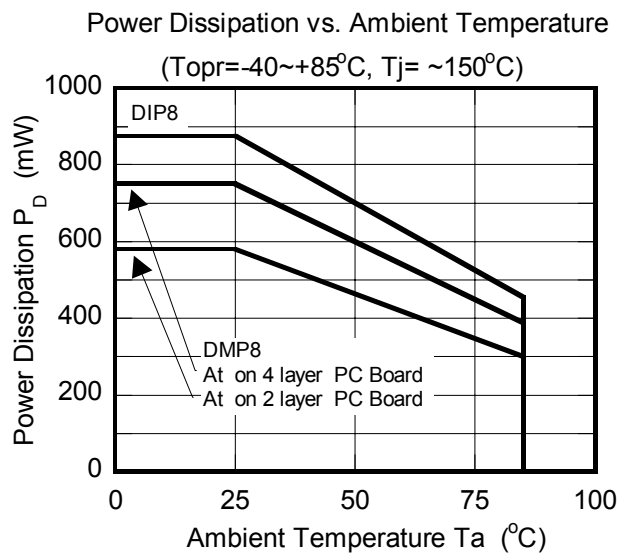
PARAMETER	SYMBOL	MAXIMUM RATINGS	UNIT	
Maximum Supply Voltage	V <sup>+</sup>	40	V	
Comparator Input Voltage	V <sub>IR</sub>	-0.3 ~ 40 (note)	V	
ON/OFF Terminal Voltage	V <sub>ON/OFF</sub>	-0.3 ~ 40 (note)		
Output Switch Voltage	V <sub>SW</sub>	40	V	
Output Switch Current	I <sub>SW</sub>	1.5	A	
Power Dissipation	P <sub>D</sub>	DIP8	875	mW
		DMP8	580 (*1)	
			750 (*2)	
Operating Temperature Range	Topr	-40 ~ +85	°C	
Storage Temperature Range	Tstg	-50 ~ +150	°C	

(note) When supply voltage is less than 40V, the absolute maximum input voltage is equal to the supply voltage.

(\*1) At on PC board : 114.3mm × 76.2mm × 1.6mm(2 layer FR-4) : Conform to EIA/JEDEC

(\*2) At on PC board : 114.3mm × 76.2mm × 1.6mm(4 layer FR-4) : Conform to EIA/JEDEC

■POWER DISSIPATION vs. AMBIENT TEMPERATURE



www.DataSheet4U.com

## ■ ELECTRICAL CHARACTERISTICS

DC Characteristics ( $V^+ = V_{ON/OFF} = 5V$ ,  $T_a = 25^\circ C$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
-----------	--------	-----------------	------	------	------	------

## OSCILLATOR BLOCK

Oscillation Frequency	$f_{OSC}$	$I_N = V_{th} - 5V$ , $C_T = 1nF$	18	27	36	kHz
Charge Current	$I_{chg}$		11	18	27	$\mu A$
Discharge Current	$I_{dis}$		110	180	300	$\mu A$
Voltage Swing	$V_{OSC}$	$C_T = 1nF$	—	0.5	—	$V_{P-P}$

## CURRENT LIMIT

Peak Current Sense Voltage	$V_{ipk}$		250	300	350	mV
----------------------------	-----------	--	-----	-----	-----	----

## OUTPUT SWITCH

Saturation Voltage	$V_{sat}$	$I_{SW} = 0.7A$	—	1.0	1.3	V
Output Transistor Bias Resistance	$R_{bias}$		—	160	—	$\Omega$
Collector Off-State Current	$I_{C(Off)}$	$V_{CE} = 40V$	—	0.01	1	$\mu A$
Maximum duty ratio	$M_{AXDUTY}$	$I_N = 0V$	100	—	—	%

## ERROR AMPLIFIER

Threshold Voltage	$V_{th}$		1.2375	1.250	1.2625	V
Input Bias Current	$I_{IB}$	$I_N = V_{th}$	—	100	200	nA

## ON/OFF BLOCK

ON Threshold Voltage	$V_{ON}$		0.8	—	—	V
OFF Threshold Voltage	$V_{OFF}$		—	—	0.56	V
Input Bias Current (ON/OFF Terminal)	$I_{ON/OFF}$	$V_{ON/OFF} = 5V$	—	240	300	$\mu A$

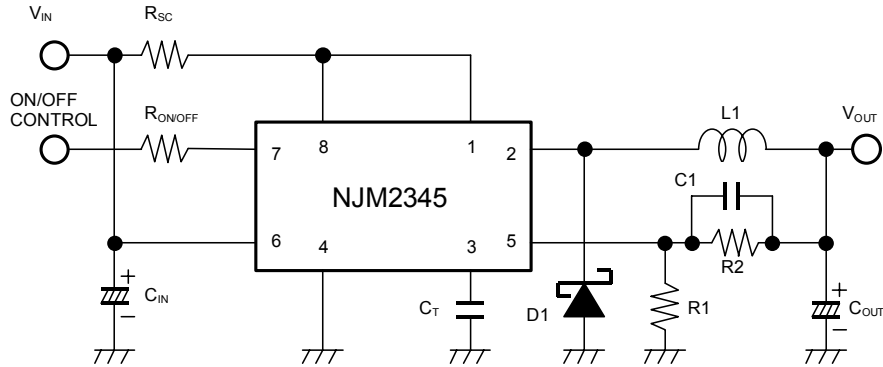
## GENERAL CHARACTERISTICS

Standby Current	$I_{CCSTBY}$	$V_{ON/OFF} = 0V$	—	9	20	$\mu A$
Operating Current	$I_{CC}$	$C_T = 1nF$ , $S_I = V^+$ , $I_N > V_{th}$ , $E_S = GND$	—	2.8	4.0	mA

(note) Output switch tests are performed under pulsed conditions to minimize power dissipation.

## ■ TYPICAL APPLICATIONS

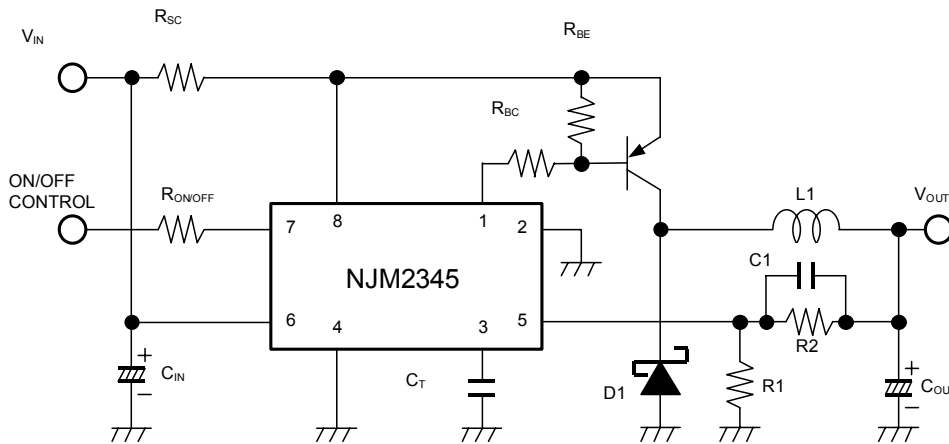
### Step-Down Converter



Though the  $I_{ON/OFF}$  decreases by inserting " $R_{ON/OFF}$ " to between ON/OFF terminal and  $V_{IN}$  terminal, the minimum operating voltage is increased due to the resistor " $R_{ON/OFF}$ ".

D1 use to schottky diode.

### Step-Down Converter (High Current)

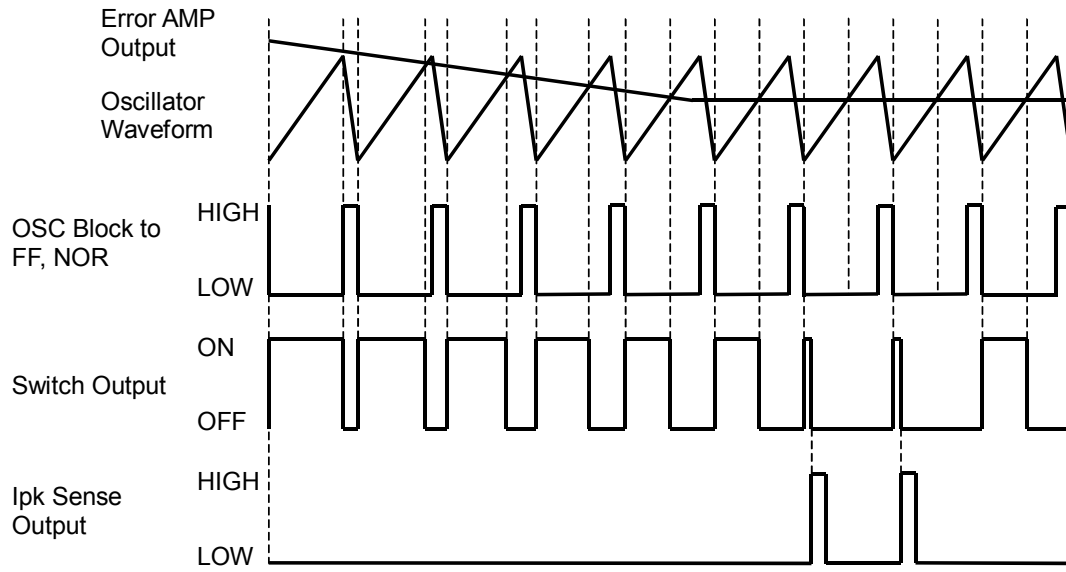


www.DataSheet4U.com

Though the  $I_{ON/OFF}$  decreases by inserting " $R_{ON/OFF}$ " to between ON/OFF terminal and  $V_{IN}$  terminal, the minimum operating voltage is increased due to the resistor " $R_{ON/OFF}$ ".

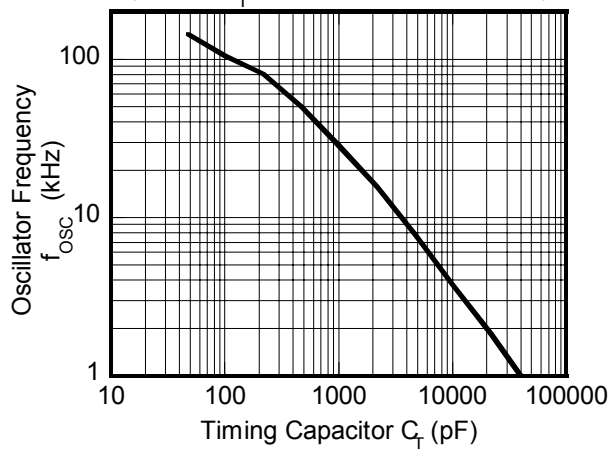
D1 use to schottky diode.

■TIMING CHART

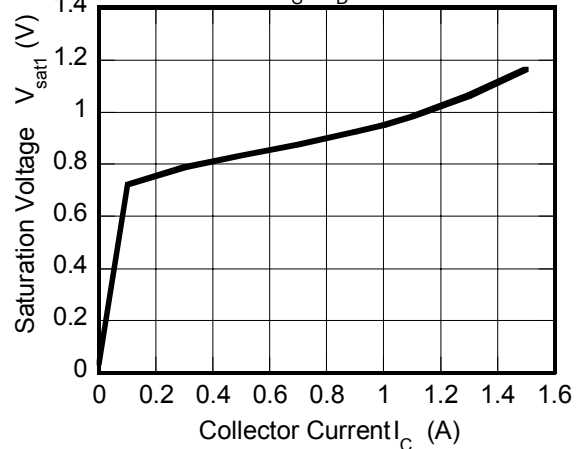


## ■ TYPICAL CHARACTERISTICS

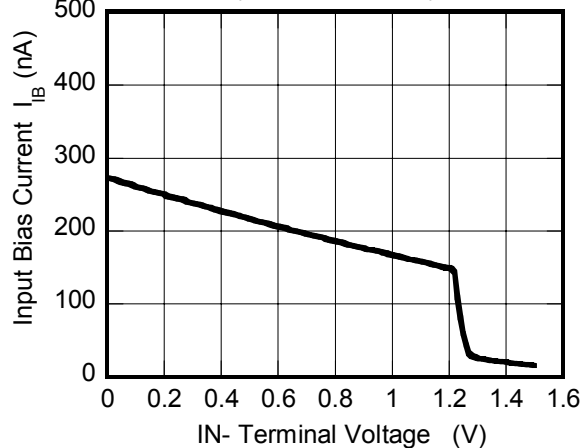
Oscillator Frequency vs. Timing Capacitor  
 ( $V^+ = 5V$ ,  $S_1 = V^+$ , Pin 5 = GND,  $T_a = 25^\circ C$ )



Saturation Voltage vs. Collector Current  
 ( $V^+ = 5V$ ,  $C_S = C_D$ ,  $T_a = 25^\circ C$ )

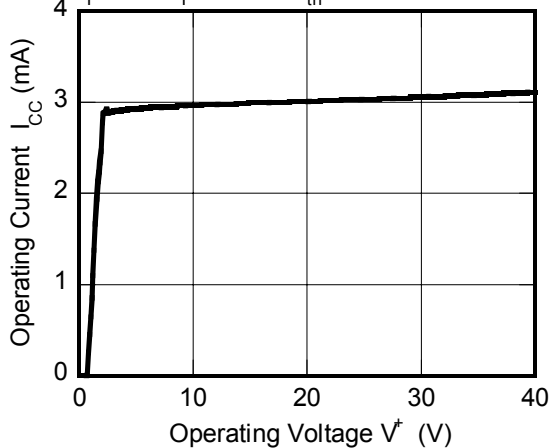


Input Bias Current vs. IN- Terminal Voltage  
 ( $V^+ = 5V$ ,  $T_a = 25^\circ C$ )

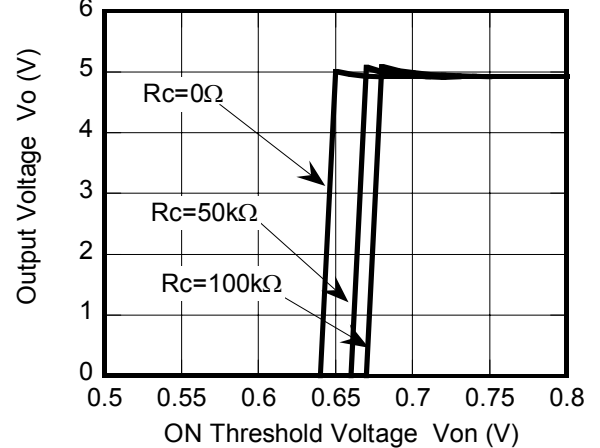


www.DataSheet4U.com

Operating Current vs. Operating Voltage  
 ( $C_T = 1nF$ ,  $S_1 = V^+$ ,  $IN \rightarrow V_{th}$ ,  $Es = GND$ ,  $T_a = 25^\circ C$ )

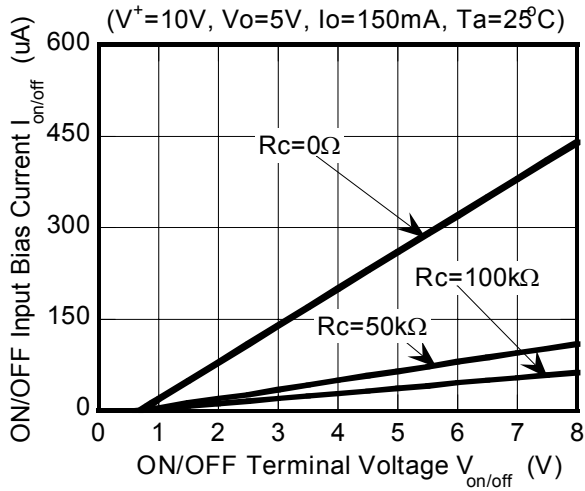


Output Voltage vs. ON Threshold Voltage  
 ( $V^+ = 10V$ ,  $V_o = 5V$ ,  $I_o = 150mA$ ,  $T_a = 25^\circ C$ )

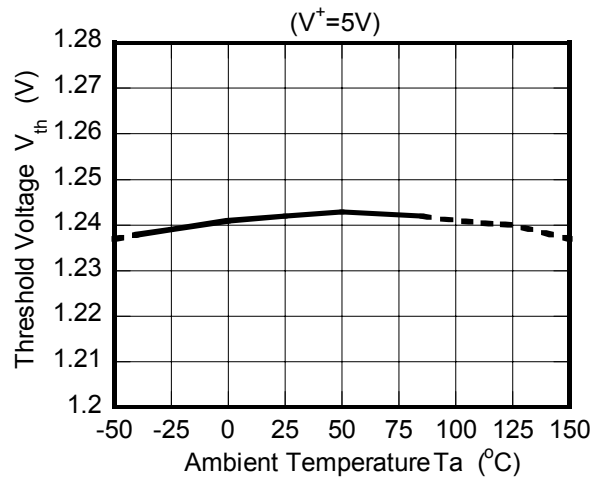


■ TYPICAL CHARACTERISTICS

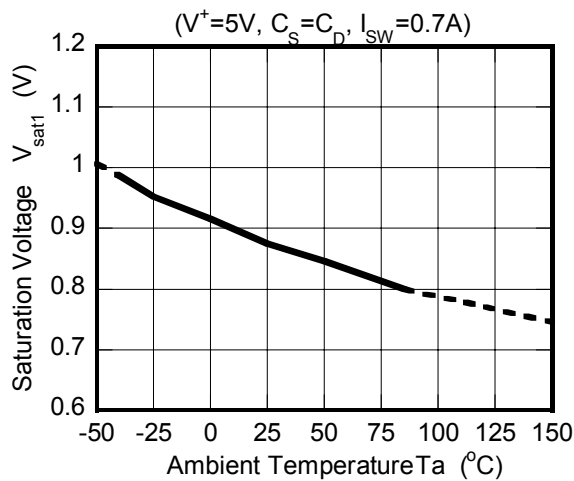
ON/OFF Input Bias Current vs. ON/OFF Terminal Voltage



Threshold Voltage vs. Temperature

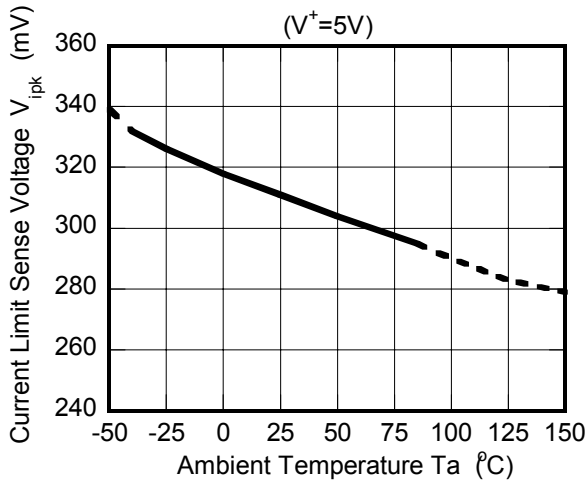


Saturation Voltage vs. Temperature

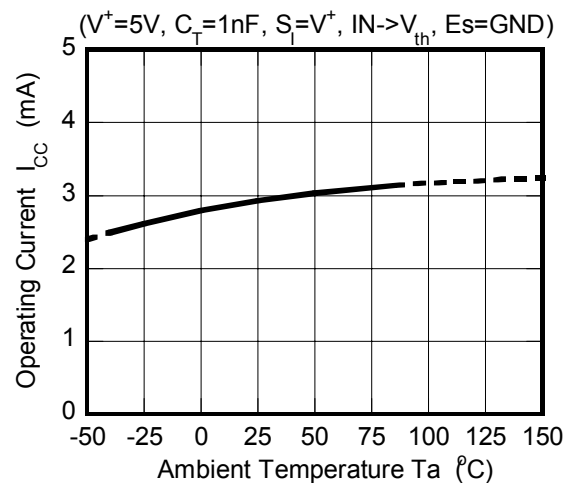


www.DataSheet4U.com

Current Limit Sense Voltage vs. Temperature



Operating Current vs. Temperature



## MEMO

www.DataSheet4U.com

[CAUTION]  
The specifications on this databook are only given for information, without any guarantee as regards either mistakes or omissions. The application circuits in this databook are described only to show representative usages of the product and not intended for the guarantee or permission of any right including the industrial rights.