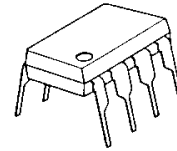


PWM DC/DC Converter IC with Standby Function

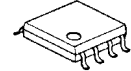
■GENERAL DESCRIPTION

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

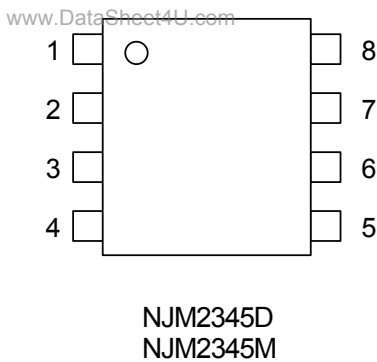


NJM2345M

■FEATURES

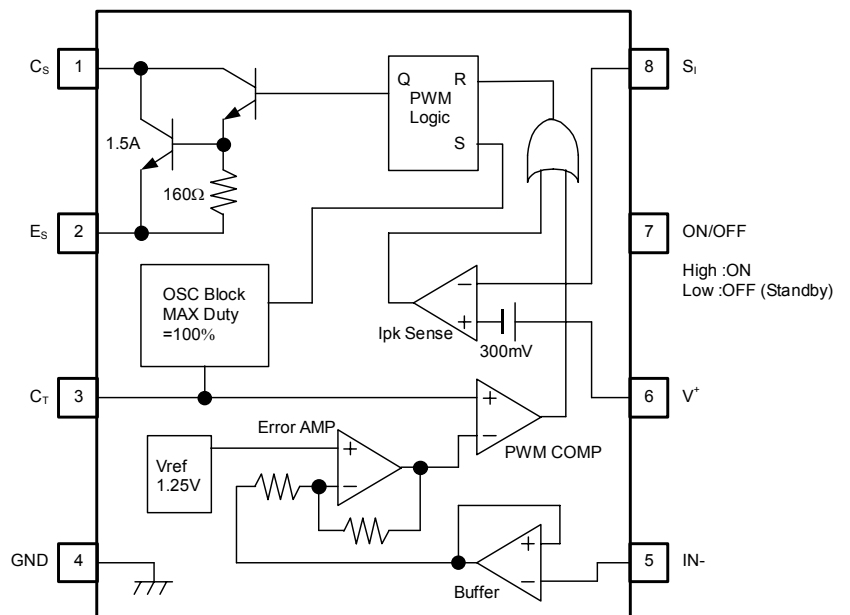
- Operating Voltage 3.0V to 40V
- Wide Oscillator Frequency 1kHz to 150kHz
- Maximum duty ratio 100%
- Precision Reference Voltage $V_{th}=1.25V \pm 1\%$
- Internal High Power Transistor 1.5A max.
- Internal Over Current Limit Circuit
- PWM switching control
- Standby Function 9 μ A typ.
- Bipolar Technology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

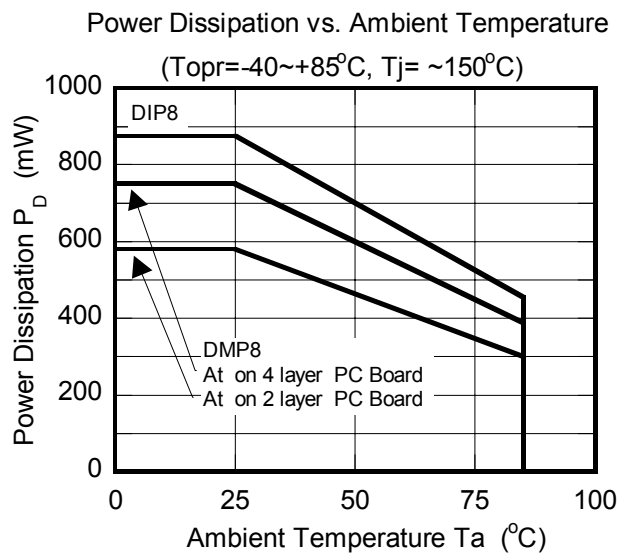
PARAMETER	SYMBOL	MAXIMUM RATINGS	UNIT	
Maximum Supply Voltage	V ⁺	40	V	
Comparator Input Voltage	V _{IR}	-0.3 ~ 40 (note)	V	
ON/OFF Terminal Voltage	V _{ON/OFF}	-0.3 ~ 40 (note)		
Output Switch Voltage	V _{SW}	40	V	
Output Switch Current	I _{SW}	1.5	A	
Power Dissipation	P _D	DIP8	875	mW
		DMP8	580 (*1)	
			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



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■ ELECTRICAL CHARACTERISTICS

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
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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	μA
Discharge Current	I_{dis}		110	180	300	μA
Voltage Swing	V_{OSC}	$C_T = 1nF$	—	0.5	—	V_{P-P}

CURRENT LIMIT

Peak Current Sense Voltage	V_{ipk}		250	300	350	mV
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OUTPUT SWITCH

Saturation Voltage	V_{sat}	$I_{SW} = 0.7A$	—	1.0	1.3	V
Output Transistor Bias Resistance	R_{bias}		—	160	—	Ω
Collector Off-State Current	$I_{C(Off)}$	$V_{CE} = 40V$	—	0.01	1	μA
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	μA

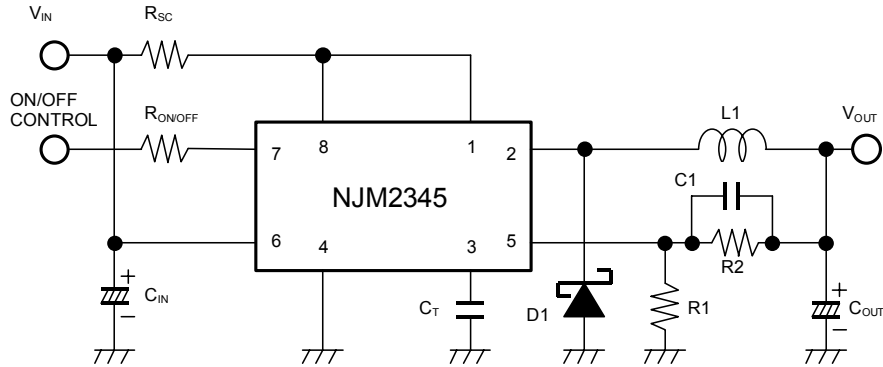
GENERAL CHARACTERISTICS

Standby Current	I_{CCSTBY}	$V_{ON/OFF} = 0V$	—	9	20	μA
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

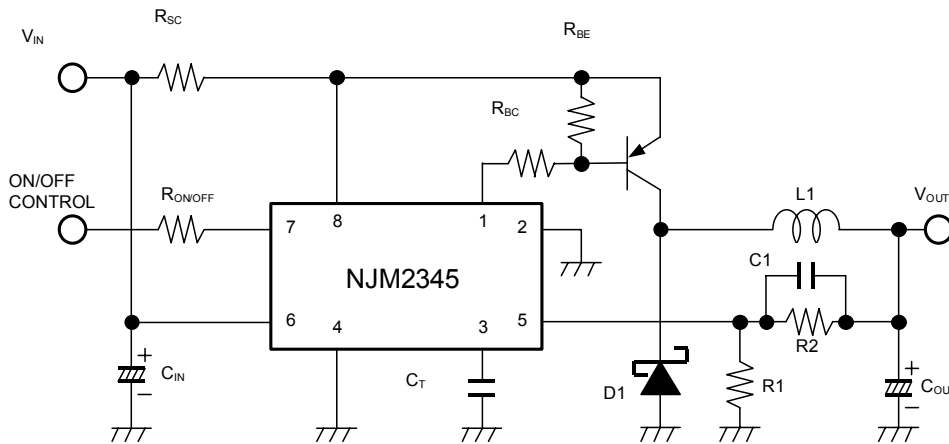
Step-Down Converter



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)

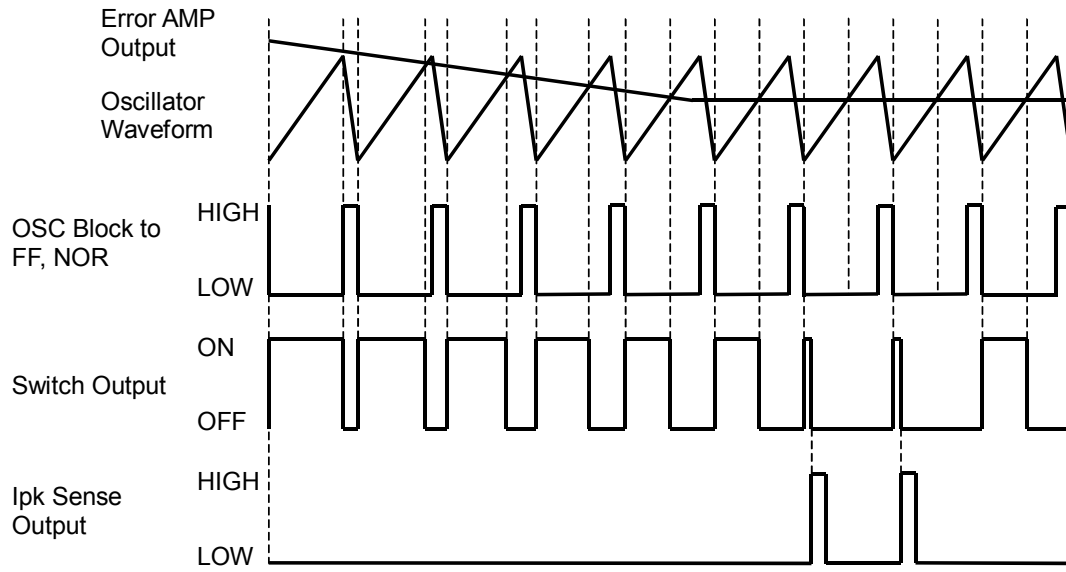


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Though the $I_{ON/OFF}$ decreases by inserting " $R_{ON/OFF}$ " to between ON/OFF terminal and V_{IN} terminal, the minimum operating voltage is increased due to the resistor " $R_{ON/OFF}$ ".

D1 use to schottky diode.

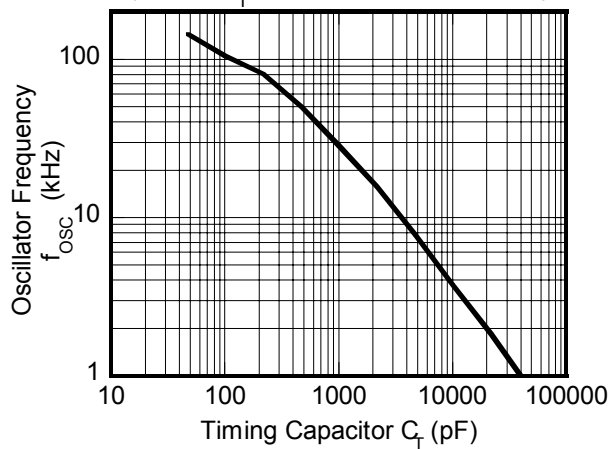
■TIMING CHART



■ TYPICAL CHARACTERISTICS

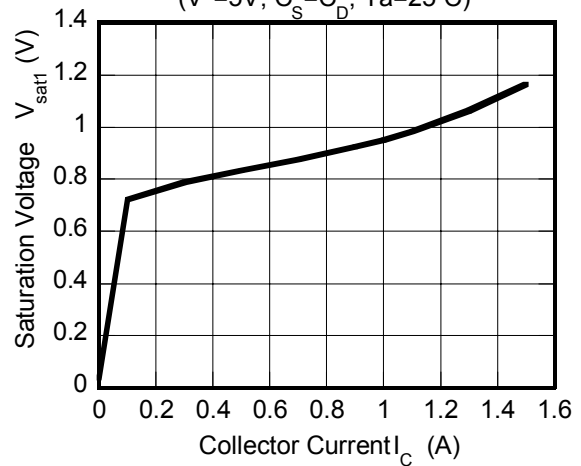
Oscillator Frequency vs. Timing Capacitor

($V^+ = 5V$, $S_1 = V^+$, Pin 5 = GND, $T_a = 25^\circ C$)



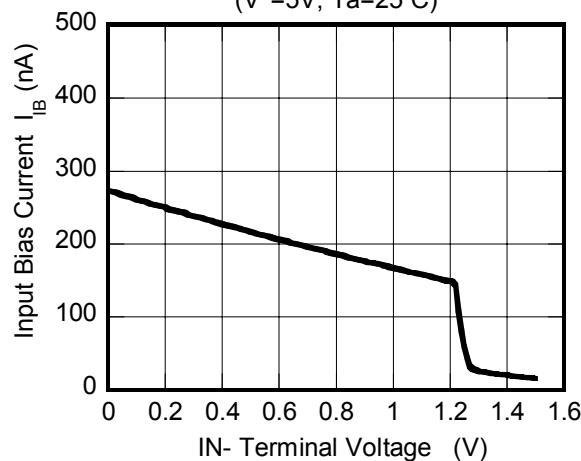
Saturation Voltage vs. Collector Current

($V^+ = 5V$, $C_S = C_D$, $T_a = 25^\circ C$)



Input Bias Current vs. IN- Terminal Voltage

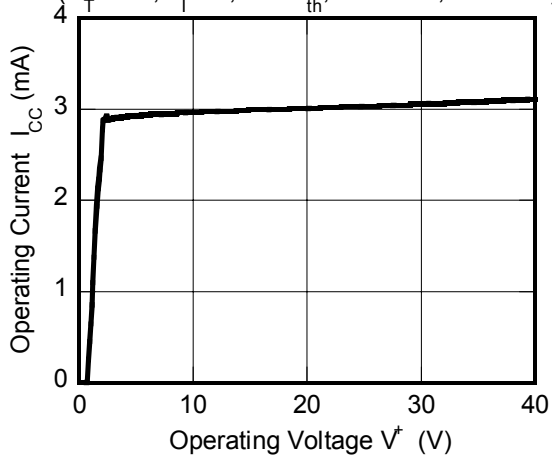
($V^+ = 5V$, $T_a = 25^\circ C$)



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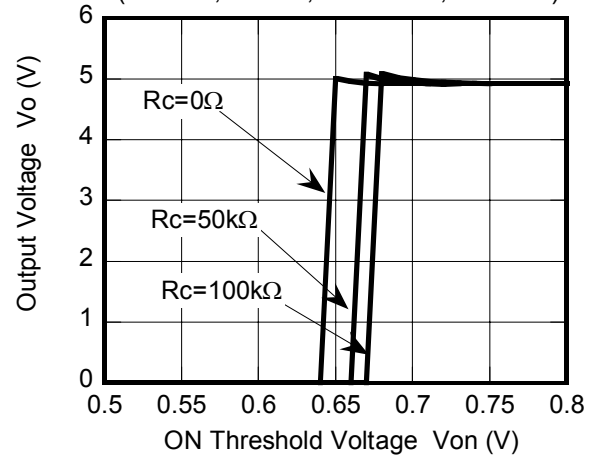
Operating Current vs. Operating Voltage

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



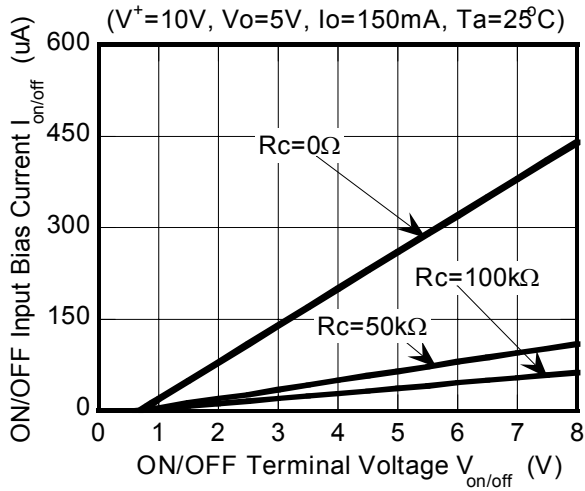
Output Voltage vs. ON Threshold Voltage

($V^+ = 10V$, $V_o = 5V$, $I_o = 150mA$, $T_a = 25^\circ C$)

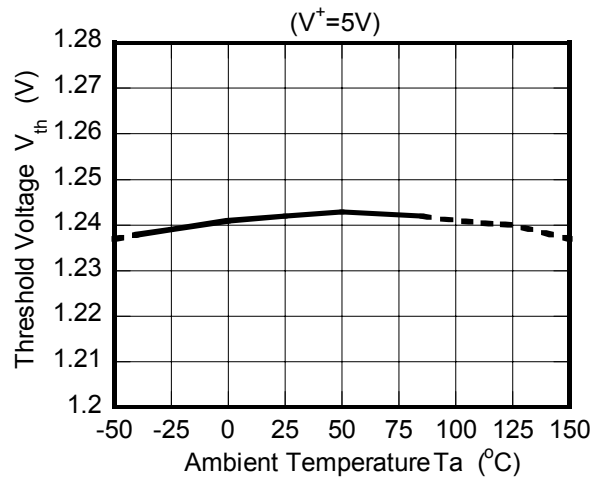


■ TYPICAL CHARACTERISTICS

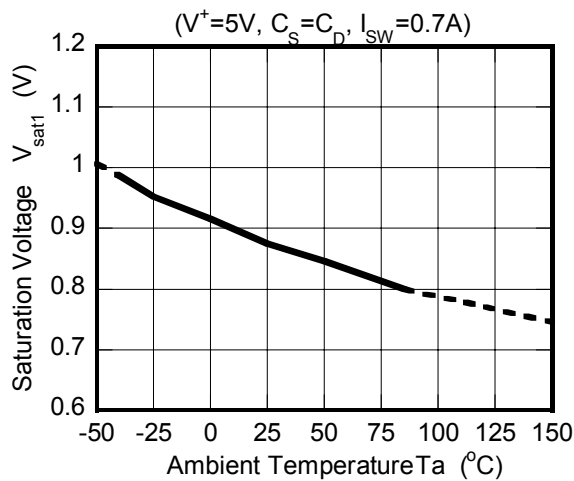
ON/OFF Input Bias Current vs. ON/OFF Terminal Voltage



Threshold Voltage vs. Temperature

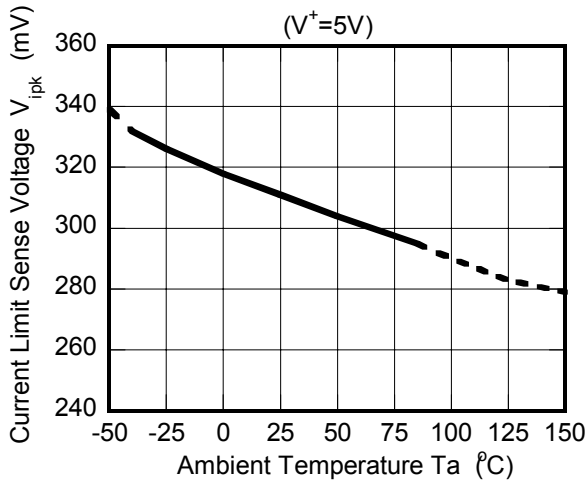


Saturation Voltage vs. Temperature

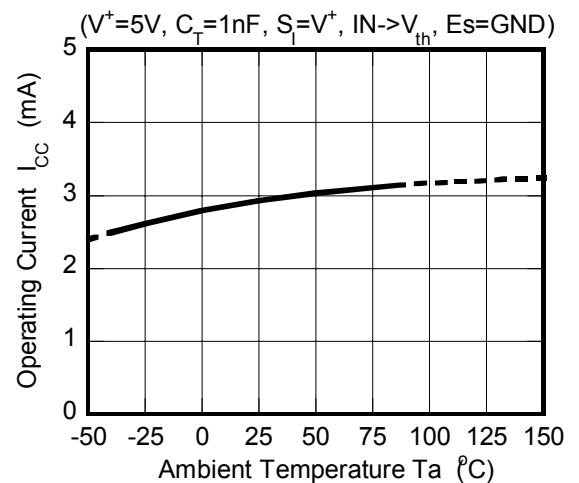


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Current Limit Sense Voltage vs. Temperature



Operating Current vs. Temperature



MEMO

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