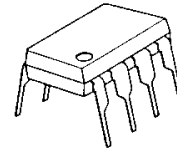


PWM DC/DC Converter IC with Standby Function

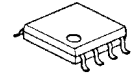
■GENERAL DESCRIPTION

The NJM2344 is a general purpose PWM DC/DC converter IC configurable for step-up, step-down and inverting applications. An internal 1.5A power transistor, a pulse-by pulse current limit and 1% precision reference make the NJM2344 suitable for a wide range of voltage converter needs. The NJM2344 features a standby function that can be used for both power saving and safety operation.

■PACKAGE OUTLINE



NJM2344D

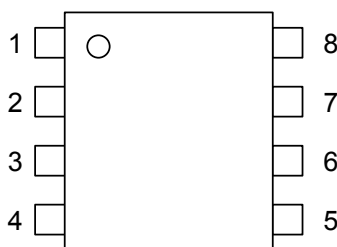


NJM2344M

■FEATURES

- Operating Voltage 3.0V to 40V
- Wide Oscillator Frequency 1kHz to 150kHz
- 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 NJM2344D : DIP8
NJM2344M : DMP8

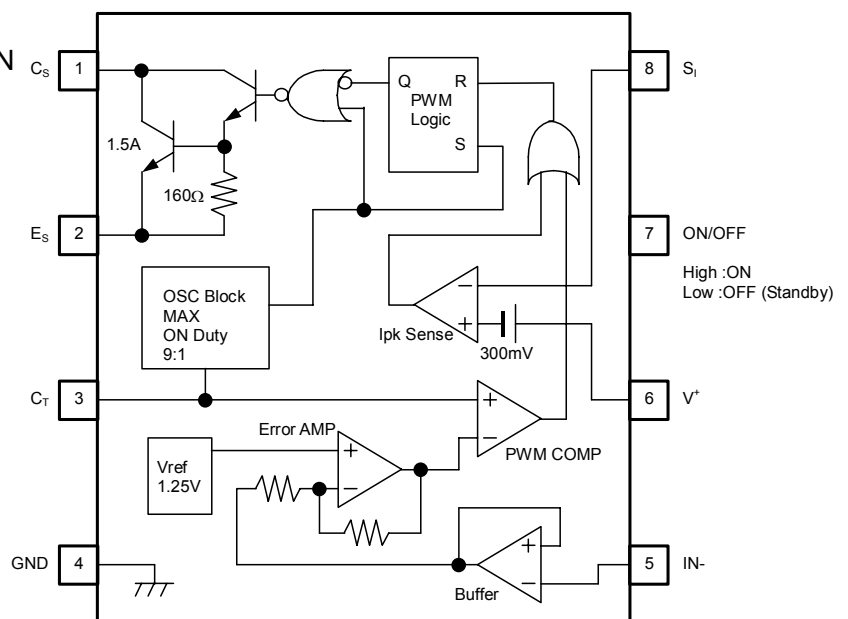
■PIN CONFIGURATION



NJM2344D
NJM2344M

- 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



NJM2344

■ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

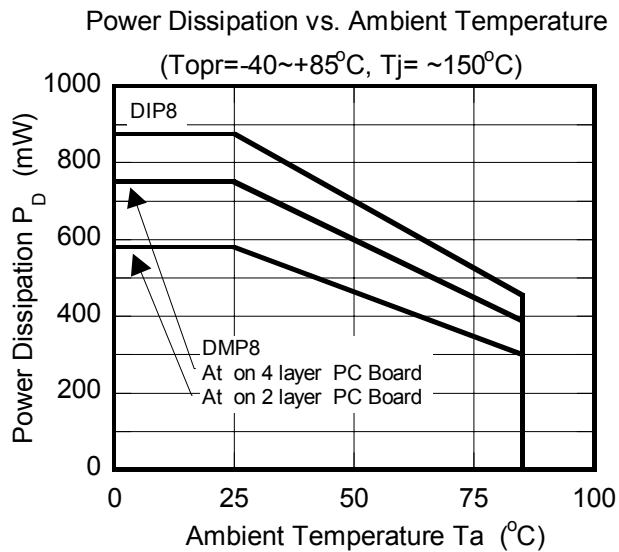
| PARAMETER | SYMBOL | MAXIMUM RATINGS | UNIT |
|-----------------------------|---------------------|---|------|
| Maximum Supply Voltage | V ⁺ | 40 | V |
| Comparator Input Voltage | V _{IR} | -0.3 ~ 40 (note) | V |
| ON/OFF Terminal Voltage | V _{ON/OFF} | -0.3 ~ 40 (note) | |
| Output Switch Voltage | V _{SW} | 40 | V |
| Output Switch Current | I _{SW} | 1.5 | A |
| Power Dissipation | P _D | DIP8 875 DMP8 580 (*1) 750 (*2) | mW |
| 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



■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} | $I_N = 0V$, $C_T = 1nF$ | 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} |
| Discharge to Charge Current Ratio | I_{ratio} | I_{chg}/I_{dis} | – | 9 | – | – |

CURRENT LIMIT

| | | | | | | |
|----------------------------|-----------|---------------------|-----|-----|-----|----|
| Peak Current Sense Voltage | V_{ipk} | $I_{chg} = I_{dis}$ | 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 | – | Ω |
| Collector Off-State Current | $I_{C(OFF)}$ | $V_{CE} = 40V$ | – | 0.01 | 1 | μA |

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 |

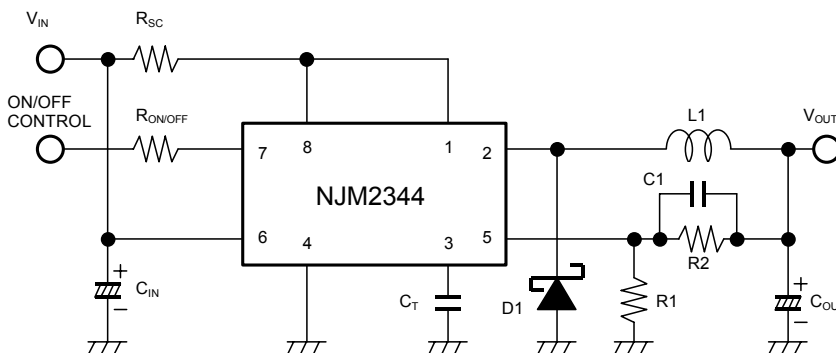
GENERAL CHARACTERISTICS

| | | | | | | |
|-------------------|--------------|--|---|-----|-----|---------|
| Standby Current | I_{CCSTBY} | $V_{ON/OFF} = 0V$ | – | 9 | 20 | μA |
| Operating Current | I_{CC} | $C_T = 1nF$, $S_I = V^+$, $I_N \rightarrow V_{th}$, $E_S = GND$ | – | 2.8 | 4.0 | mA |

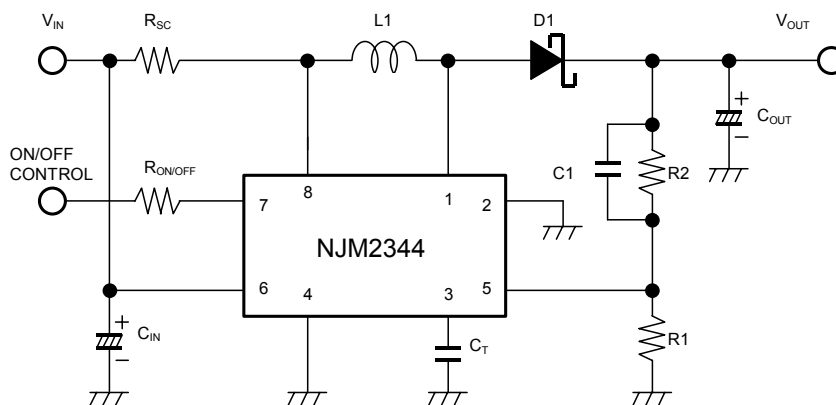
(note) Output switch tests are performed under pulsed conditions to minimize power dissipation.

■ TYPICAL APPLICATIONS

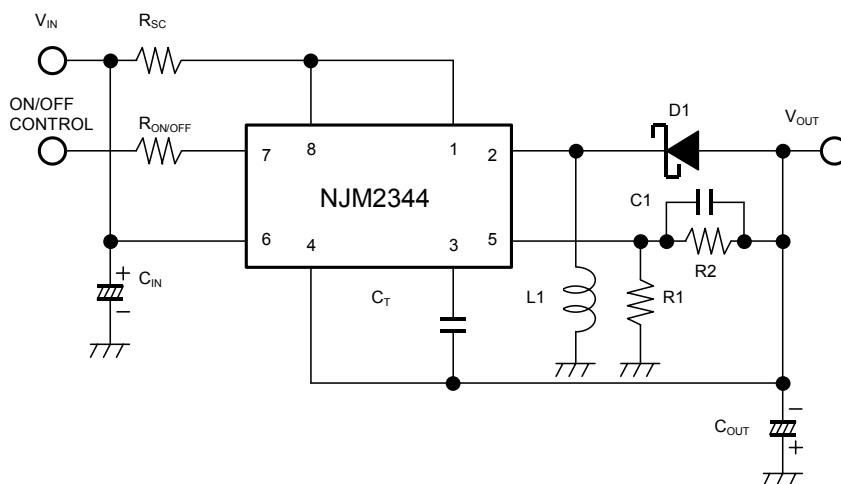
Step-Down Converter



Step-Up Converter



Inverting Converter

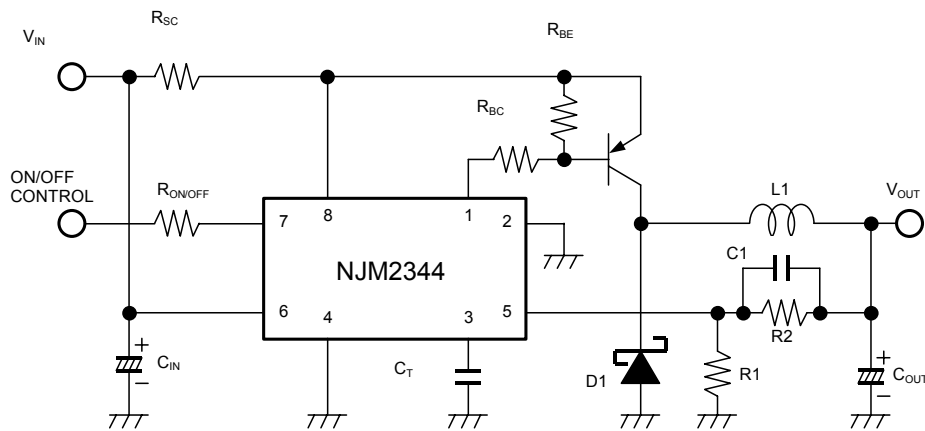


Though the $I_{ON/OFF}$ decreases by inserting " $R_{ON/OFF}$ " to between ON/OFF terminal and V_{IN} terminal, the minimum operating voltage is increased due to the resistor " $R_{ON/OFF}$ ".

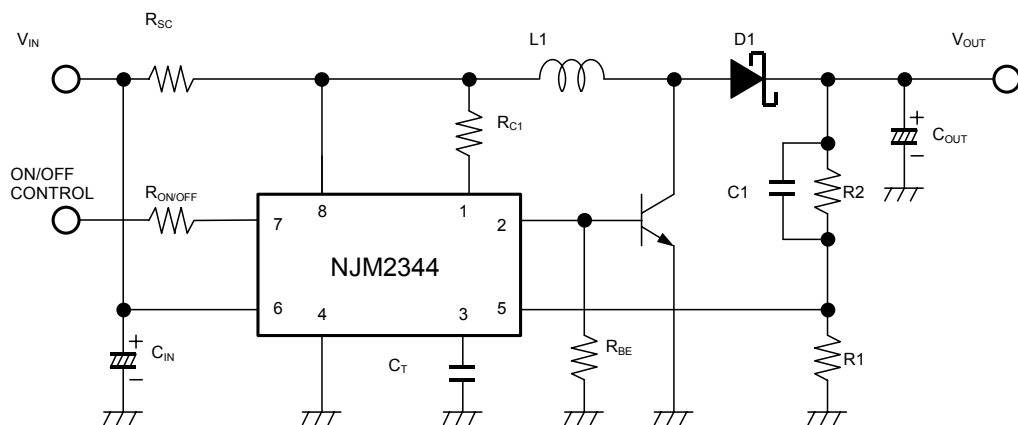
D1 use to schottky diode.

■ TYPICAL APPLICATIONS

Step-Down Converter (High Current)



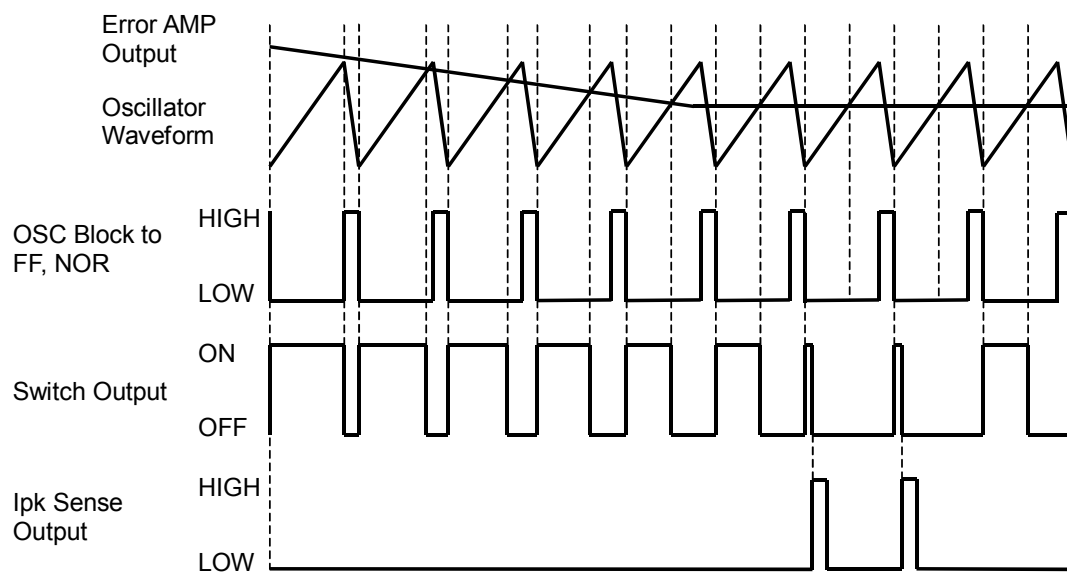
Step-Up Converter (High Current)



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 " $R_{ON/OFF}$ ".

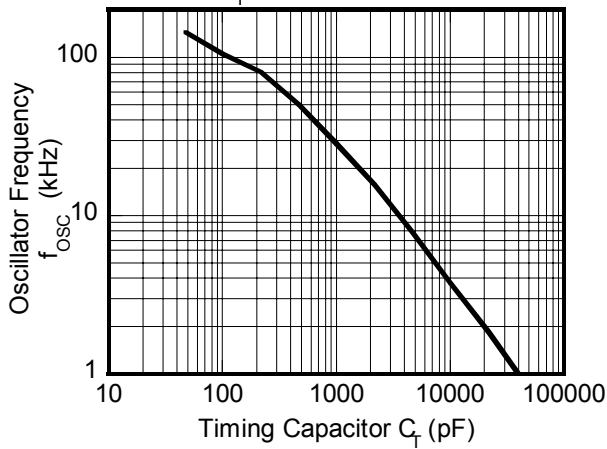
D1 use to schottky diode.

■TIMING CHART

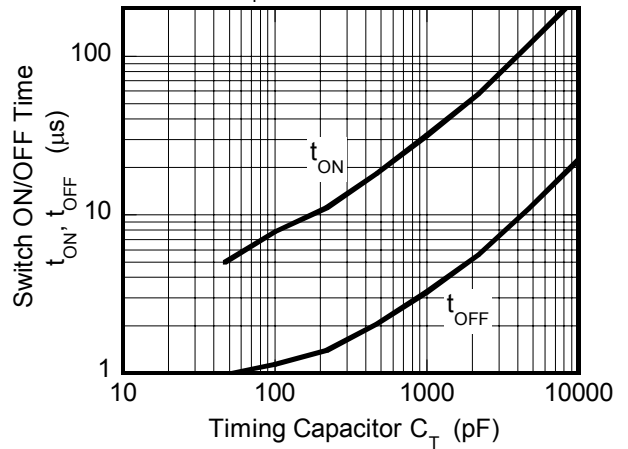


■ TYPICAL CHARACTERISTICS

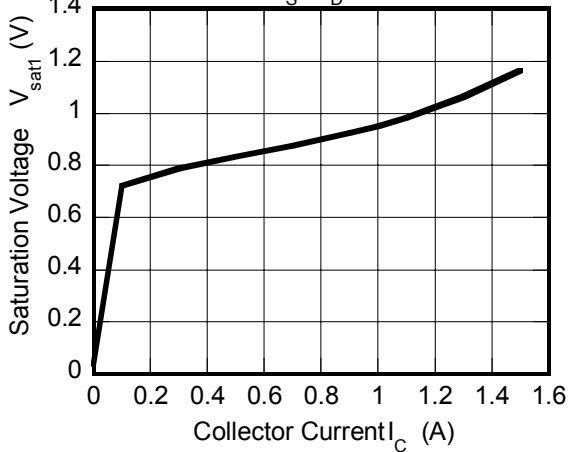
Oscillator Frequency vs. Timing Capacitor
 ($V^+=5V$, $S_I=V^+$, Pin 5=GND, $T_a=25^\circ C$)



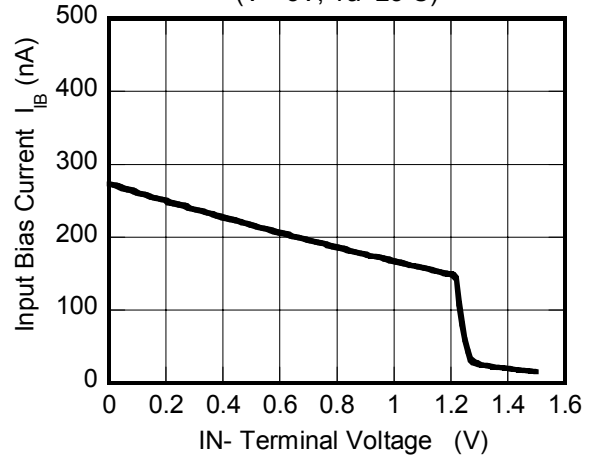
Switch ON/OFF Time vs. Timing Capacitor
 ($V^+=5V$, $S_I=V^+$, Pin 5=GND, $T_a=25^\circ C$)



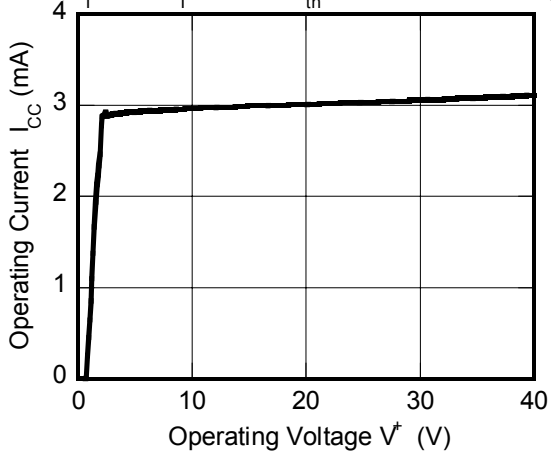
Saturation Voltage vs. Collector Current
 ($V^+=5V$, $C_S=C_D$, $T_a=25^\circ C$)



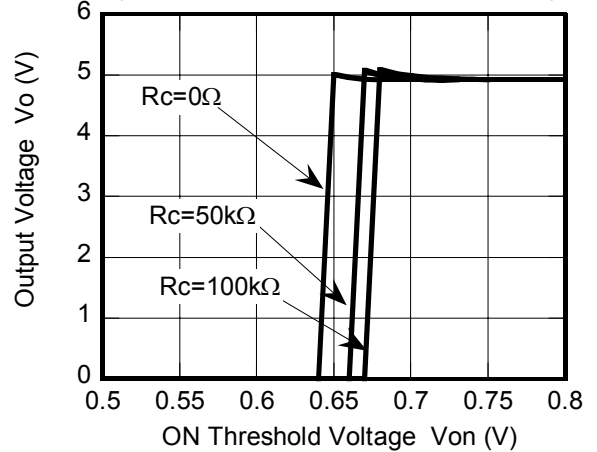
Input Bias Current vs. IN- Terminal Voltage
 ($V^+=5V$, $T_a=25^\circ C$)



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

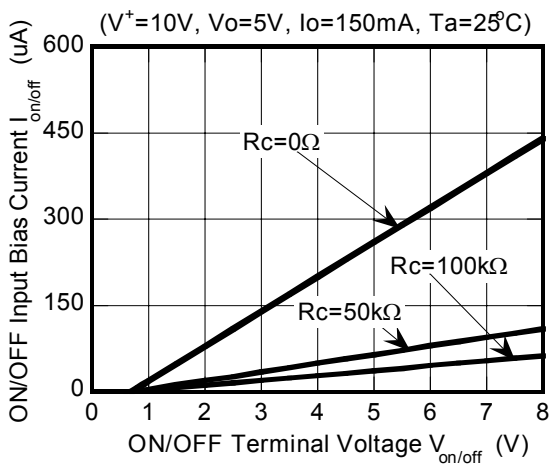


Output Voltage vs. ON Threshold Voltage
 ($V^+=10V$, $V_o=5V$, $I_o=150mA$, $T_a=25^\circ C$)

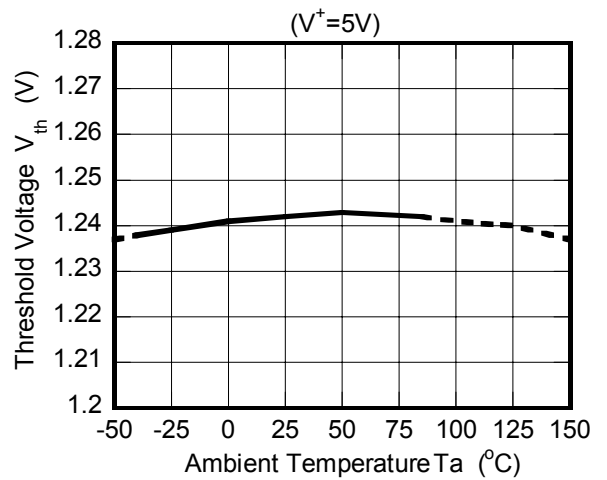


■ TYPICAL CHARACTERISTICS

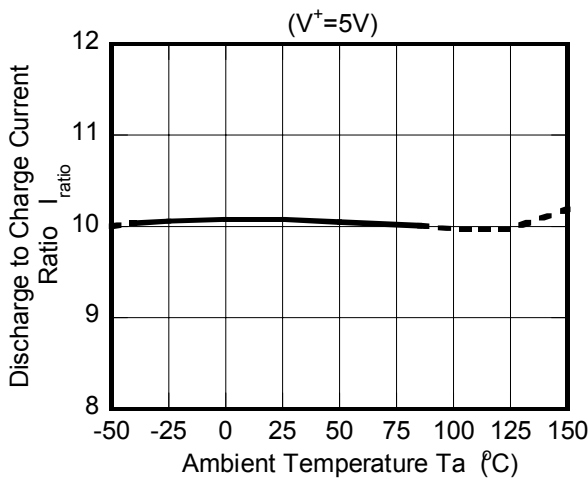
ON/OFF Input Bias Current vs. ON/OFF Terminal Voltage



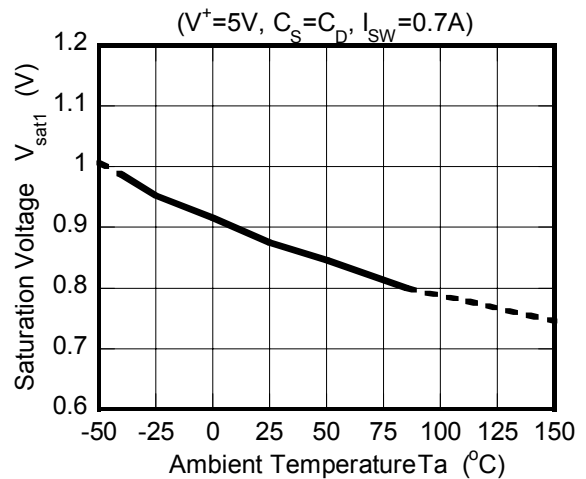
Threshold Voltage vs. Temperature



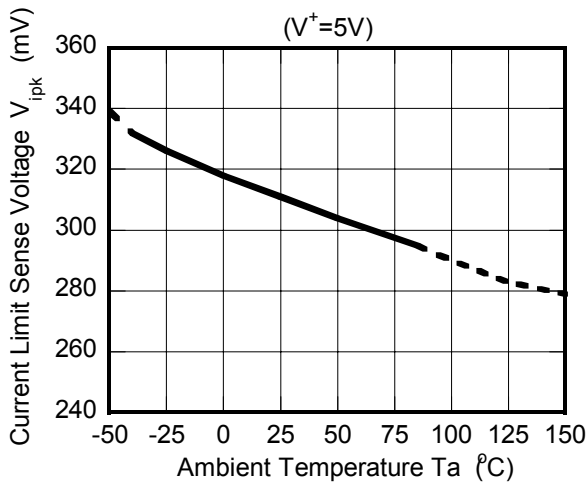
Discharge to Charge Ratio vs. Temperature



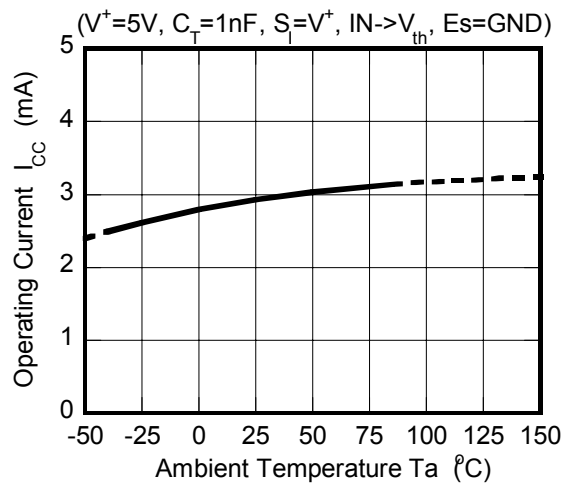
Saturation Voltage vs. Temperature



Current Limit Sense Voltage vs. Temperature



Operating Current vs. Temperature



MEMO

[CAUTION]

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