Table 1. ABSOLUTE MAXIMUM RATINGS

Parameter	Rating	Unit
VIN, RSET, EN/PWM Voltages	−0.3 to 6	V

Table 4. RECOMMENDED EN/PWM TIMING (Min and Max values are over the recommended operating conditions unless specified otherwise. Typical values are at VIN = 5.0 V, T_{AMB} = 25°C.)

Symbol	Name	Conditions	Min	Typ	Max	Units
T_{PS}	Turn−On time, EN/PWM rising to I_{LED} from shutdown	I_{LED} = 175 mA I_{LED} = 80 mA		1.5 1.3		μs
T_{P1}	Turn−On time, EN/PWM rising to I_{LED}	I_{LED} = 175 mA		600		ns
T_{P2}	Turn−Off time, EN/PWM falling to I_{LED}	I_{LED} = 175 mA I_{LED} = 80 mA		400 300		ns
T_R	LED rise time	I_{LED} = 175 mA I_{LED} = 80 mA		700 440		ns
T_F	LED fall time	I_{LED} = 175 mA I_{LED} = 80 mA		360 320		ns
T_{LO}	EN/PWM low time		1			μs
T_{HI}	EN/PWM high time		5			μs
T_{PWRDWN}	EN/PWM low time to shutdown delay			4	8	ms

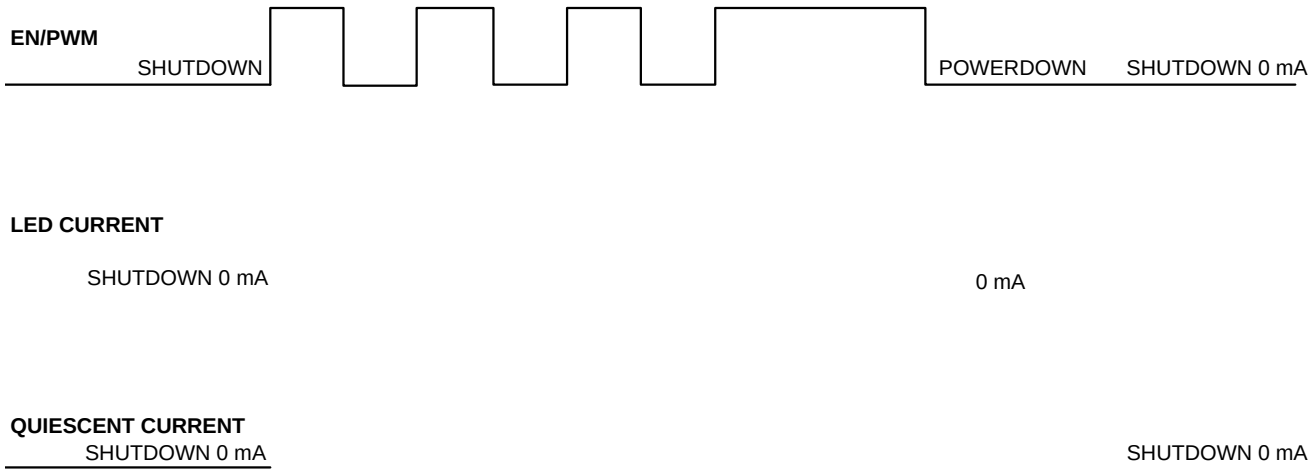


Figure 2. CAT4104 EN/PWM Timing

TYPICAL PERFORMANCE CHARACTERISTICS

(VIN = 5 V, VCC = 5 V, LED FORWARD VOLTAGE = 3.5 V, C_{IN} = 1 MF, T_{AMB} = 25°C UNLESS OTHERWISE SPECIFIED.)

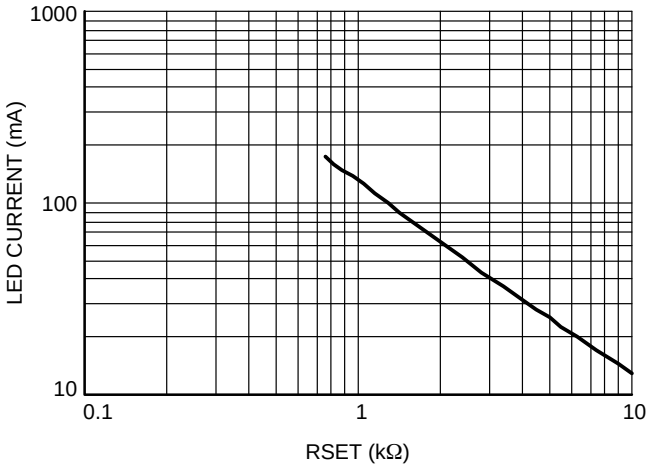


Figure 9. LED Current vs. RSET Resistor

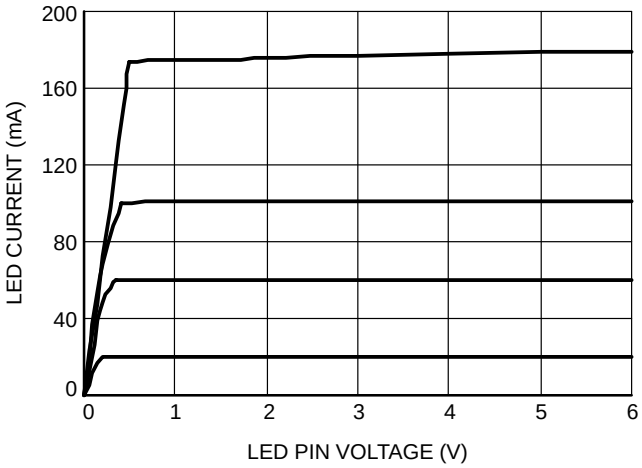


Figure 10. LED Current vs. LED Pin Voltage

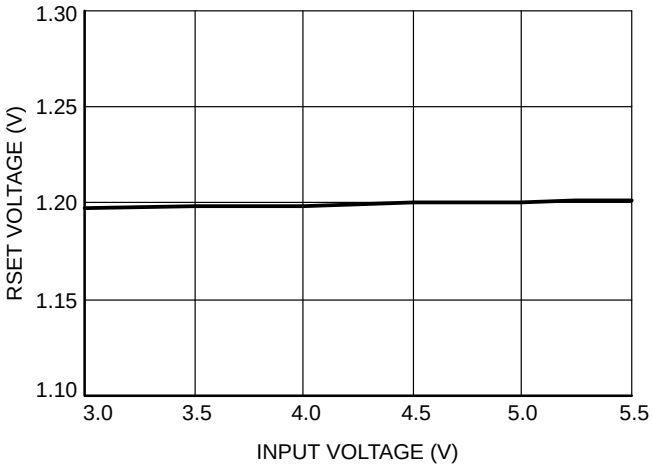


Figure 11. RSET Pin Voltage vs. Input Voltage

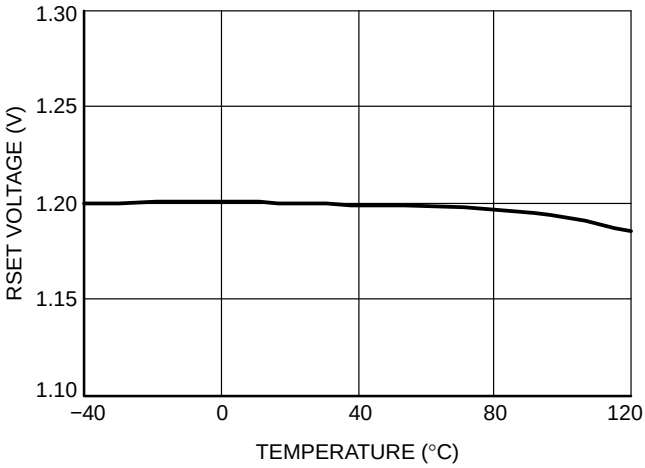


Figure 12. RSET Pin Voltage vs. Temperature

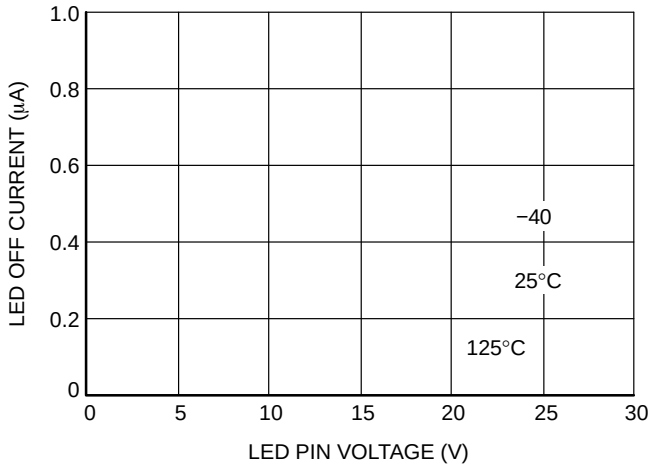


Figure 13. LED Off Current vs. LED Pin Voltage

TYPICAL PERFORMANCE CHARACTERISTICS

(VIN = 5 V, VCC = 5 V, LED FORWARD VOLTAGE = 3.5 V, C_{IN} = 1 MF, T_{AMB} = 25°C UNLESS OTHERWISE SPECIFIED.)

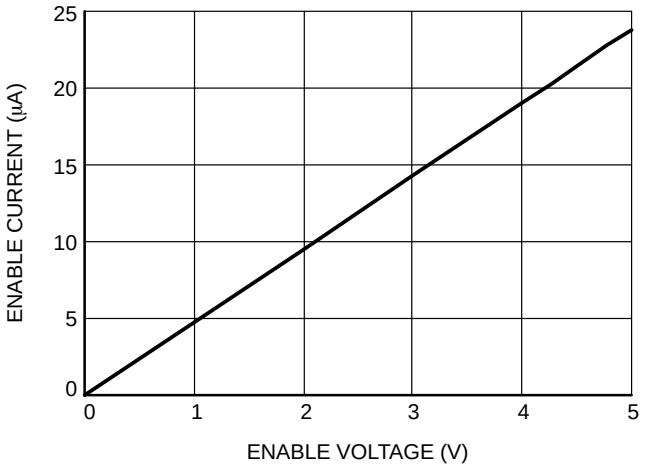


Figure 14. EN/PWM Pull−down Current vs. $V_{EN/PWM}$

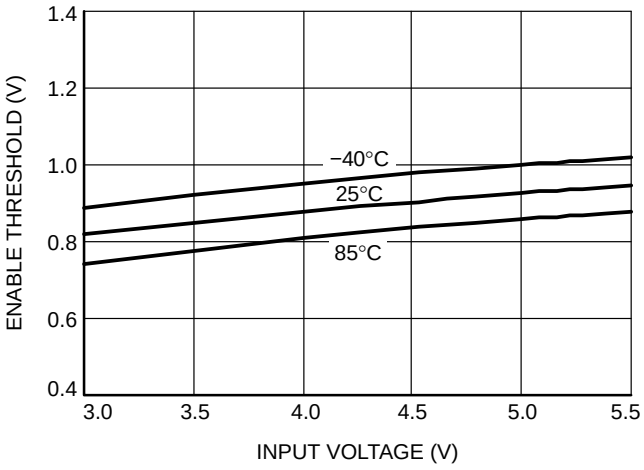


Figure 15. EN/PWM Threshold vs. VIN

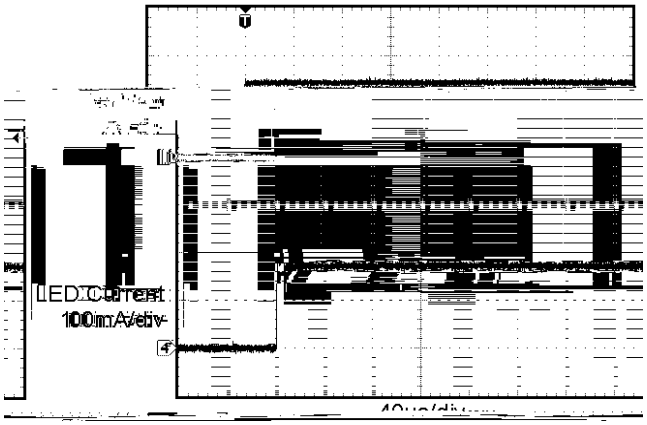


Figure 16. Power Up from Shutdown

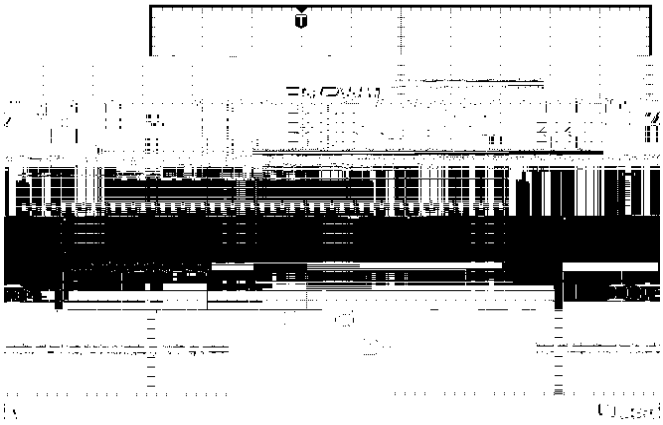


Figure 17. Power Down

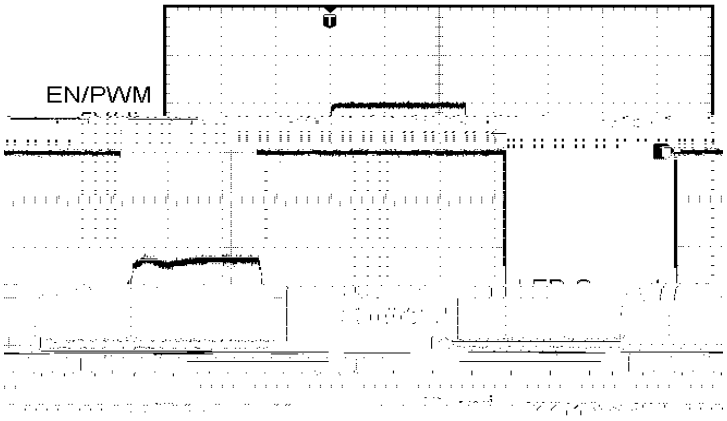


Figure 18. PWM 200 Hz, 1% Duty Cycle

Table 5. PIN DESCRIPTIONS

Name	Pin SOIC 8−Lead	Pin TDFN 8−Lead	Function
LED1	1	1	LED1 cathode terminal
LED2	2	2	LED2 cathode terminal
LED3	3	3	LED3 cathode terminal
LED4	4	4	LED4 cathode terminal
GND	5	5 and TAB	Ground reference
EN/PWM	6	6	Device enable input and PWM control
VIN	7	7	Device supply pin
RSET	8	8	LED current set pin for the LED channels

PIN FUNCTION

VIN is the supply pin for the device. A small 0.1 μF ceramic bypass capacitor is optional for noisy environments. Whenever the input supply falls below the under−voltage threshold, all LED channels are automatically disabled.

EN/PWM is the enable and one wire dimming input for all LED channels. Guaranteed levels of logic high and logic low are set at 1.3 V and 0.4 V respectively. When EN/PWM is initially taken high, the device becomes enabled and all LED currents are set at a gain of 100 times the current in RSET. To place the device into zero current shutdown mode, the EN/PWM pin must be held low for 4 ms typical.

LED1 to LED4 provide individual regulated currents for each of the LED cathodes. There pins enter a high impedance zero current state whenver the device is placed in shutdown mode.

RSET pin is connected to an external resistor to set the LED channel current. The ground side of the external resistor should be star connected to the GND of the PCB. The pin source current mirrors the current to the LED sinks. The voltage at this pin is regulated to 1.2 V.

GND is the ground reference for the device. The pin must be connected to the ground plane on the PCB.

TAB (TDFN 8−Lead Only) is the exposed pad underneath the package. For best thermal performance, the tab should be soldered to the PCB and connected to the ground plane.

BLOCK DIAGRAM

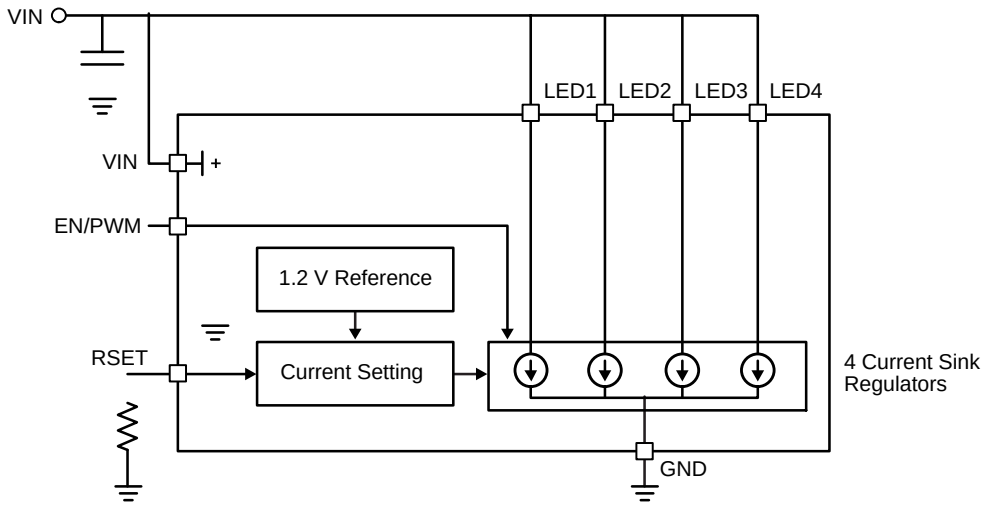


Figure 19. CAT4104 Functional Block Diagram

APPLICATION INFORMATION

Single 12 V Supply

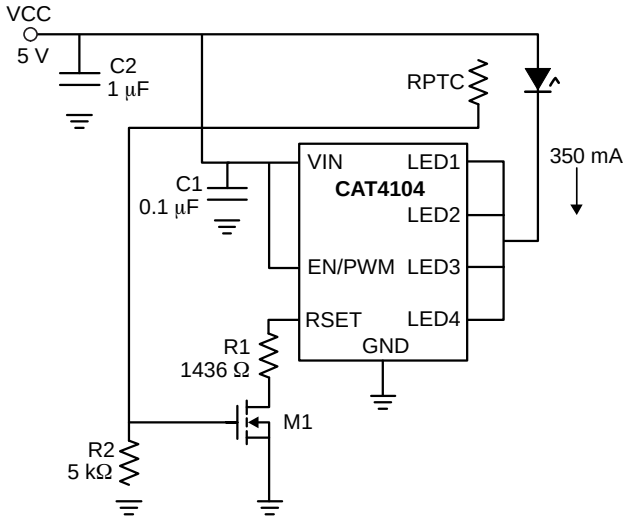
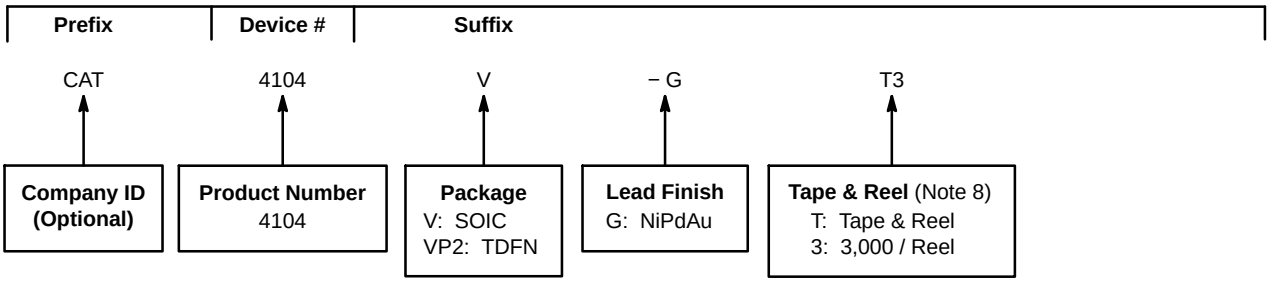


Figure 23. LED Current Derating

EXAMPLE OF ORDERING INFORMATION (NOTE 6)

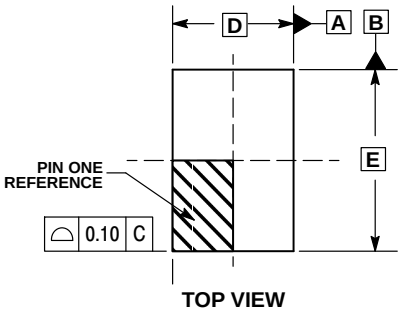


4. All packages are RoHS−compliant (Lead−free, Halogen−free).
5. The standard plated finish is NiPdAu.
6. The device used in the above example is a CAT4104V−GT3 (SOIC, NiPdAu, Tape & Reel, 3,000/Reel).
7. For additional temperature options, please contact your nearest ON Semiconductor Sales office.
8. For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

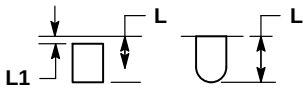
TDFN8, 2x3, 0.5P
CASE 511AK
ISSUE B

SCALE 2:1

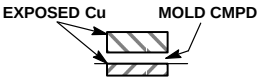
DATE 18 MAR 2015



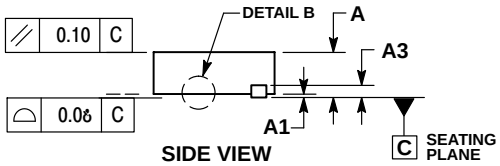
TOP VIEW



DETAIL A
ALTERNATE
CONSTRUCTIONS



DETAIL B
ALTERNATE
CONSTRUCTION

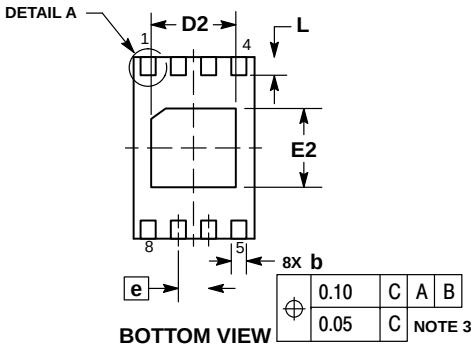


SIDE VIEW

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.25MM FROM THE TERMINAL TIP.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

DIM	MILLIMETERS	
	MIN	MAX
A	0.70	0.80
A1	0.00	0.05
A3	0.20 REF	
b	0.20	0.30
D	2.00 BSC	
D2	1.30	1.50
E	3.00 BSC	
E2	1.20	1.40
e	0.50 BSC	
L	0.20	0.40
L1	–––	0.15

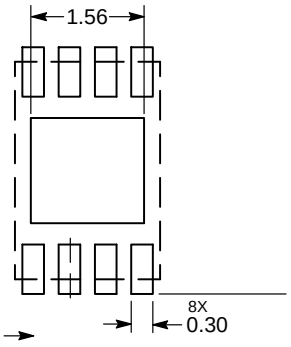
GENERIC
MARKING DIAGRAM*



BOTTOM VIEW

XXXXX = Specific Device Code

RECOMMENDED
SOLDERING FOOTPRINT*



*For additional information on our Pb−Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.