MIC2287C

1.2 MHz PWM White LED Driver with OVP in 2 mm × 2 mm VDFN and Thin SOT-23

Features

- 2.5V to 10V Input Voltage
- Output Voltage up to 34V
- Over 500 mA Switch Current
- 1.2 MHz PWM Operation
- 95 mV Feedback Voltage
- Output Overvoltage Protection (OVP)
- Options for 15V, 24V, and 34V OVP
- Overtemperature Protection
- Undervoltage Lockout (UVLO)
- Low Profile Package Options:
  - 5-Lead Thin SOT-23
  - 8-Lead 2 mm x 2 mm VDFN
- –40°C to +105°C Junction Temperature Range

Applications

- White LED Driver for Backlighting:
  - Cell Phones
  - PDAs
  - GPS Systems
  - Digital Cameras
  - MP3 Players
  - IP Phones
- LED Flashlights

General Description

The MIC2287C is a 1.2 MHz pulse width modulated (PWM), boost-switching regulator that is optimized for constant-current, white LED driver applications. With a maximum output voltage of 37V and a switch current of over 500 mA, the MIC2287C easily drives a string of up to 6 white LEDs in series, ensuring uniform brightness and eliminating several ballast resistors.

The MIC2287C implements a constant frequency, 1.2 MHz PWM control scheme. The high frequency PWM operation saves board space by reducing external component sizes. The added benefit of the constant frequency PWM scheme as opposed to variable frequency topologies is much lower noise and input ripple injected back to the battery source.

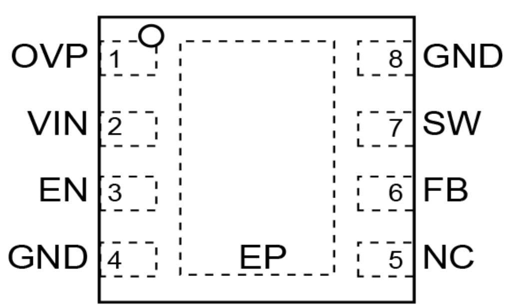
To optimize efficiency, the feedback voltage is set to only 95 mV. This reduces the power dissipation in the current set resistor and allows the lowest total output voltage, hence minimal current draw from the battery.

The MIC2287C is available with 3 levels of overvoltage protection, 15V, 24V, and 34V. This allows designers to choose the smallest possible external components with the appropriate voltage ratings for their applications.

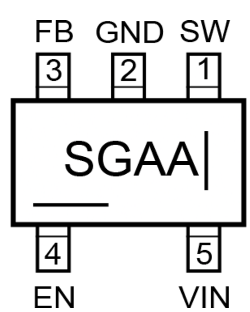
The MIC2287C is available in low profile, 5-Lead Thin SOT-23 and an 8-Lead 2 mm × 2 mm VDFN package options. The MIC2287C has a junction temperature range of –40°C to +105°C.

Package Types

MIC2287C
8-Lead 2 mm × 2 mm VDFN



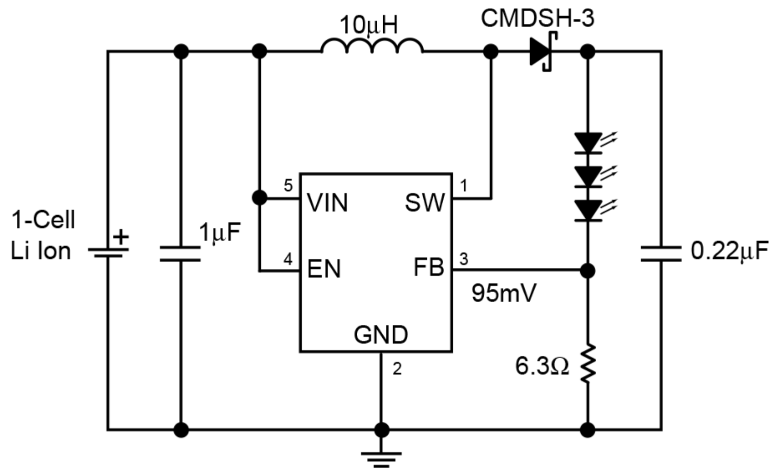
MIC2287C
5-Lead Thin SOT-23



Typical Application Circuits

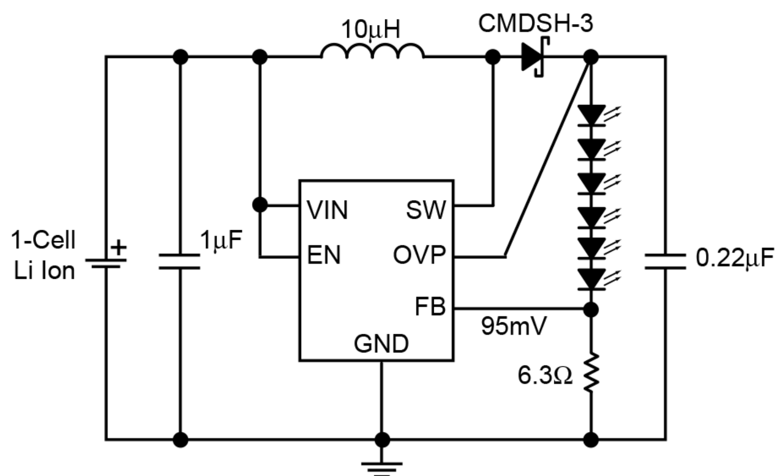
MIC2287CYD5

3-Series White LED Driver in Thin SOT-23 Package



MIC2287C-34YML

6-Series White LED Driver with Output OVP in 2 mm × 2 mm VDFN Package



1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings †

Supply Voltage (V_{IN}) 12V
Switch Voltage (V_{SW}) .... –0.3V to 37V
Enable Pin Voltage (V_{EN}) .... –0.3 to V_{IN}
FB Voltage (V_{FB}) 6V
Switch Current (I_{SW}) ....
ESD Rating (Note 1) .... 2 kV

Operating Ratings ‡

Supply Voltage (V_{IN}) .... 2.5V to 10V

† Notice: Absolute maximum ratings indicate limits beyond which damage to the component may occur. Electrical specifications do not apply when operating the device outside of its operating ratings. The maximum allowable power dissipation is a function of the maximum junction temperature, $T_{J(MAX)}$, the junction-to-ambient thermal resistance, θ_{JA}, and the ambient temperature, T_A. The maximum allowable power dissipation will result in excessive die temperature, and the regulator will go into thermal shutdown.

‡ Notice: This device is not guaranteed to operate beyond its specified operating ratings.

Note 1: Devices are inherently ESD sensitive. Handling precautions required. Human body model.

ELECTRICAL CHARACTERISTICS

Electrical specifications, unless otherwise indicated: $V_{IN} = V_{EN} = 3.6V$, $V_{OUT} = 10V$, $I_{OUT} = 10$ mA, $T_A = +25°C$. **Bold** values apply over the T_A range of –40°C < T_J < 105°C. (Note 1)

Parameters	Sym.	Min.	Typ.	Max.	Units	Conditions
Supply Voltage Range	V_{IN}	2.5	—	10	V	—
Under Voltage Lockout	V_{UVLO}	1.8	2.1	2.4	V	—
Quiescent Current	I_Q	—	2.5	5	mA	V_{FB} > 200 mV (not switching)
Shutdown Current	I_{SHDN}	—	0.1	**1**	µA	V_{EN} = 0V
Feedback Voltage	V_{FB}	85	95	105	mV	(±10%)
Feedback Input Current	I_{FB}	—	450	—	nA	V_{FB} = 95 mV
Line Regulation (Note 2)	$\lvert(\Delta V_{OUT}/V_{OUT})/\Delta V_{IN}\rvert$	—	0.5	—	%	3V ≤ V_{IN} ≤ 5V
Load Regulation (Note 2)	$\lvert\Delta V_{OUT}/V_{OUT}\rvert$	—	0.5	—	%	5 mA ≤ I_{OUT} ≤ 20 mA
Maximum Duty Cycle	D_{MAX}	**85**	90	—	%	—
Switch Current Limit	I_{SW}	—	750	—	mA	—
Switch Saturation Voltage	V_{SW}	—	450	—	mV	I_{SW} = 0.5A
Switch Leakage Current	I_{SWLK}	—	0.01	**5**	µA	V_{EN} = 0V, V_{SW} = 10V
Enable Threshold	V_{EN}	**1.5**	—	—	V	Logic High
		—	—	**0.4**	V	Logic Low
Enable Pin Current	I_{EN}	—	20	40	µA	V_{EN} = 10V
Switching Frequency	f_{SW}	1.05	1.2	1.35	MHz	—

Note 1: Specification for packaged product only.
2: Guaranteed by design.

ELECTRICAL CHARACTERISTICS (CONTINUED)

Electrical specifications, unless otherwise indicated: $V_{IN} = V_{EN} = 3.6V$, $V_{OUT} = 10V$, $I_{OUT} = 10$ mA, $T_A = +25°C$. **Bold** values apply over the T_A range of $-40°C < T_J < 105°C$. (Note 1)

Parameters	Sym.	Min.	Typ.	Max.	Units	Conditions
Overvoltage Protection	V_{OVP}	11.5	14	16.5	V	MIC2287CYML- 15 only
		19	22.5	26	V	MIC2287CYML- 24 only
		27	32	37	V	MIC2287CYML- 34 only
Thermal Shutdown Die Temperature	T_{SHDN}	—	150	—	°C	—
		—	10	—	°C	Hysteresis

Note 1: Specification for packaged product only.
2: Guaranteed by design.

TEMPERATURE SPECIFICATIONS

Electrical specifications, unless otherwise indicated: $V_{IN} = V_{EN} = 3.6V$, $V_{OUT} = 10V$, $I_{OUT} = 10$ mA.

Parameters	Sym.	Min.	Typ.	Max.	Units	Conditions
Temperature Ranges						
Junction Operating Temperatures	T_J	–40	—	+105	°C	—
Ambient Storage Temperature	T_S	–65	—	+150	°C	—
Package Thermal Resistances						
Thermal Resistance, 8-lead 2 mm × 2 mm VDFN	θ_{JA}	—	93	—	°C/W	—
Thermal Resistance, 5-lead Thin SOT-23 (TSOT)	θ_{JA}	—	256	—		—

2.0 TYPICAL PERFORMANCE CURVES

Note:	The graphs and tables provided following this note are a statistical summary based on a limited number of samples and are provided for informational purposes only. The performance characteristics listed herein are not tested or guaranteed. In some graphs or tables, the data presented may be outside the specified operating range (e.g., outside specified power supply range) and therefore outside the warranted range.

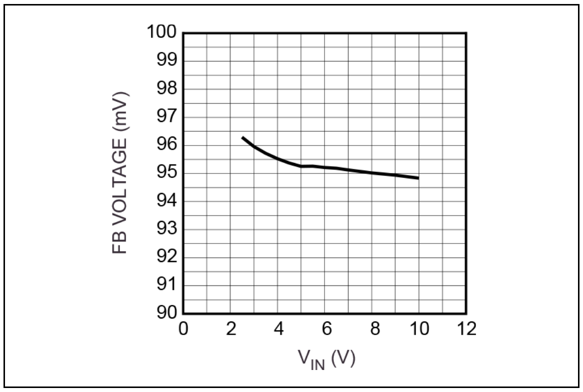


FIGURE 2-1: *Feedback Voltage vs. Input Voltage.*

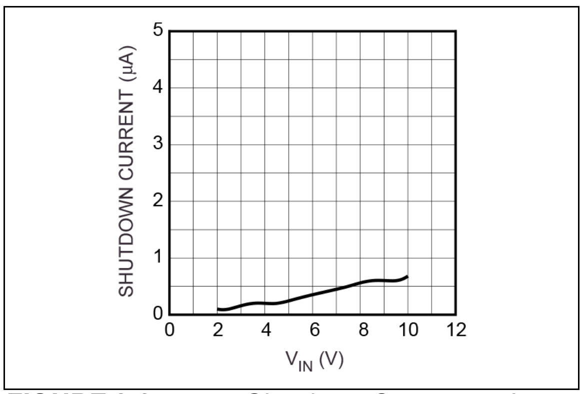


FIGURE 2-2: *Shutdown Current vs. Input Voltage.*

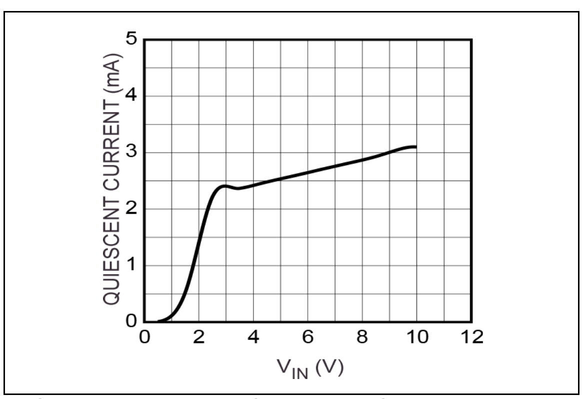


FIGURE 2-3: *Quiescent Current vs. Input Voltage.*

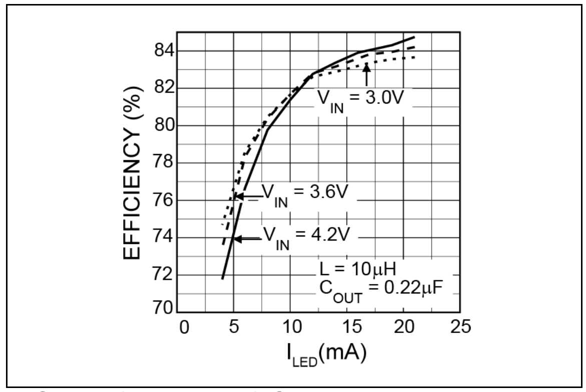


FIGURE 2-4: *3 Series White LEDs Efficiency vs. I_{LED}.*

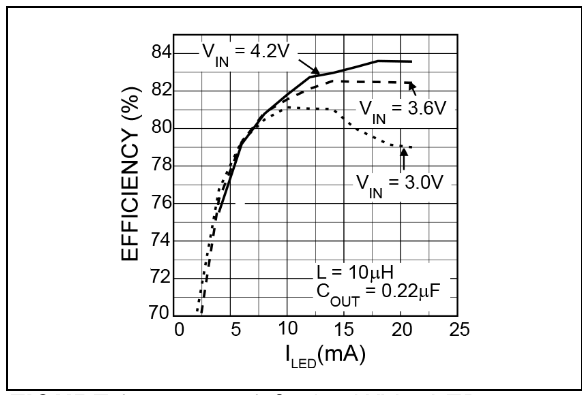


FIGURE 2-5: *6 Series White LEDs Efficiency vs. I_{LED}.*

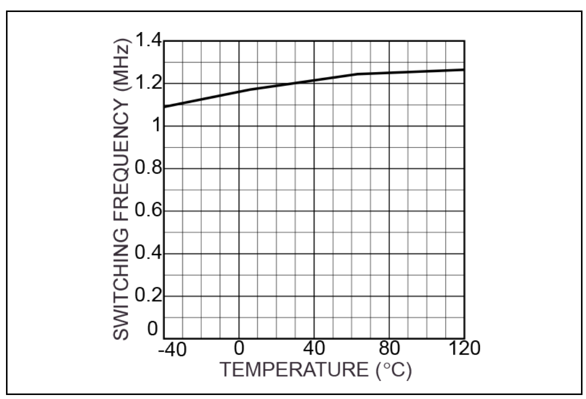


FIGURE 2-6: *f_{SW} vs. Ambient Temperature.*

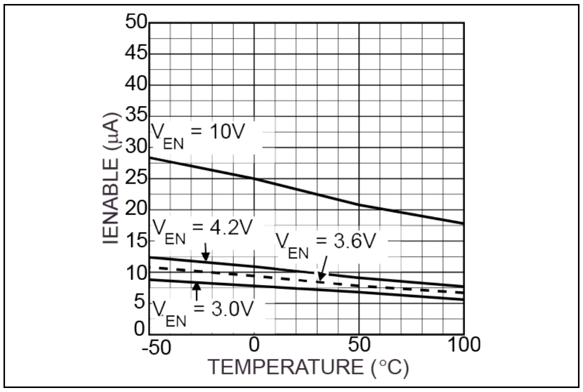


FIGURE 2-7: *EN Pin Bias Current vs. Ambient Temperature.*

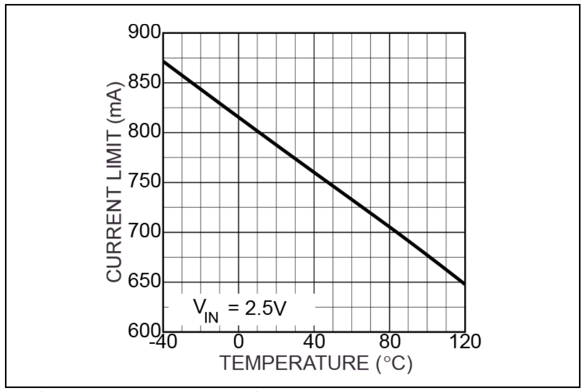


FIGURE 2-9: *Current Limit vs. Ambient Temperature.*

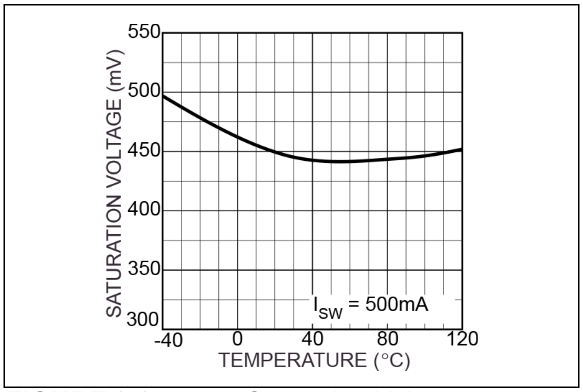


FIGURE 2-8: *Saturation Voltage vs. Ambient Temperature.*

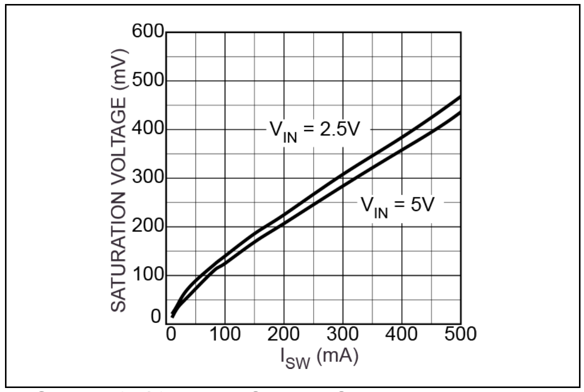


FIGURE 2-10: *Switch Saturation Voltage vs. Current.*

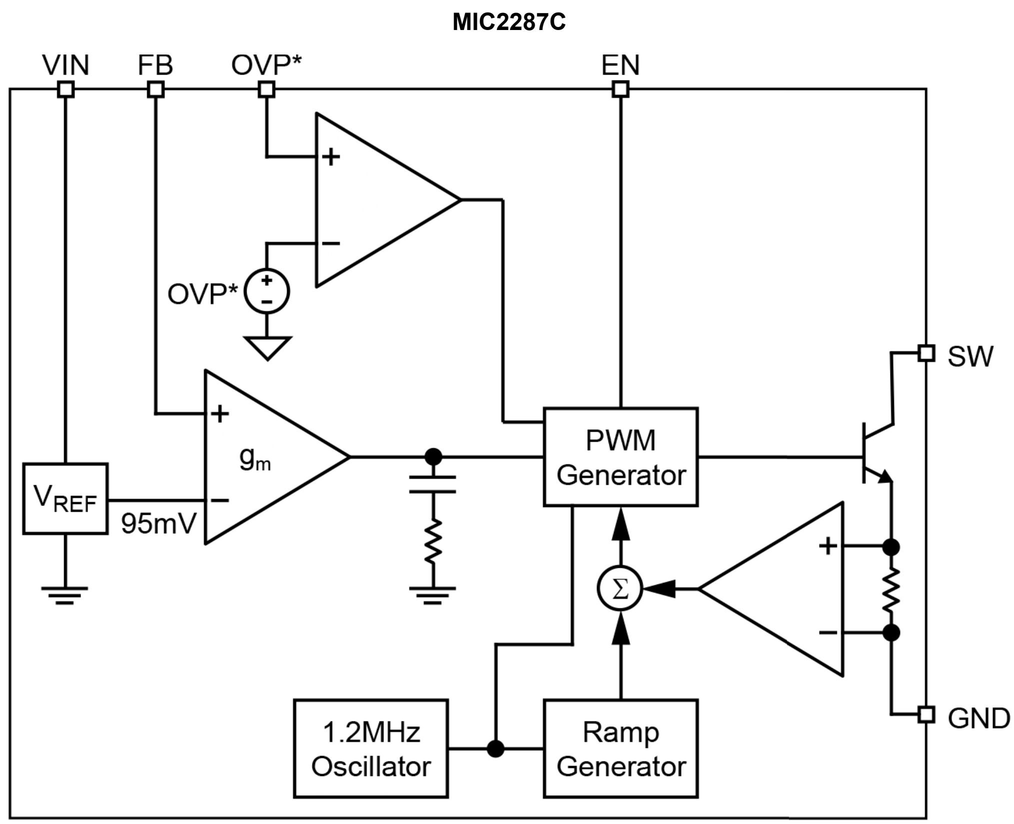
3.0 PIN DESCRIPTIONS

The descriptions of the pins are listed in Table 3-1.

TABLE 3-1: PIN FUNCTION TABLE

Pin Number 5-Lead Thin SOT-23	Pin Number 8-Lead 2 mm × 2 mm VDFN	Pin Name	Description
1	7	SW	Switch node (Input): Internal power BIPOLAR collector.
2	—	GND	Ground (Return): Ground.
3	6	FB	Feedback (Input): Output voltage sense node. Connect the cathode of the LED to this pin. A resistor from this pin to ground sets the LED current.
4	3	EN	Enable (Input): Logic high enables regulator. Logic low shuts down regulator.
5	2	VIN	Supply (Input): 2.7V to 8V for internal circuitry.
—	1	OVP	Overvoltage protection (Input): Connect to the output.
—	4	AGND	Analog ground.
—	8	PGND	Power ground.
—	5	NC	No connect (no internal connection to die).
—	EP	GND	Ground (Return): Exposed backside pad.

Functional Block Diagram



* OVP available on VDFN package option only.

4.0 FUNCTIONAL DESCRIPTION

The MIC2287C is a constant frequency, PWM current mode boost regulator. The block diagram is shown above. The MIC2287C is composed of an oscillator, slope compensation ramp generator, current amplifier, g_m error amplifier, PWM generator, and a 500 mA bipolar output transistor. The oscillator generates a 1.2 MHz clock.

The clock's two functions are to trigger the PWM generator that turns on the output transistor and to reset the slope compensation ramp generator. The current amplifier is used to measure the switch current by amplifying the voltage signal from the internal sense resistor. The output of the current amplifier is summed with the output of the slope compensation ramp generator. This summed current-loop signal is fed to one of the inputs of the PWM generator.

The g_m error amplifier measures the LED current through the external sense resistor and amplifies the error between the detected signal and the 95 mV reference voltage. The output of the g_m error amplifier provides the voltage-loop signal that is fed to the other input of the PWM generator. When the current-loop signal exceeds the voltage-loop signal, the PWM generator turns off the bipolar output transistor. The next clock period initiates the next switching cycle, maintaining the constant frequency current-mode PWM control. The LED is set by the feedback resistor:

EQUATION 4-1:

$$I_{LED} = \frac{95\ mV}{R_{FB}}$$

The Enable pin shuts down the output switching and disables control circuitry to reduce input current-to-leakage levels. Enable pin input current is zero at zero volts.

5.0 APPLICATION INFORMATION

5.1 Dimming Control

There are two techniques for dimming control. One is PWM dimming, and the other is continuous dimming.

1. The PWM dimming control is implemented by applying a PWM signal on EN pin as shown in Figure 5-1. The MIC2287C is turned on and off by the PWM signal. With this method, the LEDs operate with either zero or full current. The average LED current is increased proportionally to the duty-cycle of the PWM signal. This technique has high-efficiency because the IC and the LEDs consume no current during the off cycle of the PWM signal. The typical PWM frequency should be between 100 Hz and 10 kHz.

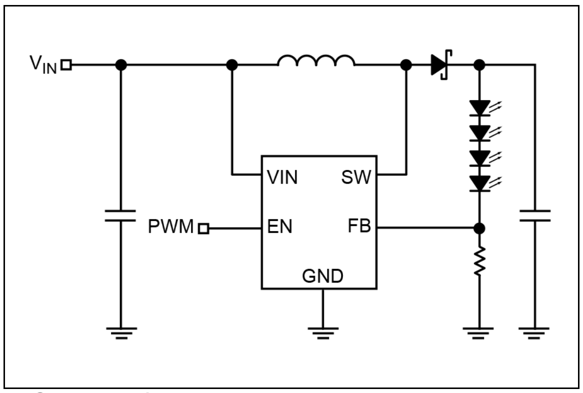


FIGURE 5-1: *PWM Dimming Method.*

2. The continuous dimming control is implemented by applying a DC control voltage to the FB pin of the MIC2287C through a series resistor as shown in Figure 5-2. The LED intensity (current) can be dynamically varied applying a DC voltage to the FB pin. The DC voltage can come from a DAC signal, or a filtered PWM signal. The advantage of this approach is a high frequency PWM signal (>10kHz) that can be used to control LED intensity.

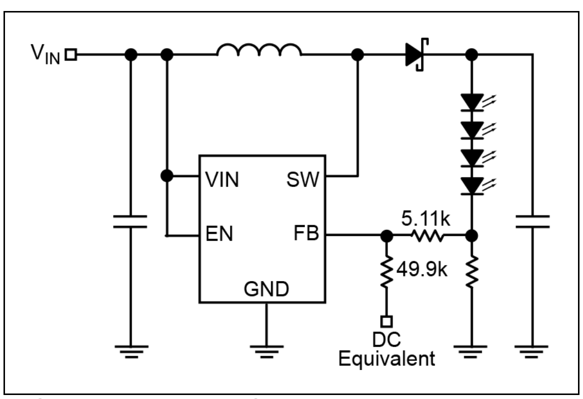


FIGURE 5-2: *Continuous Dimming.*

5.2 Open-Circuit Protection

If the LEDs are disconnected from the circuit, or in case an LED fails open, the sense resistor will pull the FB pin to ground. This will cause the MIC2287C to switch with a high duty-cycle, resulting in output overvoltage. This may cause the SW pin voltage to exceed its maximum voltage rating, possibly damaging the IC and the external components. To ensure the highest level of protection, the MIC2287C has 3 product options in the 8-lead 2 mm × 2 mm VDFN with overvoltage protection (OVP). The extra pins of the 8-lead 2 mm × 2 mm VDFN package allow a dedicated OVP monitor with options for 15V, 24V, or 34V (see Figure 5-3).

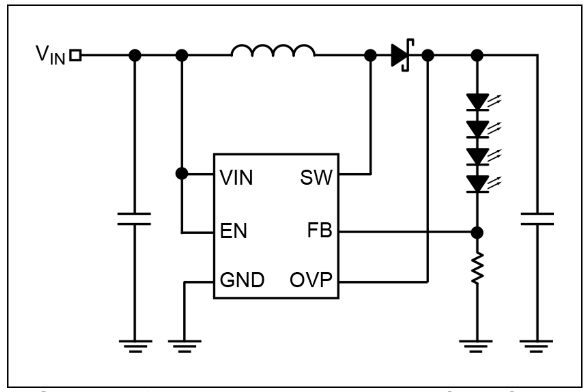


FIGURE 5-3: *VDFN Package OVP Circuit.*

The reason for the three OVP levels is to let users choose the suitable level of OVP for their application. For example, a 3-LED application would typically see an output voltage of no more than 12V, so a 15V OVP option would offer a suitable level of protection. This allows the user to select the output diode and capacitor with the lowest voltage ratings, as well as smallest size and lowest cost. The OVP will clamp the output voltage to within the specified limits.

For the 5-lead Thin SOT-23 package, an OVP pin is not available. An external Zener diode can be connected from the output of the converter to FB pin (as shown in Figure 5-4) to implement similar protection.

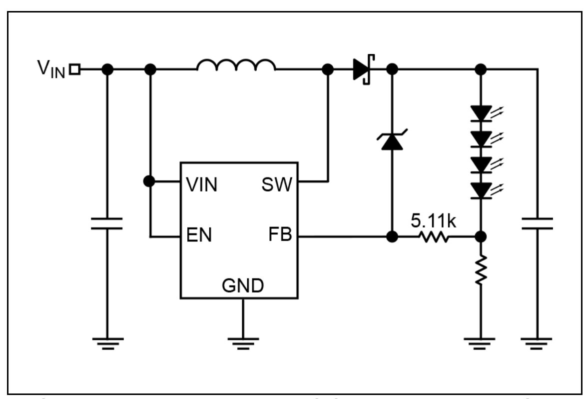


FIGURE 5-4: *Thin SOT-23 Package OVP Circuit.*

5.3 Start-Up and Inrush Current

During start-up, inrush current of approximately double the nominal current flows to set up the inductor current and the voltage on the output capacitor.

If the inrush current needs to be limited, a soft-start circuit similar to Figure 5-5 could be implemented. The soft-start capacitor (C_{SS}) provides overdrive to the FB pin at start-up, resulting in gradual increase of switch duty cycle and limited inrush current.

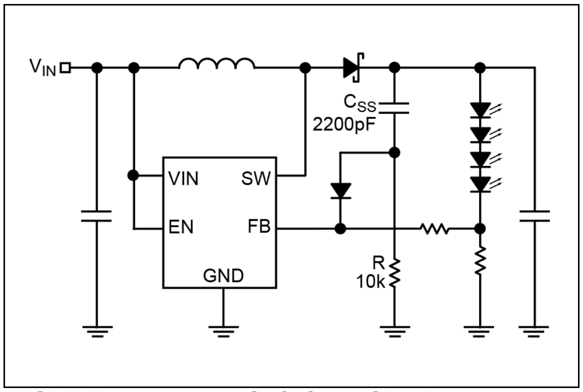


FIGURE 5-5: Soft-Start Circuit.

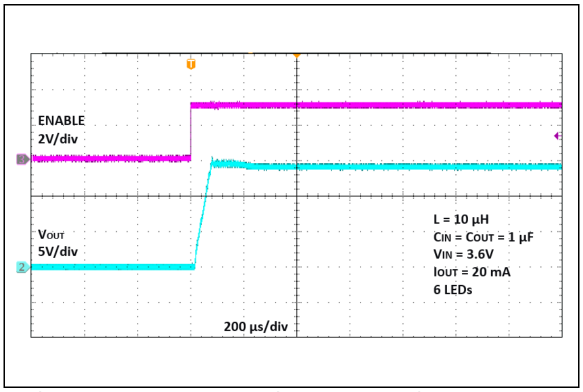


FIGURE 5-6: 6-Series LED Circuit without External Soft-Start.

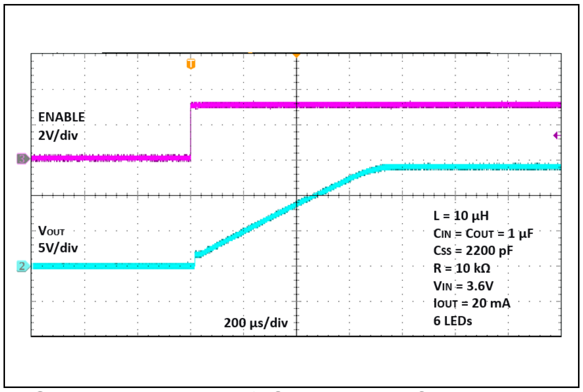


FIGURE 5-7: 6-Series LED Circuit with External Soft-Start.

6.0 EXTERNAL COMPONENT SELECTION

The MIC2287C can be used across a wide rage of applications. The table below shows recommended inductor and output capacitor values for various series-LED applications.

TABLE 6-1: CAPACITOR VALUE RANGE

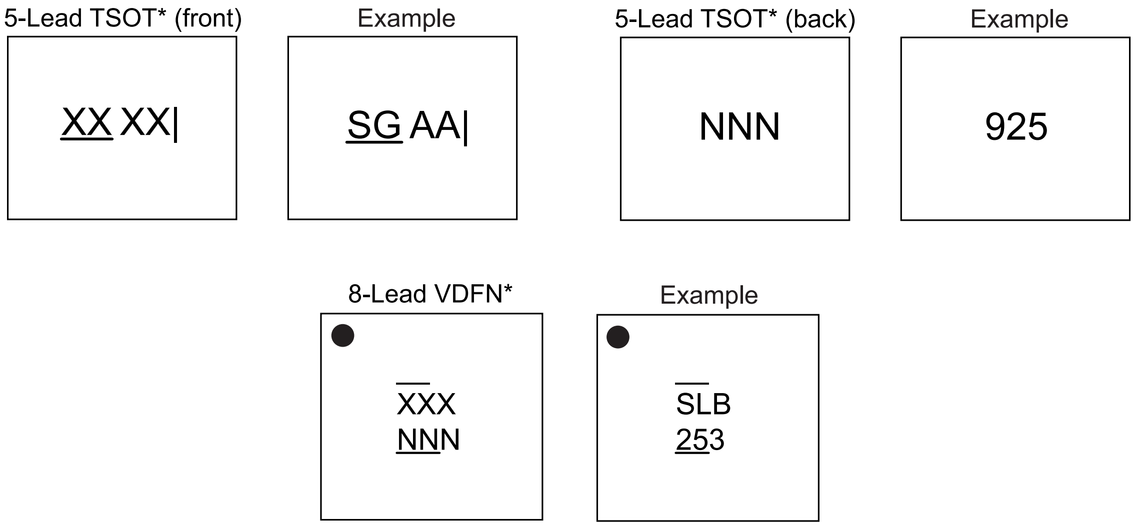
Series LEDs	Inductor Value	$C_{OUT(MIN)}$	$C_{IN(MIN)}$
2, 3	4.7 µF–10 µF	0.22 µF	1 µF
	15 µF	1 µF	1 µF
	22 µF	2.2 µF	1 µF
4	4.7 µF–10 µF	0.27 µF	1 µF
	15 µF–22 µF	1 µF	1 µF
5, 6, 7, 8	4.7 µF–22 µF	0.27 µF	1 µF

TABLE 6-2: MIC2287C RECOMMENDED INDUCTORS

Part Number	Value (µH)	DCR Typical (Ω)	I_{SAT} (A)	Size W × L × H (mm)
Coilcraft				
XGL3520-472ME_	4.7	0.063	1.8	3.2 × 3.5 × 2.0
LPS4018-472MR	4.7	0.125	1.9	4.0 × 4.0 × 1.8
XGL4020-682ME_	6.8	0.063	2.5	4.0 × 4.0 × 2.1
LPS4018-682MR_	6.8	0.15	1.3	4.0 × 4.0 × 2.1
XGL4040-103ME_	10	0.045	2.2	4.0 × 4.0 × 4.1
LPS4018-103MR_	10	0.2	1.2	4.0 × 4.0 × 2.1
XGL4040-153ME_	15	0.074	1.9	4.0 × 4.0 × 4.1
LPS4018-153MR_	15	0.26	0.91	4.0 × 4.0 × 2.1
XGL4040-223ME_	22	0.104	1.4	4.0 × 4.0 × 4.1
Würth Elektronik				
74405031047	4.7	0.196	2.5	3.0 × 2.7 × 1.2
74438333047	4.7	0.356	1.65	3.0 × 3.0 × 1.0
74438336068	6.8	0.168	1.85	3.0 × 3.0 × 2.0
74404042068	6.8	0.098	2	4.0 × 3.7 × 1.8
74438336100	10	0.28	1.55	3.0 × 3.0 × 2.0
74405042100	10	0.18	3.5	4.0 × 3.7 × 2.0
74404042150	15	0.21	1.4	4.0 × 3.7 × 1.8
74438356150	15	0.2	1.35	4.1 × 4.1 × 2.1
74408943220	22	0.185	1.4	4.8 × 4.8 × 3.8
TDK Corporation				
VLCF4024T-4R7N1R4-2	4.7	0.75	1.43	4.0 × 4.0 × 2.4
VLCF4024T-6R8N1R1-2	6.8	0.101	1.15	4.0 × 4.0 × 2.4
VLS4012HBX-220M-N	22	0.59	1.26	4.0 × 4.0 × 1.4

7.0 PACKAGING INFORMATION

7.1 Package Marking Information



PACKAGE MARKING DRAWING SYMBOLS LEGEND

Symbol	Definition
XX . . . X	Product code or customer-specific information. (Note 1, Note 2)
YYWW	Date code, where YY is the last 2 digits of calendar year and WW is the work week (i.e., week of January 1 is week 01). (Note 3)
M	Month of assembly (if applicable). January is represented by “A” and each month thereafter follows the order of the alphabet through “L” for December.
NNN	Alphanumeric traceability code. (Note 3, Note 4)
e3	Pb-free JEDEC designator for Matte Tin (Sn).
*	Indicates this package is Pb-free. The Pb-free JEDEC designator (the symbol in the row above this one) can be found on the outer packaging for this package.
●, ▲, ▼	Pin one index is identified by a dot, delta up, or delta down (triangle mark).

Note 1: If the full Microchip part number cannot fit on one line, it will be carried over to the next line, limiting the number of available characters for customer-specific information. The package may or may not include the corporate logo.

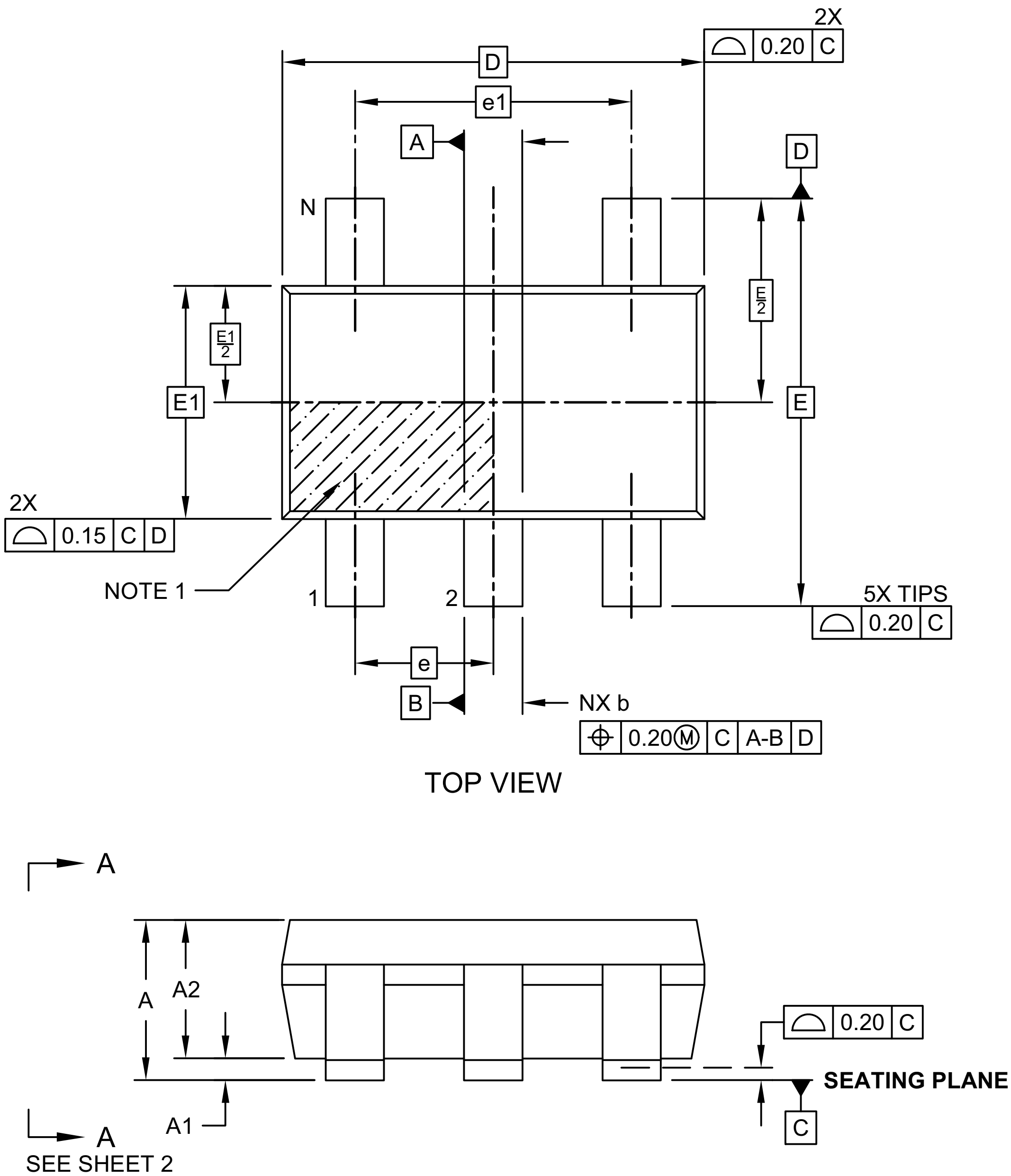
2: Any underbar (_) and/or overbar (‾) symbols shown in a package marking drawing may not be to scale.

3: If the full date code (YYWW) and the alphanumeric traceability code (NNN)—usually marked together on the last or only line of a package marking as the seven-character YYWWNNN—cannot fit on the package together, the codes will be truncated based on the number of available character spaces, as follows:
6 characters = YWWNNN; 5 characters = WWNNN; 4 characters = WNNN; 3 characters = NNN;
2 characters = NN; 1 character = N.

4: Some products might have a “Y” symbol at the end of the last or only line in a package marking, usually at the end of the alphanumeric traceability code (NNN or truncated versions), to indicate the product is Pb-free.

5-Lead TSOT [D5A] Package Outline and Recommended Land Pattern

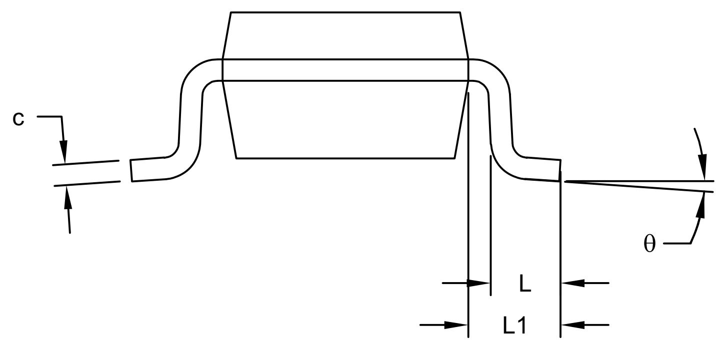
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



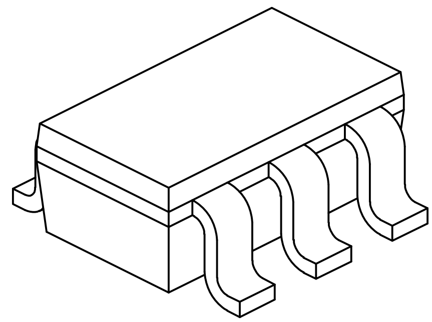
Microchip Technology Drawing C04-1179 Rev A Sheet 1 of 2

5-Lead TSOT [D5A] Package Outline and Recommended Land Pattern

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



VIEW A-A
SHEET 1



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Leads	N		5	
Pitch	e		0.95 BSC	
Outside lead pitch	e1		1.90 BSC	
Overall Height	A	-	-	1.00
Molded Package Thickness	A2	0.84	0.87	0.90
Standoff	A1	0.00	-	0.10
Overall Width	E		2.80 BSC	
Molded Package Width	E1		1.60 BSC	
Overall Length	D		2.90 BSC	
Foot Length	L	0.30	0.40	0.50
Footprint	L1		0.60 REF	
Foot Angle	ϕ	0°	-	4°
Lead Thickness	c		0.127 REF	
Lead Width	b	0.30	-	0.50

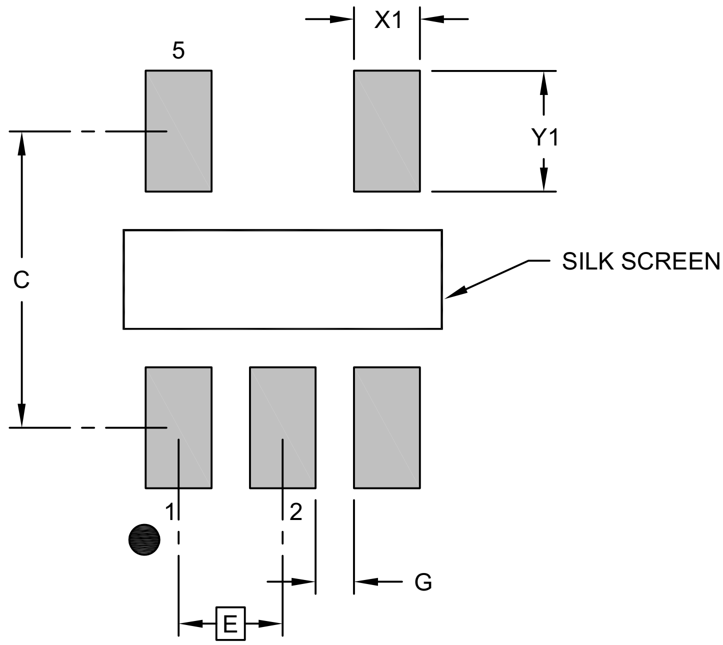
Notes:

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1179 Rev A Sheet 1 of 2

5-Lead TSOT [D5A] Package Outline and Recommended Land Pattern

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.95 BSC		
Contact Pad Spacing	C		2.60	
Contact Pad Width (X5)	X1			0.60
Contact Pad Length (X5)	Y1			1.10
Contact Pad to Center Pad (X2)	G	0.20		

Notes:

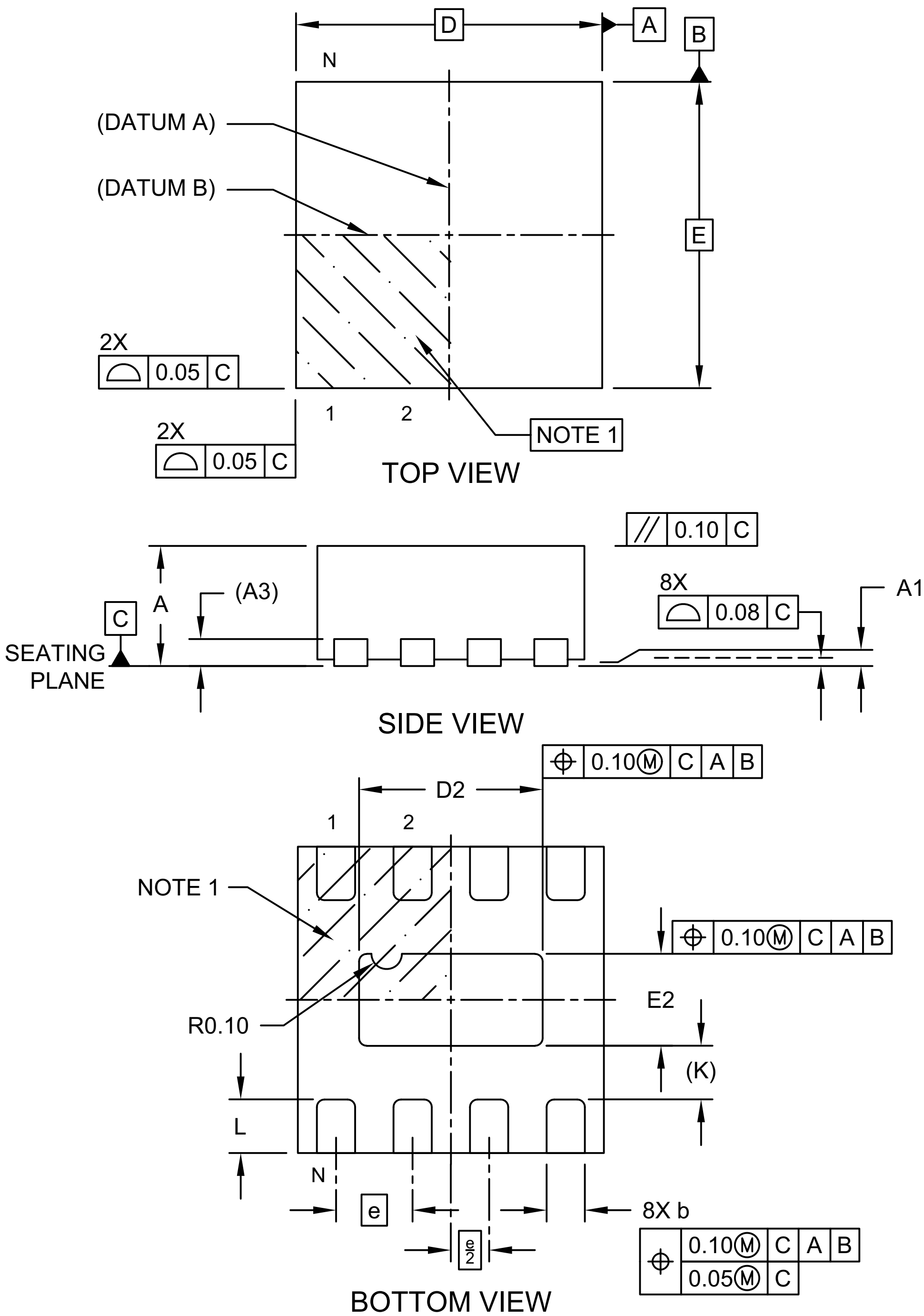
1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-3179 Rev A

8-Lead 2 mm × 2 mm VDFN [H2A] Package Outline and Recommended Land Pattern

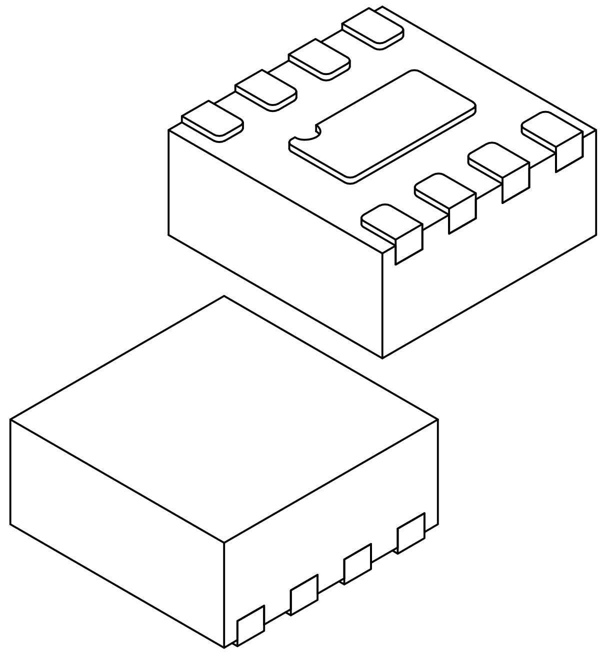
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Microchip Technology Drawing C04-1247 Rev A Sheet 1 of 2

8-Lead 2 mm × 2 mm VDFN [H2A] Package Outline and Recommended Land Pattern

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		8	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.203 REF	
Overall Length	D		2.00 BSC	
Exposed Pad Length	D2	1.10	1.20	1.30
Overall Width	E		2.00 BSC	
Exposed Pad Width	E2	0.50	0.60	0.70
Terminal Width	b	0.20	0.25	0.30
Terminal Length	L	0.30	0.35	0.40
Terminal-to-Exposed-Pad	K		0.35 REF	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

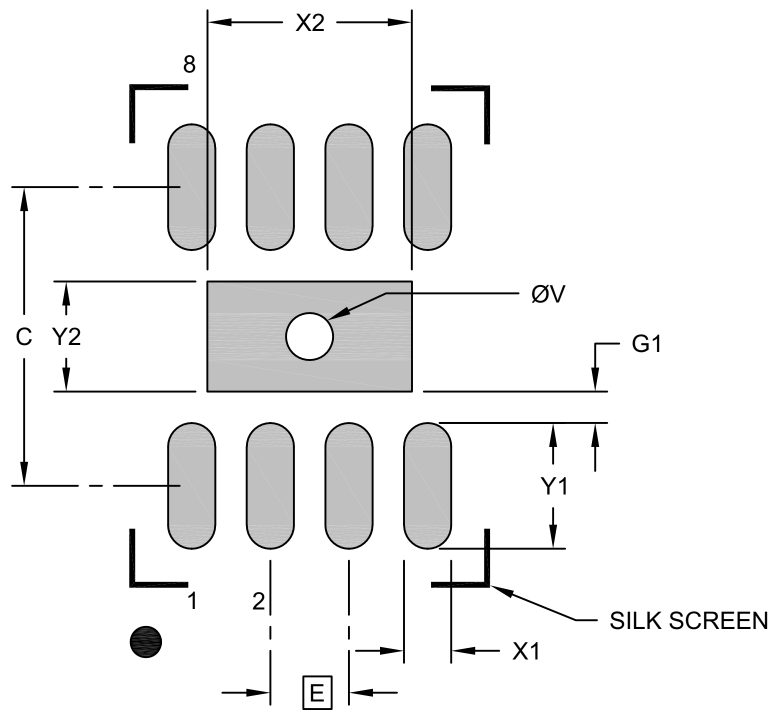
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1247 Rev A Sheet 2 of 2

8-Lead 2 mm × 2 mm VDFN [H2A] Package Outline and Recommended Land Pattern

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			0.70
Optional Center Pad Length	Y2			1.30
Contact Pad Spacing	C		1.90	
Contact Pad Width (X8)	X1			0.30
Contact Pad Length (X8)	Y1			0.80
Contact Pad to Center Pad (X8)	G1	0.20		
Thermal Via Diameter	V		0.30	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-3247 Rev. A

APPENDIX A: REVISION HISTORY

Revision A (September 2023)

- Converted Micrel document MIC2287C to Microchip data sheet DS20006808A.
- Corrections made where needed for various figures, captions, table values, and content order.
- Other minor text changes throughout.

NOTES:

PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, contact your local Microchip representative or sales office.

PART No.	-XX	X	XX	-XX
Device	Output Overvoltage Protection (OVP)	Junction Temp. Range	Package	Media Type

Device:	MIC2287C:		1.2 MHz PWM White LED Driver with OVP
OVP:	<blank>	=	No OVP (D5 package option only)
	-15	=	15V Output Overvoltage Protection
	-24	=	24V Output Overvoltage Protection
	-34	=	34V Output Overvoltage Protection
Junction Temperature Range:	Y	=	40°C to +105°C
Package:	D5	=	5-Lead Thin SOT-23
	ML	=	8-Lead 2 mm × 2 mm VDFN
Media Type:	-TR	=	3000/Reel (D5 package option only)
	-TR	=	5000/Reel (ML package option only)
	-TX	=	3000/Reel, Non-standard Tape & Reel

Note 1: Tape and Reel identifier only appears in the catalog part number description. This identifier is used for ordering purposes and is not printed on the device package. Check with your Microchip Sales Office for package availability with the Tape and Reel options.

Examples:

a) MIC2287CYD5-TR: MIC2287C, No OVP, –40°C to +105°C Junction Temp. Range, 5-Lead Thin SOT-23, 3000/Reel

b) MIC2287C-24YML-TR: MIC2287C, 24V Output Overvoltage Protection, –40°C to +105°C Temp. Range, 8-Lead 2 mm × 2 mm VDFN, 5000/Reel

c) MIC2287C-15YML-TR: MIC2287C, 15V Output Overvoltage Protection, –40°C to +105°C Temp. Range, 8-Lead 2 mm × 2 mm VDFN, 5000/Reel

d) MIC2287C-34YML-TR: MIC2287C, 34V Output Overvoltage Protection, –40°C to +105°C Temp. Range, 8-Lead 2 mm × 2 mm VDFN, 5000/Reel

e) MIC2287CYD5-TX: MIC2287C, No OVP, –40°C to +105°C Junction Temp. Range, 5-Lead Thin SOT-23, 3000/Reel (Non-Standard Tape & Reel)

NOTES:

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