MIC2287

1.2 MHz PWM White LED Driver with OVP

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
- <1% Line and Load Regulation
- <1 µA Shutdown Current
- Overtemperature Protection
- UVLO
- Low Profile Thin SOT-23-5 Package Option
- 8-Lead 2 mm x 2 mm VDFN Package Option
- –40°C to +125°C Junction Temperature Range

Applications

- White LED Driver for Backlighting:
  - Cell Phones
  - PDAs
  - GPS Systems
  - Digital Cameras
  - MP3 Players
  - IP Phones
- Photo Flash LED Driver
- LED Flashlights
- Constant Current Power Supplies

General Description

The MIC2287 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 34V and a switch current of over 500 mA, the MIC2287 easily drives a string of up to 8 white LEDs in series, ensuring uniform brightness and eliminating several ballast resistors.

The MIC2287 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.

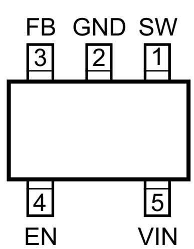
To optimize efficiency, the feedback voltage is set to only 95 mV. This reduces the power dissipation in the current set resistor and allows the lowest total output voltage, hence minimal current draw from the battery.

The MIC2287 is available with three 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.

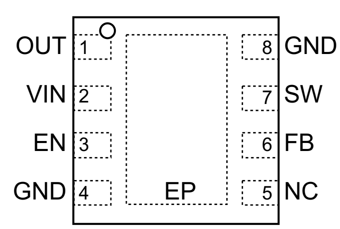
The MIC2287 is available in low profile 5-lead Thin SOT-23 and an 8-lead 2 mm x 2 mm VDFN package options. The MIC2287 has a junction temperature range of –40°C to +125°C.

Package Types

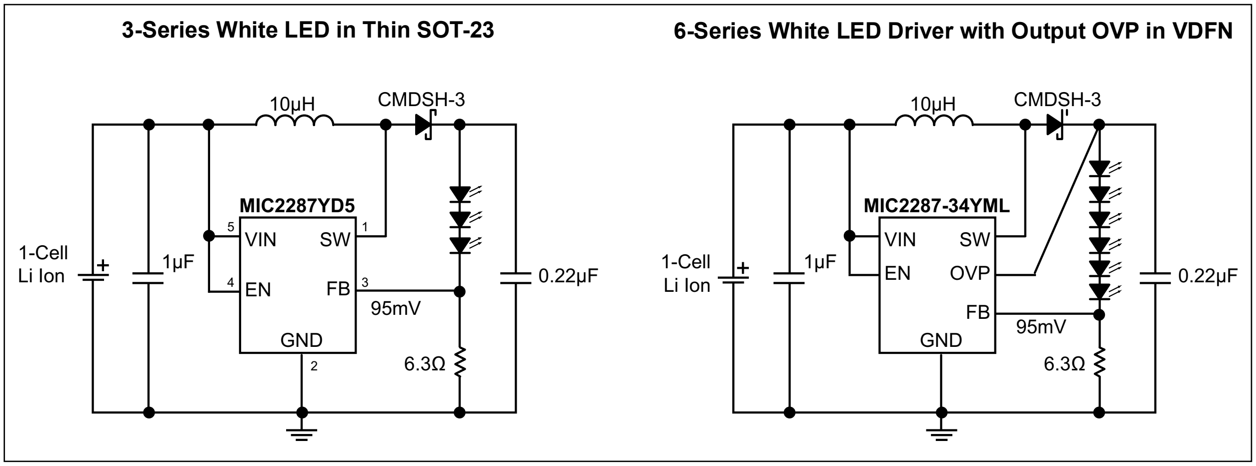
MIC2287
5-Lead TSOT-23 (D5)
(Top View)



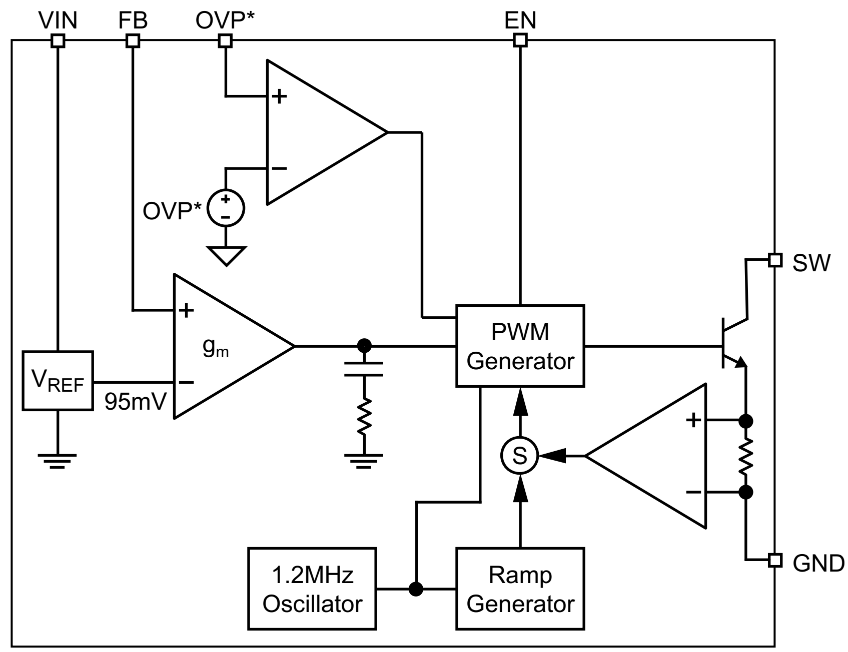
MIC2287
8-Lead VDFN (ML)
(Top View)



Typical Application Circuits



Functional Block Diagram



*OVP available on VDFN package option only

1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings †

Supply Voltage (V_{IN}) ....+12V
Switch Voltage (V_{SW}) ....–0.3V to +34V
Enable Pin Voltage (V_{EN})....................–0.3V to V_{IN}
Feedback Voltage (V_{FB})....................+6V
Switch Current (I_{SW}) 2A
ESD Rating (Note 1) ....2 kV

Operating Ratings ‡

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

† Notice: Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operational sections of this specification is not intended. Exposure to maximum rating conditions for extended periods may affect device reliability.

‡ Notice: The device is not guaranteed to function outside its operating ratings.

Note 1: Device is ESD sensitive. Handling precautions are recommended. Human body model.

ELECTRICAL CHARACTERISTICS

T_A = +25°C, V_{IN} = V_{EN} = 3.6V, V_{OUT} = 10V, I_{OUT} = 10 mA, unless otherwise noted.
Bold values valid for –40°C ≤ T_J ≤ +125°C; unless noted. Note 1

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Supply Voltage Range	V_{IN}	**2.5**	—	**10**	V	—
Undervoltage Lockout	V_{UVLO}	1.8	2.1	2.4	V	—
Quiescent Current	I_{VIN}	—	2.5	5	mA	V_{FB} > 200 mV, (not switching)
Shutdown Current	I_{SD}	—	0.1	**1**	µA	V_{EN} = 0V, Note 2
Feedback Voltage	V_{FB}	90	95	100	mV	±5%
Feedback Input Current	I_{FB}	—	–450	—	nA	V_{FB} = 95 mV
Line Regulation (Note 3)	—	—	0.5	1	%	3V ≤ V_{IN} ≤ 5V
Load Regulation (Note 3)	—	—	0.5	2	%	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_{SW}	—	0.01	**5**	µA	V_{EN} = 0V, V_{SW} = 10V
Enable Threshold	V_{EN}	**1.5**	—	—	V	Turn on
		—	—	**0.4**		Turn off
Enable Pin Current	I_{EN}	—	20	40	µA	V_{EN} = 10V
Oscillator Frequency	f_{SW}	1.05	1.2	1.35	MHz	—
Overvoltage Protection	V_{OVP}	13	14	16	V	MIC2287YML-15
		21	22.5	24		MIC2287YML-24
		30	32	34		MIC2287YML-34
Overtemperature Threshold Shutdown	T_J	—	150	—	°C	—
		—	10	—		Hysteresis

Note 1: Specifications for packaged product only.
2: I_{SD} = I_{VIN}.
3: Ensured by design.

TEMPERATURE SPECIFICATIONS

Parameters	Sym.	Min.	Typ.	Max.	Units	Conditions
Temperature Ranges						
Junction Temperature Range	T_J	–40	—	+125	°C	—
Storage Temperature Range	T_S	–65	—	+150	°C	—
Package Thermal Resistances						
Thermal Resistance, VDFN 8-Ld	θ_{JA}	—	93	—	°C/W	—
Thermal Resistance, TSOT-23 5-Ld	θ_{JA}	—	256	—	°C/W	—

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.

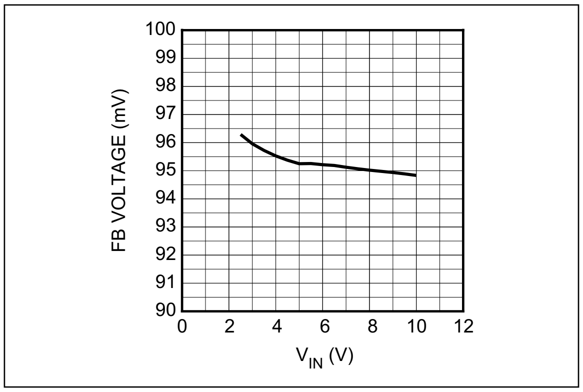


FIGURE 2-1: Feedback Voltage vs. Input Voltage.

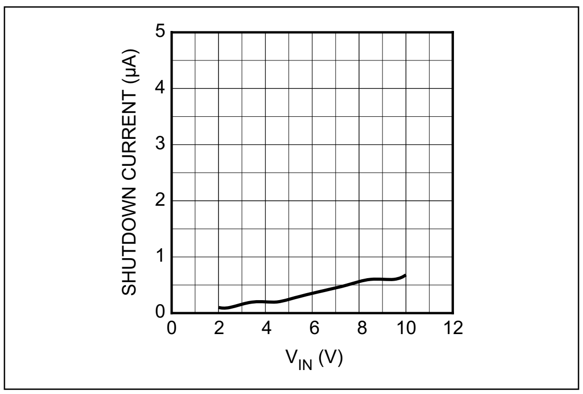


FIGURE 2-2: Shutdown Current vs. Input Voltage.

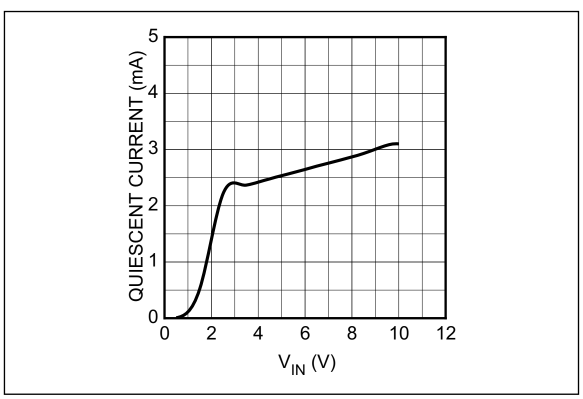


FIGURE 2-3: Quiescent Current vs. Input Voltage.

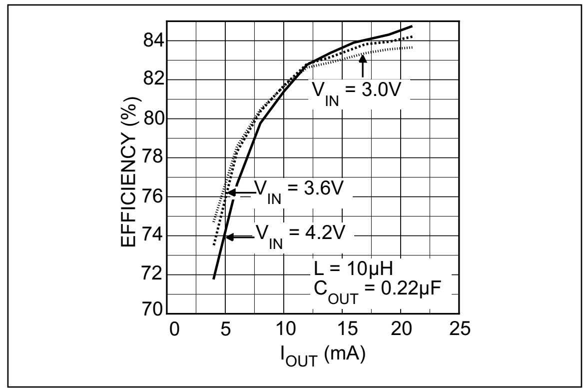


FIGURE 2-4: 3-Series LED Efficiency.

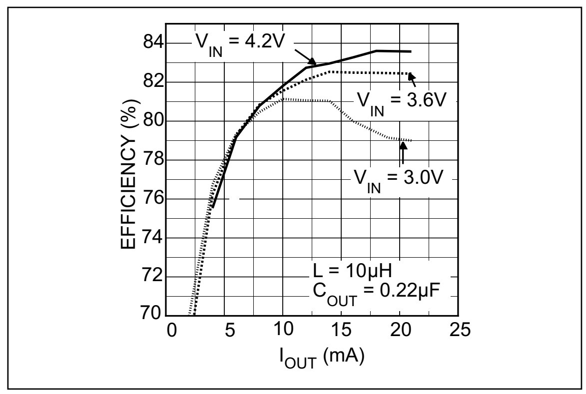


FIGURE 2-5: 6-Series LED Efficiency.

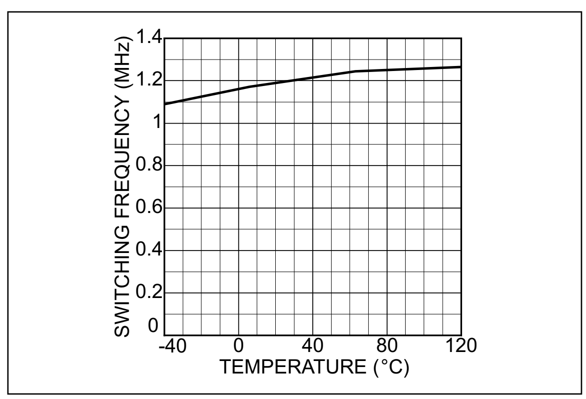


FIGURE 2-6: Switch Frequency vs. Temperature.

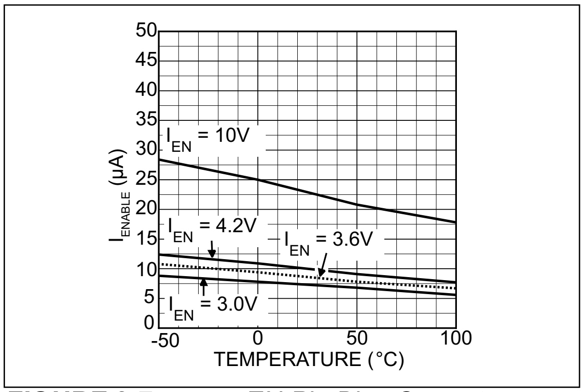


FIGURE 2-7: *EN Pin Bias Current vs. Temperature.*

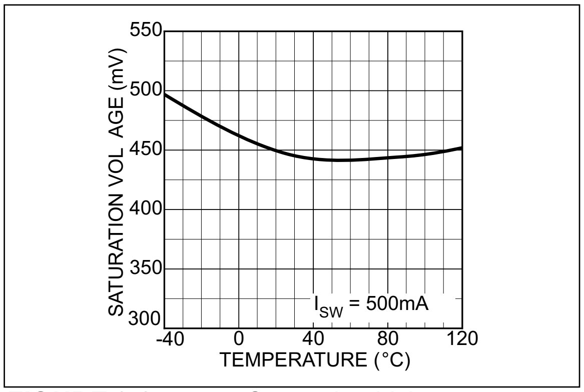


FIGURE 2-8: *Saturation Voltage vs. Temperature.*

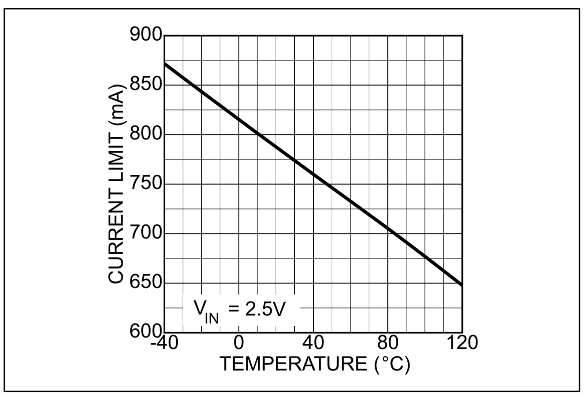


FIGURE 2-9: *Current Limit vs. Temperature.*

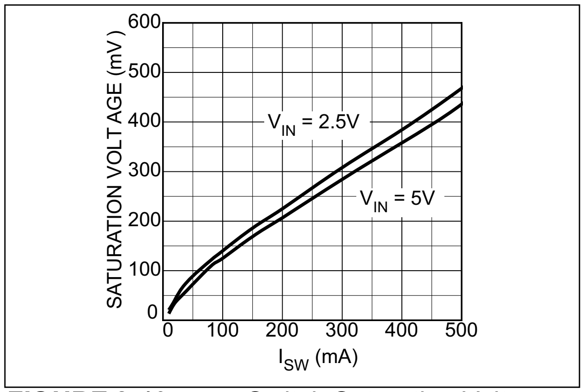


FIGURE 2-10: *Switch Saturation Voltage vs. Current.*

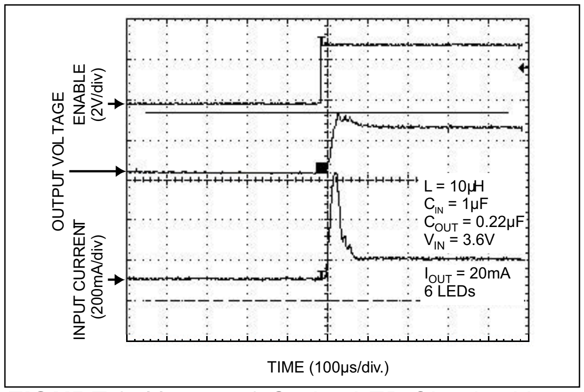


FIGURE 2-11: *6-Series LED Circuit without External Soft-Start.*

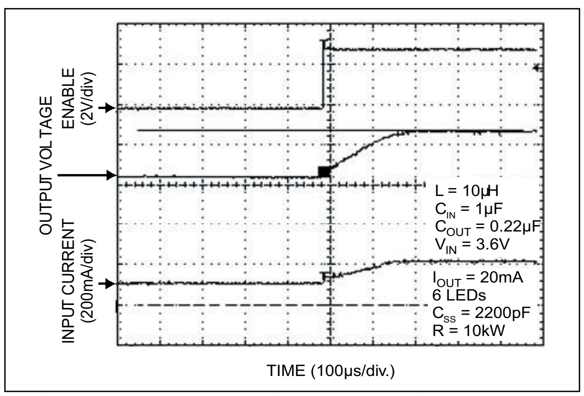


FIGURE 2-12: *6-Series LED Circuit with External Soft-Start.*

3.0 PIN DESCRIPTIONS

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

TABLE 3-1: PIN FUNCTION TABLE

Pin Number TSOT-23	Pin Number 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 the regulator. Logic low shuts down the regulator.
5	2	VIN	Supply (Input): 2.5V to 10V 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.

4.0 FUNCTIONAL DESCRIPTION

The MIC2287 is a constant frequency, PWM current mode boost regulator (see the Functional Block Diagram). The MIC2287 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:

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

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 EXTERNAL COMPONENT SELECTION

The MIC2287 can be used across a wide rage of applications. Table 5-1 shows recommended inductor and output capacitor values for various series-LED applications.

TABLE 5-1: RECOMMENDED INDUCTOR & OUTPUT CAPACITOR VALUES

Series LEDs	L	Manufacturer	Min. C_{OUT}	Manufacturer
2	22 µH	LQH32CN220K21 (Murata) NLC453232T-220K (TDK)	2.2 µF	0805ZD225KAT (AVX) GRM40X5R225K10 (Murata)
	15 µH	LQH32CN150K21 (Murata) NLC453232T-150K (TDK)	1 µF	0805ZD105KAT (AVX) GRM40X5R105K10 (Murata)
	10 µH	LQH32CN100K21 (Murata) NLC453232T-100K (TDK)	0.22 µF	0805ZD224KAT (AVX) GRM40X5R224K10 (Murata)
	6.8 µH	LQH32CN6R8K21 (Murata) NLC453232T-6R8K (TDK)	0.22 µF	0805ZD225KAT (AVX) GRM40X5R225K10 (Murata)
	4.7 µH	LQH32CN4R7K21 (Murata) NLC453232T-4R7K (TDK)	0.22 µF	0805ZD224KAT (AVX) GRM40X5R224K10 (Murata)
3	22 µH	LQH43MN220K21 (Murata) NLC453232T-220K (TDK)	2.2 µF	0805YD225MAT (AVX) GRM40X5R225K16 (Murata)
	15 µH	LQH43MN150K21 (Murata) NLC453232T-150K (TDK)	1 µF	0805YD105MAT (AVX) GRM40X5R105K16 (Murata)
	10 µH	LQH43MN100K21 (Murata) NLC453232T-100K (TDK)	0.22 µF	0805YD224MAT (AVX) GRM40X5R224K16 (Murata)
	6.8 µH	LQH43MN6R8K21 (Murata) NLC453232T-6R8K (TDK)	0.22 µF	0805YD224MAT (AVX) GRM40X5R224K16 (Murata)
	4.7 µH	LQH43MN4R7K21 (Murata) NLC453232T-4R7K (TDK)	0.27 µF	0805YD274MAT (AVX) GRM40X5R224K16 (Murata)
4	22 µH	LQH43MN220K21 (Murata) NLC453232T-220K (TDK)	1 µF	0805YD105MAT (AVX) GRM40X5R105K25 (Murata)
	15 µH	LQH43MN150K21 (Murata) NLC453232T-150K (TDK)	1 µF	0805YD105MAT (AVX) GRM40X5R105K25 (Murata)
	10 µH	LQH43MN100K21 (Murata) NLC453232T-100K (TDK)	0.27 µF	0805YD274MAT (AVX) GRM40X5R274K25 (Murata)
	6.8 µH	LQH43MN6R8K21 (Murata) NLC453232T-6R8K (TDK)	0.27 µF	0805YD274MAT (AVX) GRM40X5R274K25 (Murata)
	4.7 µH	LQH43MN4R7K21 (Murata) NLC453232T-4R7K (TDK)	0.27 µF	0805YD274MAT (AVX) GRM40X5R274K25 (Murata)
5, 6	22 µH	LQH43MN220K21 (Murata) NLC453232T-220K (TDK)	0.22 µF	08053D224MAT (AVX) GRM40X5R224K25 (Murata)
	15 µH	LQH43MN150K21 (Murata) NLC453232T-150K (TDK)	0.22 µF	08053D224MAT (AVX) GRM40X5R224K25 (Murata)
	10 µH	LQH43MN100K21 (Murata) NLC453232T-100K (TDK)	0.27 µF	08053D274MAT (AVX) GRM40X5R274K25 (Murata)
	6.8 µH	LQH43MN6R8K21 (Murata) NLC453232T-6R8K (TDK)	0.27 µF	08053D274MAT (AVX) GRM40X5R274K25 (Murata)
	4.7 µH	LQH43MN4R7K21 (Murata) NLC453232T-4R7K (TDK)	0.27 µF	08053D274MAT (AVX) GRM40X5R274K25 (Murata)

TABLE 5-1: RECOMMENDED INDUCTOR & OUTPUT CAPACITOR VALUES (CONTINUED)

Series LEDs	L	Manufacturer	Min. C_{OUT}	Manufacturer
7, 8	22 µH	LQH43MN220K21 (Murata) NLC453232T-220K (TDK)	0.22 µF	08053D224MAT (AVX) GRM40X5R224K25 (Murata)
	15 µH	LQH43MN150K21 (Murata) NLC453232T-150K (TDK)	0.22 µF	08053D224MAT (AVX) GRM40X5R224K25 (Murata)
	10 µH	LQH43MN100K21 (Murata) NLC453232T-100K (TDK)	0.27 µF	08053D274MAT (AVX) GRM40X5R274K25 (Murata)
	6.8 µH	LQH43MN6R8K21 (Murata) NLC453232T-6R8K (TDK)	0.27 µF	08053D274MAT (AVX) GRM40X5R274K25 (Murata)
	4.7 µH	LQH43MN4R7K21 (Murata) NLC453232T-4R7K (TDK)	0.27 µF	08053D274MAT (AVX) GRM40X5R274K25 (Murata)

5.1 Dimming Control

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

1. PWM dimming control is implemented by applying a PWM signal on EN pin as shown in Figure 5-1. The MIC2287 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. Typical PWM frequency should be between 100 Hz and 10 kHz.

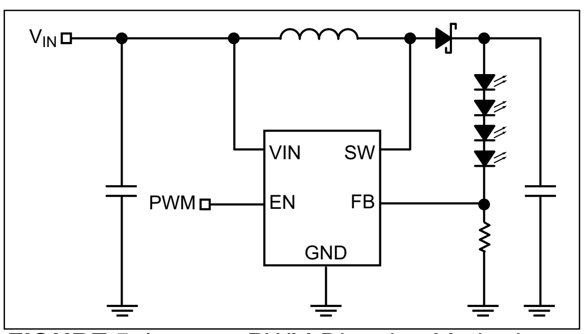


FIGURE 5-1: *PWM Dimming Method*

2. Continuous dimming control is implemented by applying a DC control voltage to the FB pin of the MIC2287 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 (>10 kHz) that can be used to control LED intensity.

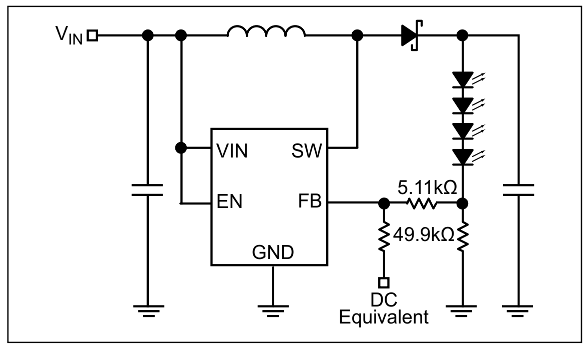


FIGURE 5-2: *Continuous Dimming.*

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 MIC2287 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 MIC2287 has three product options in the 8-lead 2 mm x 2 mm VDFN with overvoltage protection (OVP). The extra pins of the VDFN package allow a dedicated OVP monitor with options for 15V, 24V, or 34V (see Figure 5-3). 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 Thin SOT-23-5 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.

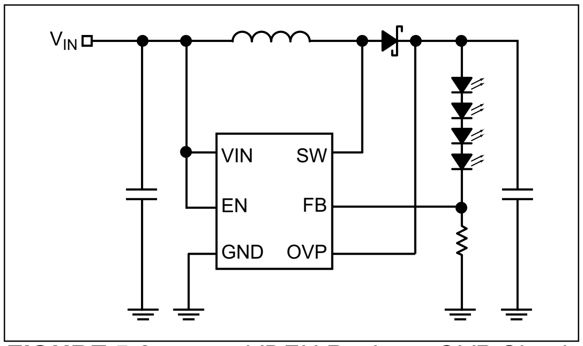


FIGURE 5-3: VDFN Package OVP Circuit.

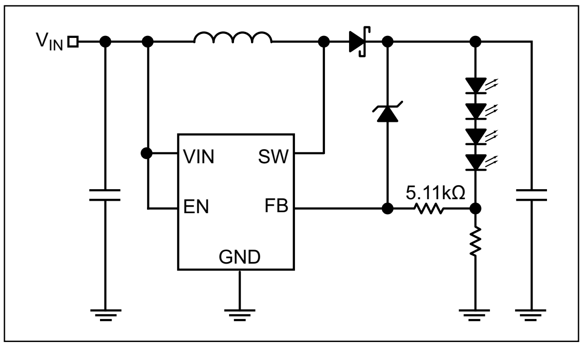


FIGURE 5-4: Thin SOT-23 Package OVP Circuit.

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.

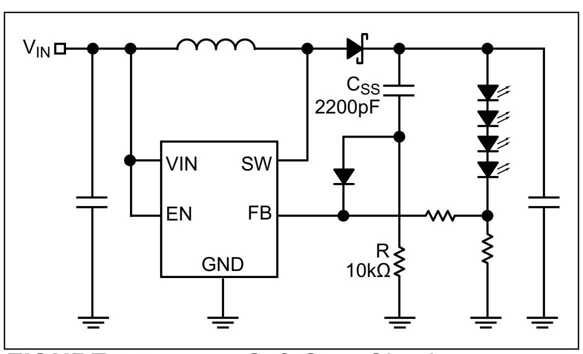
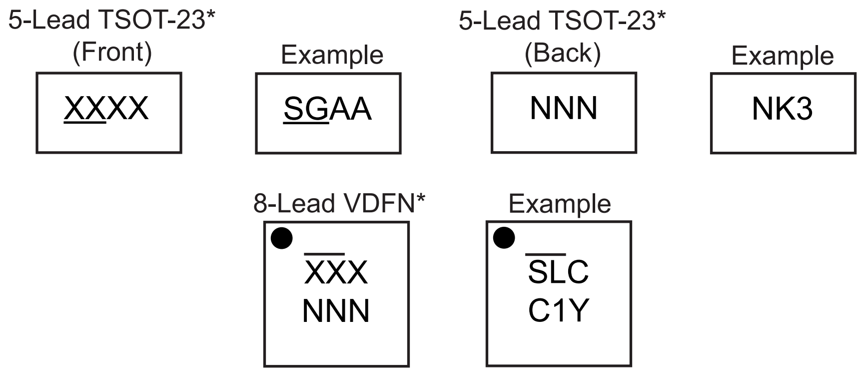


FIGURE 5-5: Soft-Start Circuit.

6.0 PACKAGING INFORMATION

6.1 Package Marking Information



Legend:	XX...X	Product code or customer-specific information
	Y	Year code (last digit of calendar year)
	YY	Year code (last 2 digits of calendar year)
	WW	Week code (week of January 1 is week ‘01’)
	NNN	Alphanumeric traceability code
	(e3)	Pb-free JEDEC® designator for Matte Tin (Sn)
	*	This package is Pb-free. The Pb-free JEDEC designator ((e3)) 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).

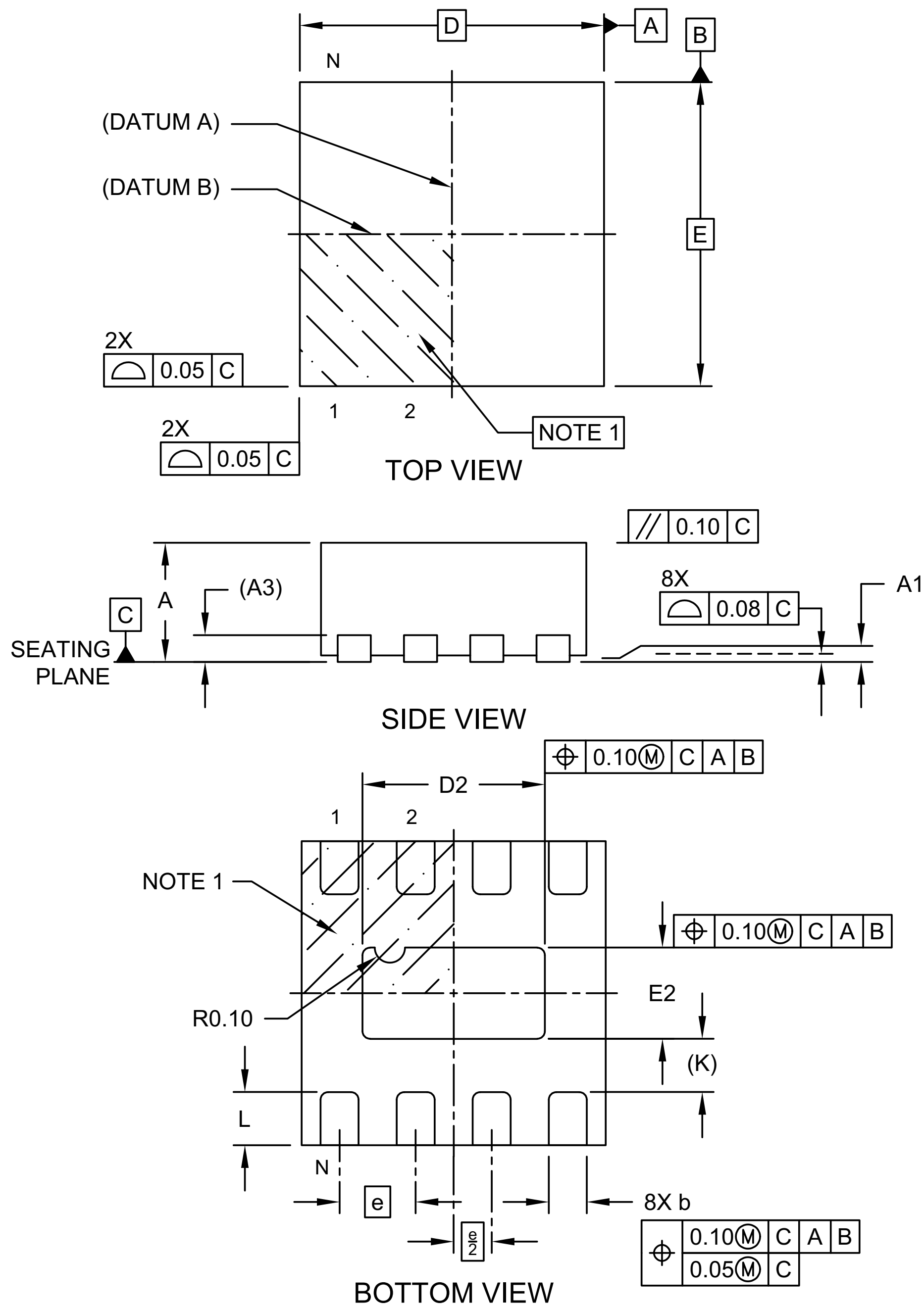
Note: In the event the full Microchip part number cannot be marked on one line, it will be carried over to the next line, thus limiting the number of available characters for customer-specific information. Package may or may not include the corporate logo.

Underbar (_) and/or Overbar (‾) symbol may not be to scale.

Note: If the full seven-character YYWWNNN code cannot fit on the package, the following truncated codes are used based on the available marking space:
6 Characters = YWWNNN; 5 Characters = WWNNN; 4 Characters = WNNN; 3 Characters = NNN;
2 Characters = NN; 1 Character = N

8-Lead Very Thin Plastic Dual Flat, No Lead Package (H2A) - 2x2x0.9 mm Body [VDFN] With 1.20x0.6 mm Exposed Pad

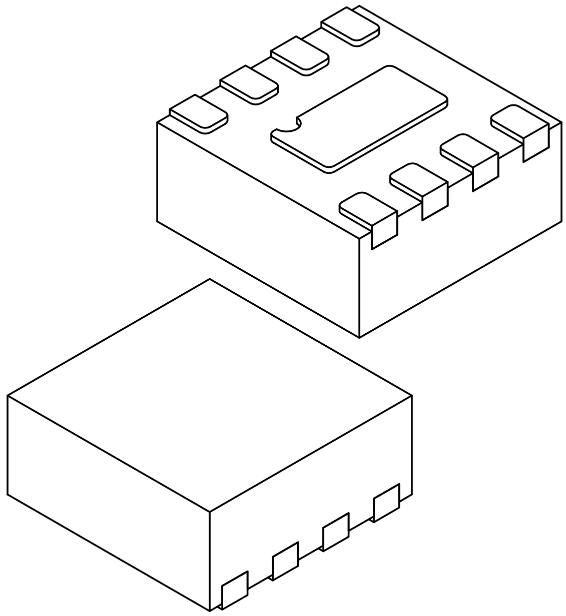
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



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

8-Lead Very Thin Plastic Dual Flat, No Lead Package (H2A) - 2x2x.9 mm Body [VDFN] With 1.20x0.6 mm Exposed Pad

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	

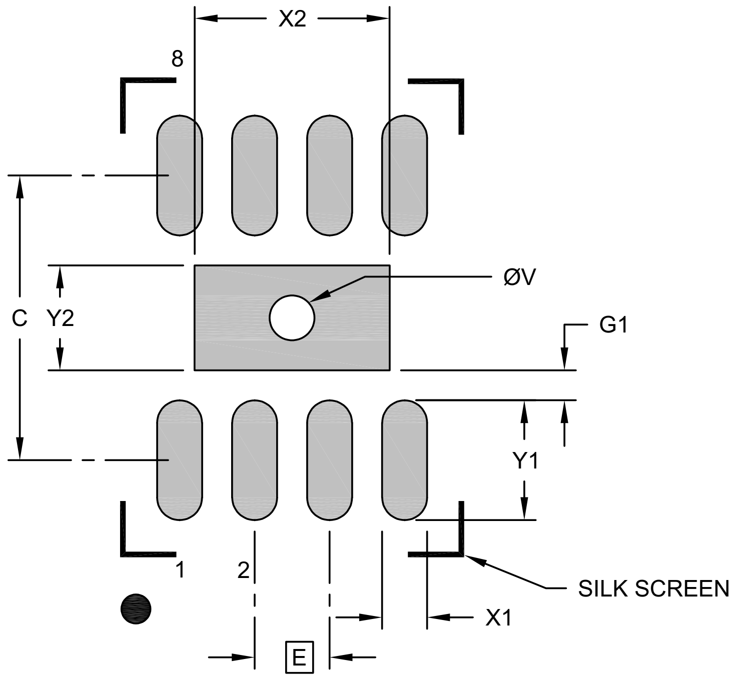
Notes:

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 B Sheet 2 of 2

8-Lead Very Thin Plastic Dual Flat, No Lead Package (H2A) - 2x2 mm Body [VDFN] Micrel Legacy Package

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			1.30
Optional Center Pad Length	Y2			0.70
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	0.27	0.30	0.33

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

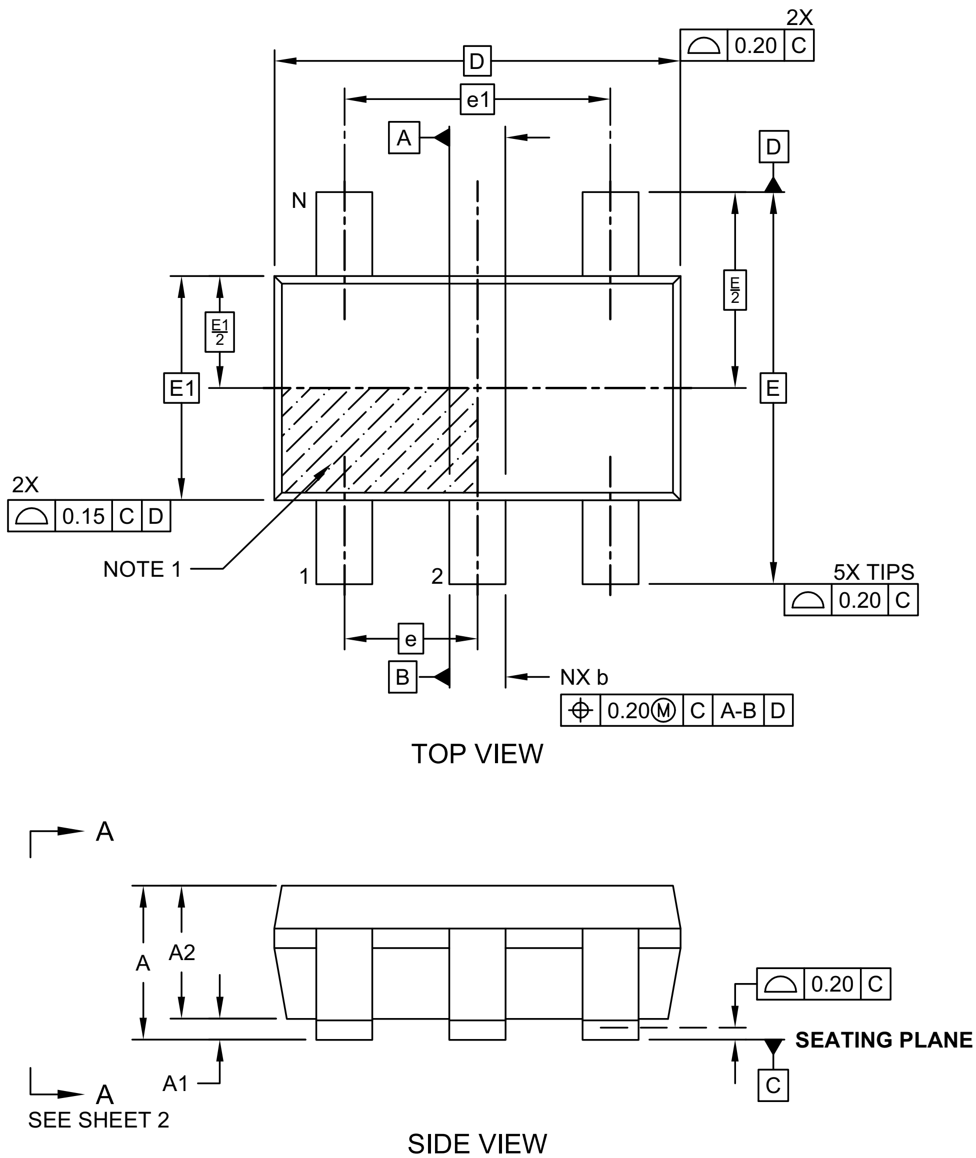
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

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. B

5-Lead Plastic Thin Small Outline Transistor (D5A) [TSOT]
Micrel Legacy Package TSOT-5LD-PL-1

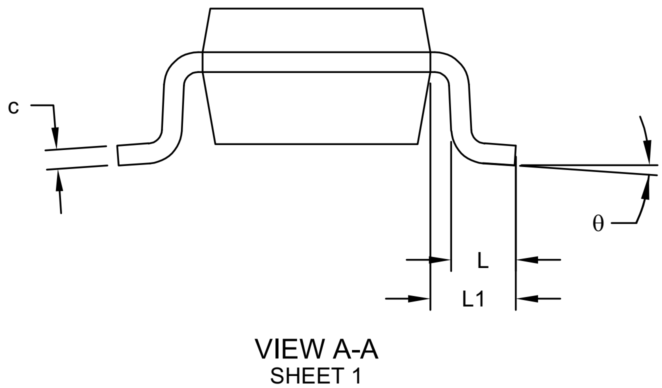
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

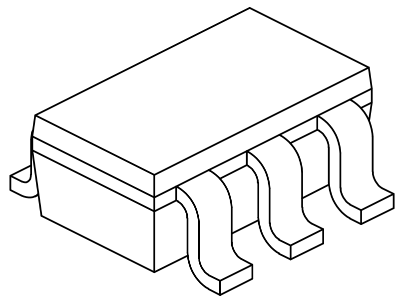


Microchip Technology Drawing C04-1179 Rev A Sheet 1 of 2

5-Lead Plastic Thin Small Outline Transistor (D5A) [TSOT]
Micrel Legacy Package TSOT-5LD-PL-1

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 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

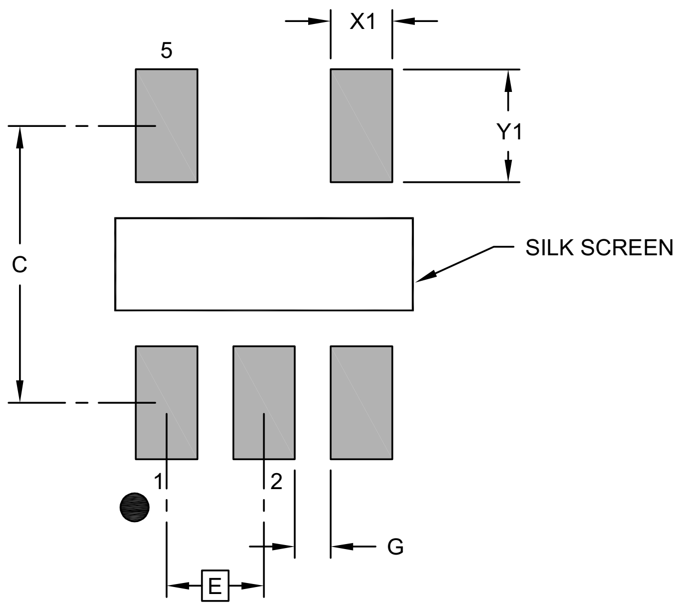
Notes:

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 Plastic Thin Small Outline Transistor (D5A) [TSOT]
Micrel Legacy Package TSOT-5LD-PL-1

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

APPENDIX A: REVISION HISTORY

Revision A (October 2024)

- Converted Micrel document MIC2287 to Microchip data sheet DS20006946A.
- 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 Number	[-XX]	X	XX	-XX
Device	Overvoltage Protection	Temp. Range	Package	Media Type

Device:	MIC2287:		1.2 MHz PWM White LED Driver with OVP
Overvoltage Protection:	<blank>	=	None
	-15	=	15V
	-24	=	24V
	-34	=	34V
Temperature Range:	Y	=	–40°C to +125°C
Package:	D5	=	5-Lead Thin SOT-23
	ML	=	8-Lead 2 mm x 2 mm VDFN
Media Type:	TR	=	3,000/Reel (D5 only)
	TR	=	5,000/Reel (ML only)
	TX	=	3,000/Rev. Reel (D5 only)

Examples:

a) MIC2287YD5-TR:
MIC2287, No Overvoltage Protection, –40°C to +125°C Temp. Range, 5-Lead TSOT-23, 3,000/Reel

b) MIC2287-15YML-TR:
MIC2287, 15V Overvoltage Protection, –40°C to +125°C Temp. Range, 8-Lead VDFN, 5,000/Reel

c) MIC2287-24YML-TR:
MIC2287, 24V Overvoltage Protection, –40°C to +125°C Temp. Range, 8-Lead VDFN, 5,000/Reel

d) MIC2287-34YML-TR:
MIC2287, 34V Overvoltage Protection, –40°C to +125°C Temp. Range, 8-Lead VDFN, 5,000/Reel

Note: 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 option.

NOTES:

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