



Product Change Notification / SYST-26NEEC741

Date:

28-Aug-2021

Product Category:

Linear Regulators

PCN Type:

Document Change

Notification Subject:

Data Sheet - MIC5318 Data Sheet Document Revision

Affected CPNs:

[SYST-26NEEC741_Affected_CPN_08282021.pdf](#)

[SYST-26NEEC741_Affected_CPN_08282021.csv](#)

Notification Text:

SYST-26NEEC741

Microchip has released a new Product Documents for the MIC5318 Data Sheet of devices. If you are using one of these devices please read the document located at [MIC5318 Data Sheet](#).

Notification Status: Final

Description of Change:

- Converted Micrel document MIC5318 to Microchip data sheet template DS20006578A.
- Minor grammatical text changes throughout.

Impacts to Data Sheet: None

Reason for Change: To Improve Productivity

Change Implementation Status: Complete

Date Document Changes Effective: 28 Aug 2021

NOTE: Please be advised that this is a change to the document only the product has not been changed.

Markings to Distinguish Revised from Unrevised Devices: N/A

Attachments:

[MIC5318 Data Sheet](#)

Please contact your local [Microchip sales office](#) with questions or concerns regarding this notification.

Terms and Conditions:

If you wish to receive Microchip PCNs via email please register for our PCN email service at our [PCN home page](#) select register then fill in the required fields. You will find instructions about registering for Microchips PCN email service in the [PCN FAQ](#) section.

If you wish to change your PCN profile, including opt out, please go to the [PCN home page](#) select login and sign into your myMicrochip account. Select a profile option from the left navigation bar and make the applicable selections.

Affected Catalog Part Numbers (CPN)

MIC5318-1.3YD5-TR
MIC5318-1.3YMT-TR
MIC5318-1.5YD5-TR
MIC5318-1.5YD5-TX
MIC5318-1.5YMT-TR
MIC5318-1.8YD5-TR
MIC5318-1.8YD5-TX
MIC5318-1.8YMT-TR
MIC5318-2.1YD5-TR
MIC5318-2.1YMT-TR
MIC5318-2.5YD5-TR
MIC5318-2.5YD5-TX
MIC5318-2.5YMT-TR
MIC5318-2.6YD5-TR
MIC5318-2.6YMT-TR
MIC5318-2.85YD5-TR
MIC5318-2.85YD5-TX
MIC5318-2.8YD5-TR
MIC5318-2.8YD5-TX
MIC5318-2.8YMT-TR
MIC5318-2.9YD5-TR
MIC5318-2.9YMT-TR
MIC5318-3.0YD5-TR
MIC5318-3.0YD5-TX
MIC5318-3.0YMT-TR
MIC5318-3.3YD5-TR
MIC5318-3.3YD5-TX
MIC5318-3.3YMT-TR
MIC5318-4.6YD5-TR
MIC5318-4.6YMT-TR
MIC5318YD5-TR
MIC5318YD5-TX
MIC5318YMT-TR

High Performance 300 mA μ Cap Ultra-Low Dropout Regulator

Features

- Ultra-Low Dropout Voltage 110 mV @ 300 mA
- Input Voltage Range: 2.3V to 6.0V
- 300 mA Guaranteed Output Current
- Stable with Ceramic Output Capacitors
- Ultra-Low Output Noise: 30 μ V_{RMS}
- Low Quiescent Current: 85 μ A Total
- High PSRR > 70 dB @ 1 kHz
- Less than 35 μ s Turn-On Time
- High Output Accuracy
 - $\pm 2\%$ Initial Accuracy
 - $\pm 3\%$ over Temperature
- Thermal Shutdown and Current-Limit Protection
- Tiny 6-lead 1.6 mm x 1.6 mm UDFN package
- Thin SOT23-5 Package

Applications

- Mobile Phones
- PDAs
- GPS Receivers
- Portable Electronics
- Digital Still and Video Cameras

General Description

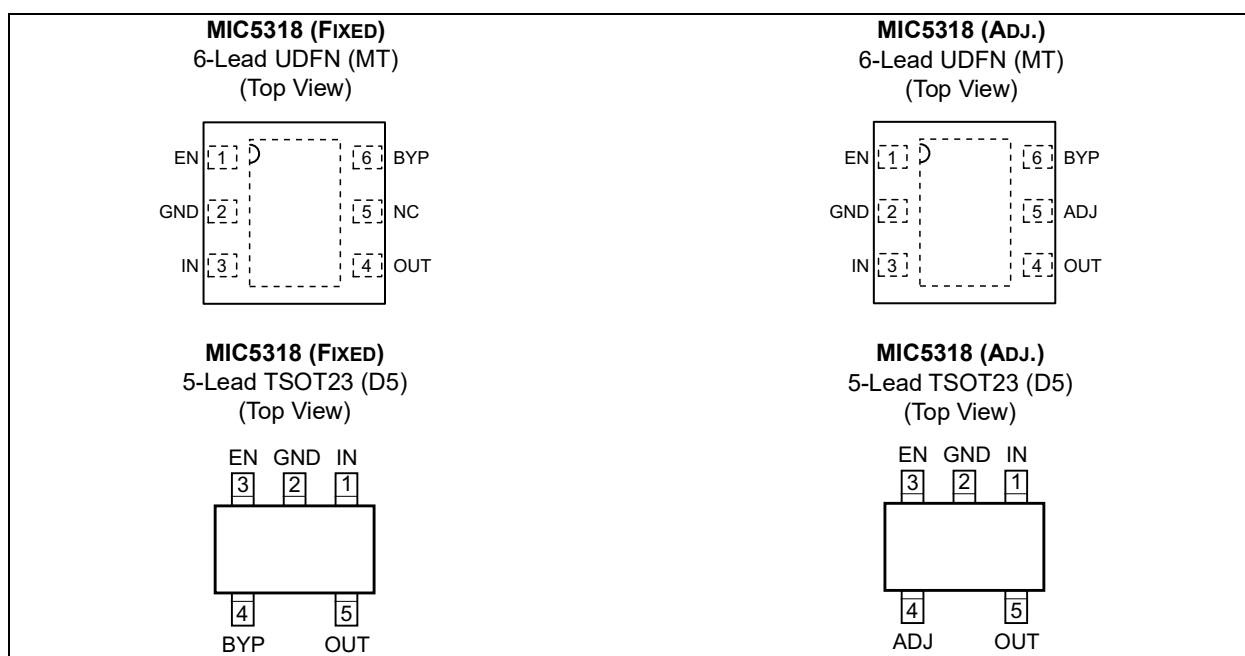
The MIC5318 is a high performance, single output ultra-low dropout regulator, offering low total output noise in an ultra-small UDFN package. The MIC5318 is capable of sourcing 300 mA output current and offers high PSRR and low output noise, making it an ideal solution for RF applications.

Ideal for battery operated applications, the MIC5318 offers 2% initial accuracy, extremely low dropout voltage (110 mV @ 300 mA), and low ground current (typically 85 μ A total). The MIC5318 can also be put into a “zero” off-mode current state, drawing no current when disabled.

The MIC5318 is available in the 1.6 mm x 1.6 mm UDFN package, occupying only 2.56 mm² of PCB area, fully a 36% reduction in board area when compared to SC-70 and 2 mm x 2 mm UDFN packages.

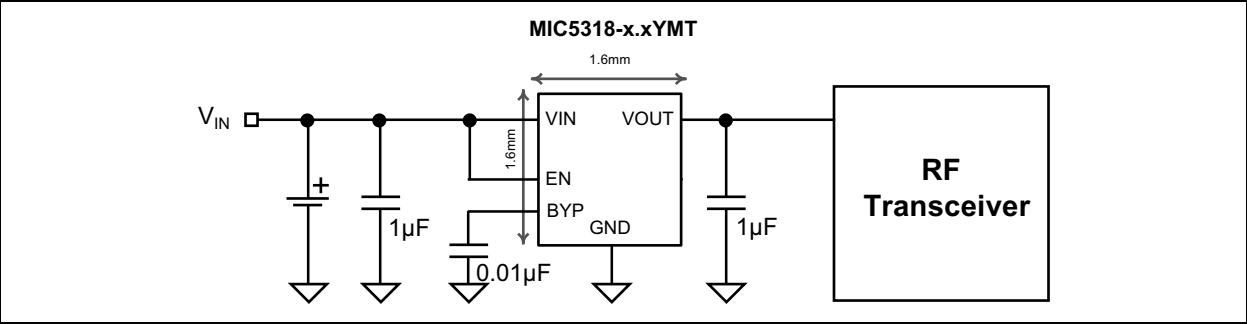
The MIC5318 has an operating junction temperature range of -40°C to $+125^{\circ}\text{C}$ and is available in fixed and adjustable output voltages in lead-free (RoHS compliant) UDFN and Thin SOT23-5 packages.

Package Types

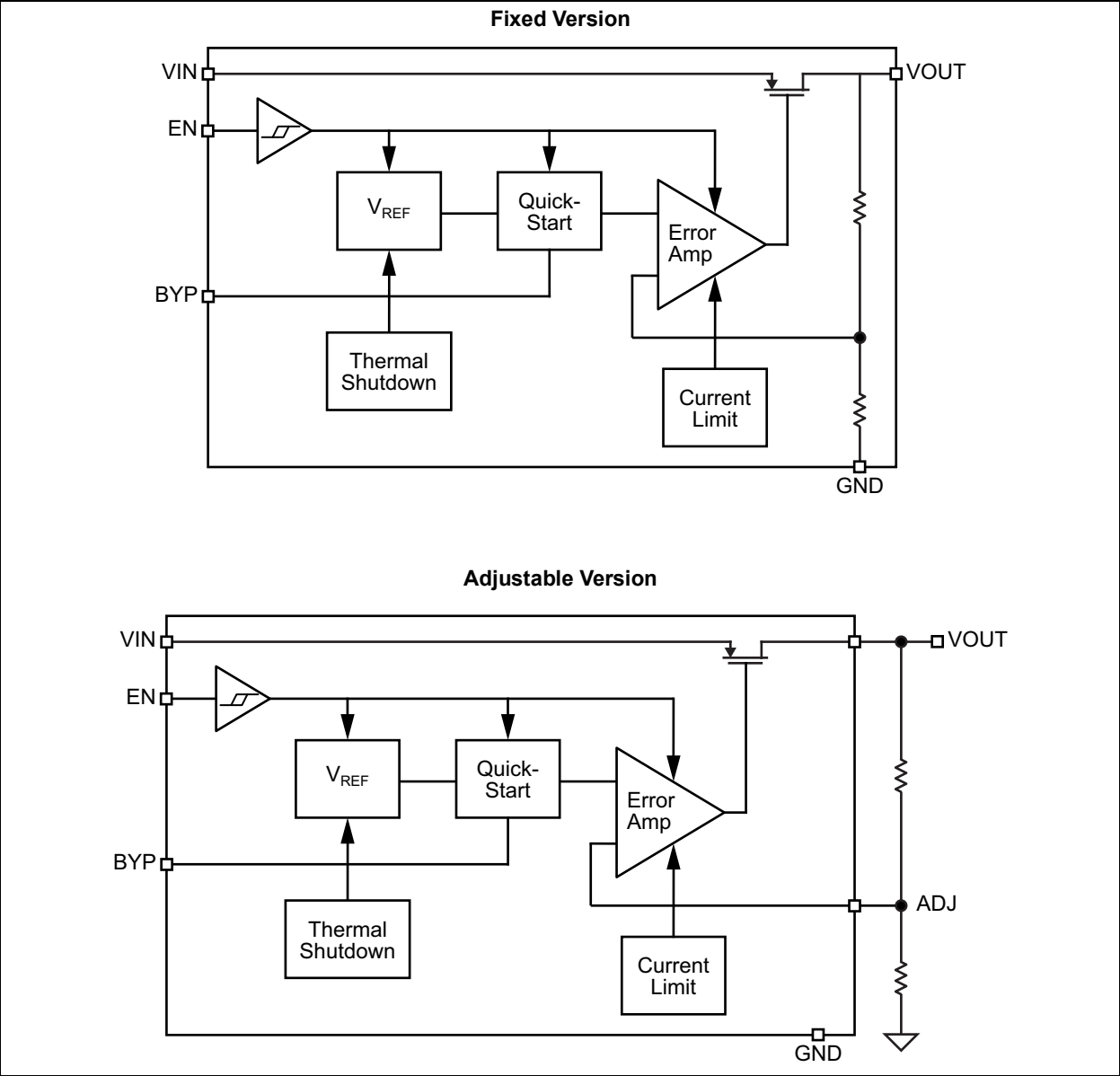


MIC5318

Typical Application Circuit



Functional Block Diagrams



1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings †

Supply Voltage (V_{IN})	0V to +6.5V
Enable Input Voltage (V_{EN})	0V to +6.5V
Power Dissipation (Note 1)	Internally Limited
ESD Rating	Note 2

Operating Ratings ‡

Supply Voltage (V_{IN})	+2.3V to +6.0V
Enable Input Voltage (V_{EN})	0V to V_{IN}

† **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 rating.

Note 1: The maximum allowable power dissipation of any T_A (ambient temperature) is $P_{D(MAX)} = (T_{J(MAX)} - T_A)/\theta_{JA}$. Exceeding the maximum allowable power dissipation will result in excessive die temperature, and the regulator will go into thermal shutdown.

2: Devices are ESD sensitive. Handling precautions are recommended. Human body model.

ELECTRICAL CHARACTERISTICS

Electrical Characteristics: $V_{IN} = V_{OUT} + 1.0V$; $C_{OUT} = 1.0 \mu F$; $I_{OUT} = 100 \mu A$; $T_J = +25^\circ C$, **bold** values valid for $-40^\circ C$ to $+125^\circ C$, unless noted. (Note 1)

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Output Voltage Accuracy	V_{OUT}	-2.0	—	2.0	%	Variation from nominal V_{OUT}
		-3.0	—	3.0		Variation from nominal V_{OUT} ; $-40^\circ C$ to $+125^\circ C$
Line Regulation	$\frac{\Delta V_{OUT}}{(V_{OUT} \times \Delta V_{IN})}$	—	0.02	0.6	%/V	$V_{IN} = V_{OUT} + 1V$ to 6.0V; $I_{OUT} = 100 \mu A$
Load Regulation (Note 2)	$\frac{\Delta V_{OUT}}{V_{OUT}}$	—	0.2	2.0	%	$I_{OUT} = 100 \mu A$ to 300 mA
Dropout Voltage (Note 3)	V_{DO}	—	17	—	mV	$I_{OUT} = 50 mA$; $V_{OUT} \geq 2.8V$
		—	50	100		$I_{OUT} = 150 mA$; $V_{OUT} \geq 2.8V$
		—	110	200		$I_{OUT} = 300 mA$; $V_{OUT} \geq 2.8V$
Ground Pin Current (Note 4)	I_{GND}	—	85	150	μA	$I_{OUT} = 0 mA$ to 300 mA
Ground Pin Current in Shutdown	I_{SHDN}	—	0.01	1	μA	$V_{EN} \leq 0.2V$

Note 1: Specification for packaged product only.

2: Regulation is measured at constant junction temperature using low duty cycle pulse testing, changes in output voltage due to heating effects are covered by the thermal regulation specification.

3: Dropout voltage is defined as the input-to-output differential at which the output voltage drops 2% below its nominal value measured at 1V differential. For outputs below 2.3V, dropout voltage is the input-to-output differential with the minimum input voltage 2.3V.

4: Ground pin current is the regulation quiescent current. The total current drawn from the supply is the sum of the load current plus the ground pin current.

ELECTRICAL CHARACTERISTICS (CONTINUED)

Electrical Characteristics: $V_{IN} = V_{OUT} + 1.0V$; $C_{OUT} = 1.0 \mu F$; $I_{OUT} = 100 \mu A$; $T_J = +25^\circ C$, **bold** values valid for $-40^\circ C$ to $+125^\circ C$, unless noted. (Note 1)

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Ripple Rejection	PSRR	—	75	—	dB	f = Up to 1 kHz; C _{OUT} = 1.0 μF; C _{BYP} = 0.1 μF
		—	55	—		f = 1 kHz to 20 kHz; C _{OUT} = 1.0 μF; C _{BYP} = 0.1 μF
Current Limit	I _{LIM}	340	500	900	mA	V _{OUT} = 0V
Output Voltage Noise	e _N	—	30	—	μV _{RMS}	C _{OUT} = 1.0 μF; C _{BYP} = 0.1 μF; 10 Hz to 100 kHz
Enable Input						
Enable Input Voltage	V _{EN}	—	—	0.2	V	Logic Low
		1.1	—	—		Logic High
Enable Input Current	I _{EN}	—	0.01	1	μA	V _{IL} ≤ 0.2V
		—	0.01	1		V _{IH} ≥ 1.0V
Turn-On Time						
Turn-On Time	t _{ON}	—	30	100	μs	C _{OUT} = 1.0 μF; C _{BYP} = 0.1 μF; I _{OUT} = 150 mA

Note 1: Specification for packaged product only.

- Regulation is measured at constant junction temperature using low duty cycle pulse testing, changes in output voltage due to heating effects are covered by the thermal regulation specification.
- Dropout voltage is defined as the input-to-output differential at which the output voltage drops 2% below its nominal value measured at 1V differential. For outputs below 2.3V, dropout voltage is the input-to-output differential with the minimum input voltage 2.3V.
- Ground pin current is the regulation quiescent current. The total current drawn from the supply is the sum of the load current plus the ground pin current.

TEMPERATURE SPECIFICATIONS

Parameters	Sym.	Min.	Typ.	Max.	Units	Conditions
Temperature Ranges						
Maximum Junction Temperature Range	$T_{J(MAX)}$	-40	—	+125	$^\circ C$	—
Operating Temperature Range	T_J	-40	—	+125	$^\circ C$	—
Storage Temperature Range	T_S	-65	—	+150	$^\circ C$	—
Lead Temperature	—	—	—	+260	$^\circ C$	Soldering, 3 sec.
Package Thermal Resistance						
Thermal Resistance, UDFN 6-Lead	θ_{JA}	—	100	—	$^\circ C/W$	—
Thermal Resistance, TSOT23-5	θ_{JA}	—	235	—	$^\circ C/W$	—

Note 1: The maximum allowable power dissipation is a function of ambient temperature, the maximum allowable junction temperature and the thermal resistance from junction to air (i.e., T_A , T_J , θ_{JA}). Exceeding the maximum allowable power dissipation will cause the device operating junction temperature to exceed the maximum rating. Sustained junction temperatures above that maximum can impact device reliability.

2.0 TYPICAL OPERATING CHARACTERISTICS

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.

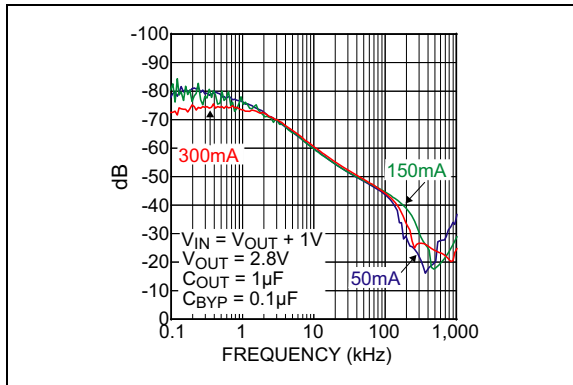


FIGURE 2-1: Power Supply Rejection Ratio.

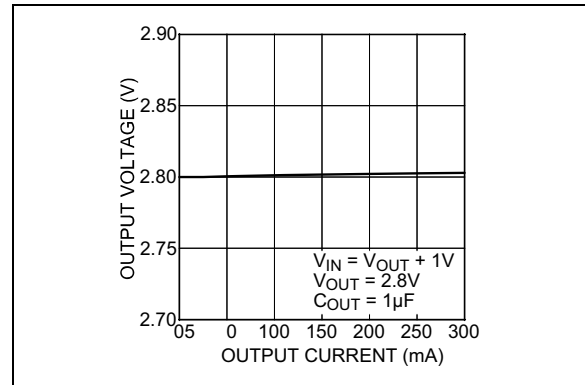


FIGURE 2-4: Output Voltage vs. Output Current.

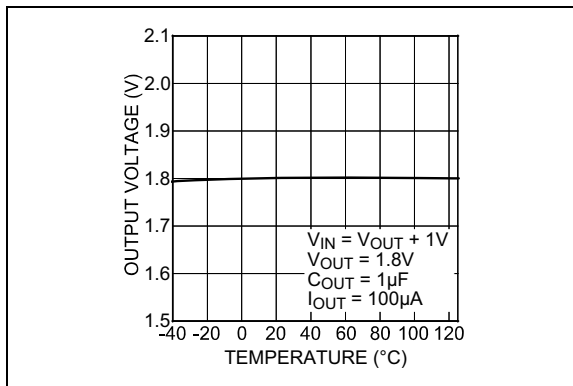


FIGURE 2-2: Output Voltage vs. Temperature.

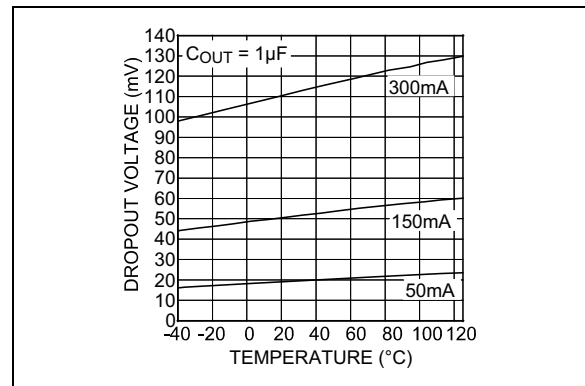


FIGURE 2-5: Dropout Voltage vs. Temperature.

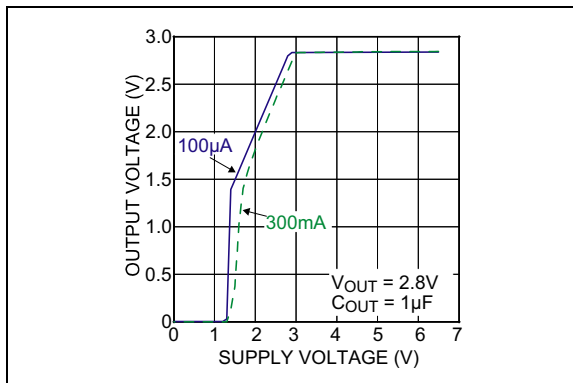


FIGURE 2-3: Output Voltage vs. Supply Voltage.

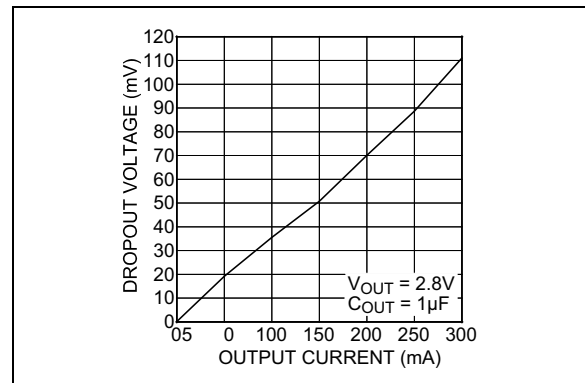


FIGURE 2-6: Dropout Voltage vs. Output Current.

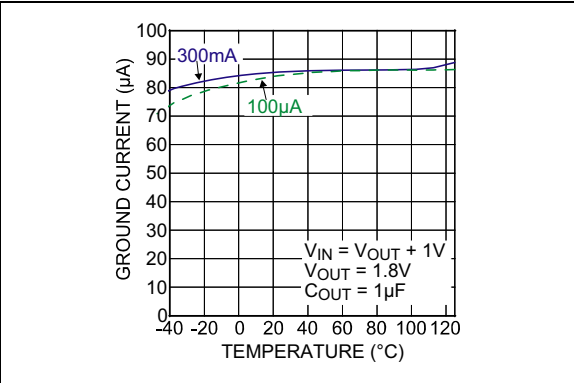


FIGURE 2-7: Ground Pin Current vs. Temperature.

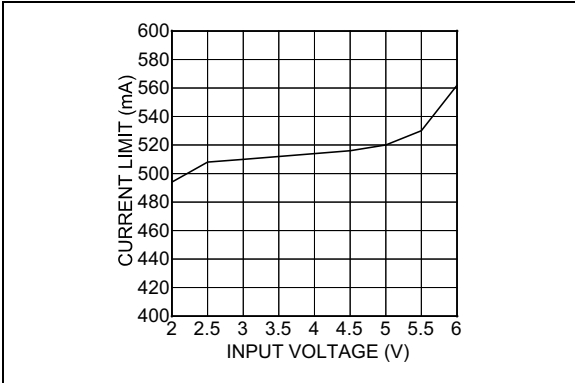


FIGURE 2-10: Current Limit vs. Input Voltage.

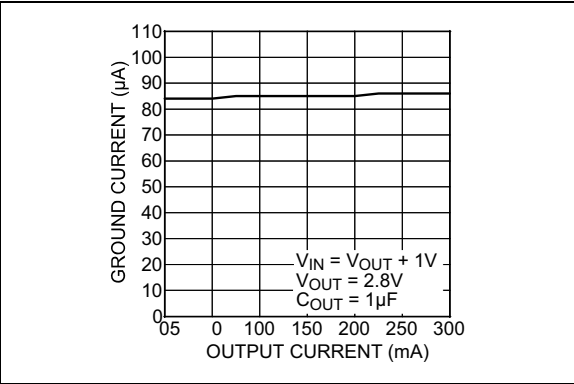


FIGURE 2-8: Ground Pin Current vs. Output Current.

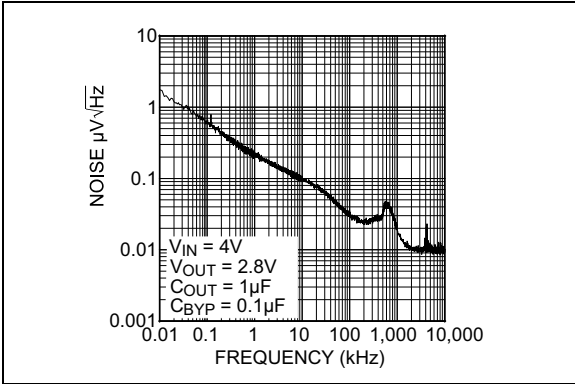


FIGURE 2-11: Output Noise Spectral Density.

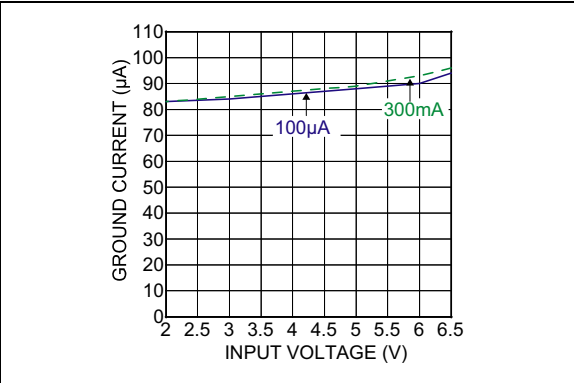


FIGURE 2-9: Ground Pin Current vs. Input Voltage.

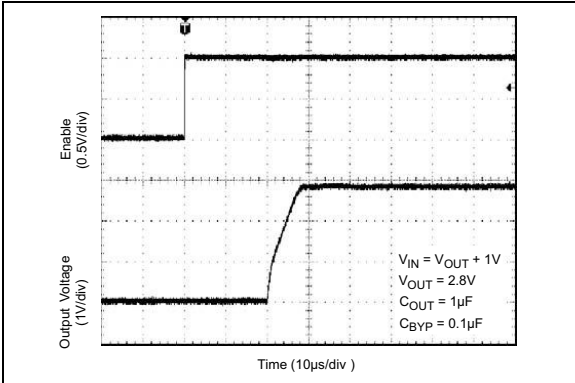


FIGURE 2-12: Enable Turn-On.

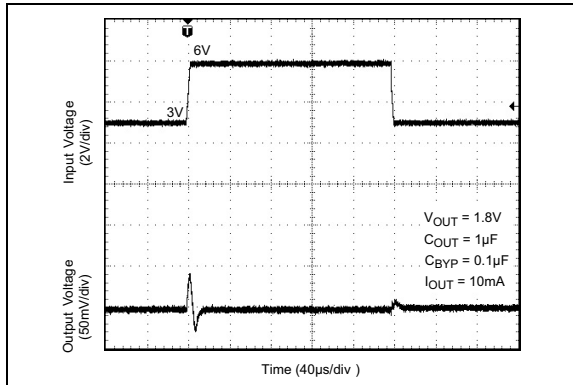


FIGURE 2-13: Line Transient.

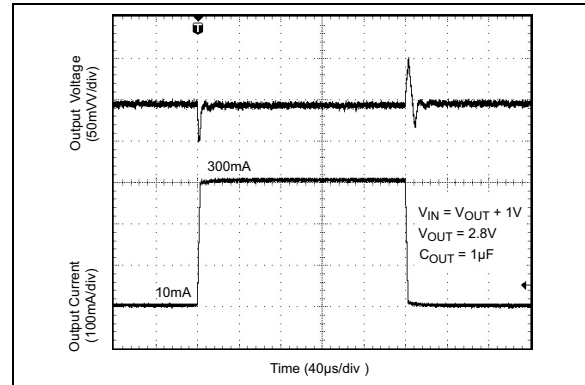


FIGURE 2-14: Load Transient.

MIC5318

3.0 PIN DESCRIPTIONS

The descriptions of the pins are listed in [Table 3-1](#).

TABLE 3-1: PIN FUNCTION TABLE

Pin Number UDFN-6 (Fixed)	Pin Number UDFN-6 (Adj.)	Pin Number TSOT23-5 (Fixed)	Pin Number TSOT23-5 (Adj.)	Pin Name	Description
1	1	3	3	EN	Enable Input. Active-High. High = on, low = off. Do not leave floating.
2	2	2	2	GND	Ground
3	3	1	1	IN	Supply Input.
4	4	5	5	OUT	Output Voltage.
5	—	—	—	NC	No connection.
—	5	—	4	ADJ	Adjust Input. Connect to external resistor voltage divider network.
6	6	4	—	BYP	Reference Bypass: Connect external 0.01 μ F to GND for reduced Output Noise. May be left open.
ePad	ePad	—	—	EP	Exposed Heat Sink Pad: connected to ground internally.

4.0 APPLICATION INFORMATION

4.1 Enable/Shutdown

The MIC5318 comes with an active-high enable pin that allows the regulator to be disabled. Forcing the enable pin low disables the regulator and sends it into a “zero” off-mode current state. In this state, current consumed by the regulator goes nearly to zero. Forcing the enable pin high enables the output voltage. The active-high enable pin uses CMOS technology and the enable pin cannot be left floating; a floating enable pin may cause an indeterminate state on the output.

4.2 Input Capacitor

The MIC5318 is a high-performance, high bandwidth device. Therefore, it requires a well-bypassed input supply for optimal performance. A 1 μ F capacitor is required from the input to ground to provide stability. Low-ESR ceramic capacitors provide optimal performance at a minimum of space. Additional high-frequency capacitors, such as small-valued NPO dielectric-type capacitors, help filter out high-frequency noise and are good practice in any RF-based circuit.

4.3 Output Capacitor

The MIC5318 requires an output capacitor of 1 μ F or greater to maintain stability. The design is optimized for use with low-ESR ceramic chip capacitors. High ESR capacitors may cause high frequency oscillation. The output capacitor can be increased, but performance has been optimized for a 1 μ F ceramic output capacitor and does not improve significantly with larger capacitance.

X7R/X5R dielectric-type ceramic capacitors are recommended because of their temperature performance. X7R-type capacitors change capacitance by 15% over their operating temperature range and are the most stable type of ceramic capacitors. Z5U and Y5V dielectric capacitors change value by as much as 50% and 60%, respectively, over their operating temperature ranges. To use a ceramic chip capacitor with Y5V dielectric, the value must be much higher than an X7R ceramic capacitor to ensure the same minimum capacitance over the equivalent operating temperature range.

4.4 Bypass Capacitor

A capacitor can be placed from the noise bypass pin to ground to reduce output voltage noise. The capacitor bypasses the internal reference. A 0.1 μ F capacitor is recommended for applications that require low-noise outputs. The bypass capacitor can be increased, further reducing noise and improving PSRR. Turn-on time increases slightly with respect to bypass capacitance. A unique, quick-start circuit allows the MIC5318 to drive a large capacitor on the bypass pin

without significantly slowing turn-on time. Refer to the [Typical Operating Characteristics](#) for performance with different bypass capacitors.

4.5 No-Load Stability

Unlike many other voltage regulators, the MIC5318 will remain stable and in regulation with no load. This is especially crucial for CMOS RAM keep-alive applications.

4.6 Adjustable Regulator Application

Adjustable regulators use the ratio of two resistors to multiply the reference voltage to produce the desired output voltage. The MIC5318 can be adjusted from 1.25V to 5.5V by using two external resistors (Figure 4-1). The resistors set the output voltage based on the following equation:

EQUATION 4-1:

$$V_{OUT} = V_{REF} \times \left(1 + \frac{R1}{R2}\right)$$

Where:

$V_{REF} = 1.25V$

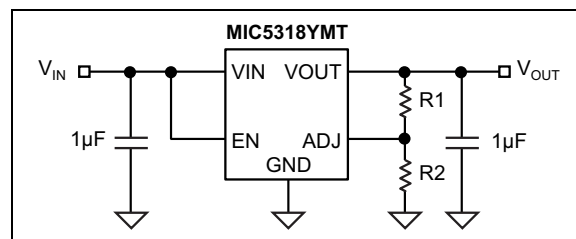


FIGURE 4-1: Adjustable Voltage Output.

4.7 Thermal Considerations

The MIC5318 is designed to provide 300 mA of continuous current. Maximum ambient operating temperature can be calculated based on the output current and the voltage drop across the part. Given that the input voltage is 3.3V, the output voltage is 2.8V and the output current equals 300 mA.

The actual power dissipation of the regulator circuit can be determined using the equation:

EQUATION 4-2:

$$P_D = (V_{IN} - V_{OUT}) \times I_{OUT} + V_{IN} \times I_{GND}$$

MIC5318

Because this device is CMOS and the ground current is typically <100 μ A over the load range, the power dissipation contributed by the ground current is <1% and can be ignored for this calculation:

EQUATION 4-3:

$$P_D = (3.3V - 2.8V) \times 300mA = 0.15W$$

To determine the maximum ambient operating temperature of the package, use the junction-to-ambient thermal resistance of the device and the following basic equation:

EQUATION 4-4:

$$P_{D(MAX)} = \frac{T_{J(MAX)} - T_A}{\theta_{JA}}$$

Where:

$T_{J(MAX)}$ = 125°C, the max. junction temp. of the die.

θ_{JA} = 100°C/W

Table 4-1 shows junction-to-ambient thermal resistance for the MIC5318 in the 6-lead 1.6 mm x 1.6 mm UDFN package.

TABLE 4-1: THERMAL RESISTANCE

Package	θ_{JA} for Recommended Min. Footprint
6-Lead UDFN	100°C/W

Substituting P_D for $P_{D(MAX)}$ and solving for the ambient operating temperature will give the maximum operating conditions for the regulator circuit. The junction-to-ambient thermal resistance for the minimum footprint is 100°C/W.

The maximum power dissipation must not be exceeded for proper operation.

For example, when operating the MIC5318-2.8YMT at an input voltage of 3.3V and 300 mA load with a minimum footprint layout, the maximum ambient operating temperature T_A can be determined as follows:

EQUATION 4-5:

$$0.15W = (125^\circ C - T_A) / 100^\circ C/W$$
$$T_A = 110^\circ C$$

Therefore, a 2.8V application with 300 mA of output current can accept an ambient operating temperature of 110°C in a 1.6 mm x 1.6 mm UDFN package. For a full discussion of heat sinking and thermal effects on voltage regulators, refer to the “Regulator Thermals” section of Microchip’s [Designing with Low-Dropout Voltage Regulators handbook](#).

5.0 PACKAGING INFORMATION

5.1 Package Marking Information

5-Lead TSOT-23*

XXXX
NNN

Example

QD25
706

6-Lead UDFN*

▲
XXX

Example

▲
DAA

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.

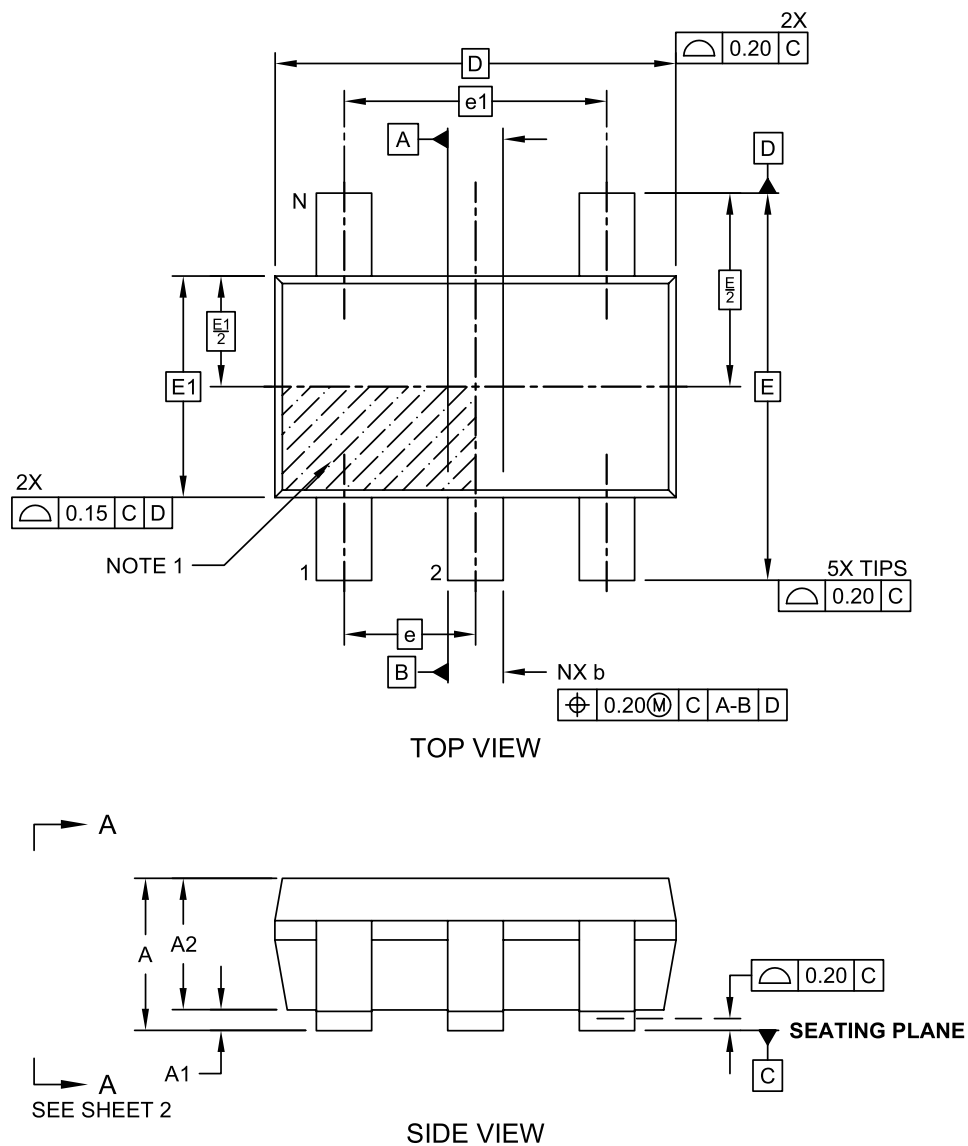
TABLE 5-1: MARKING CODES

Part Number	Marking Code	Output Voltage
MIC5318-1.5YMT	15D	1.5V
MIC5318-1.8YMT	18D	1.8V
MIC5318-2.5YMT	25D	2.5V
MIC5318-2.8YMT	28D	2.8V
MIC5318-3.3YMT	33D	3.3V
MIC5318YMT	DAA	Adjustable
MIC5318-1.5YD5	QD15	1.5V
MIC5318-1.8YD5	QD15	1.8V
MIC5318-2.5YD5	QD25	2.5V
MIC5318-2.8YD5	QD28	2.8V
MIC5318-3.3YD5	QD33	3.3V
MIC5318YD5	QDAA	Adjustable

5-Lead TSOT-23 Package Outline and Recommended Land Pattern

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

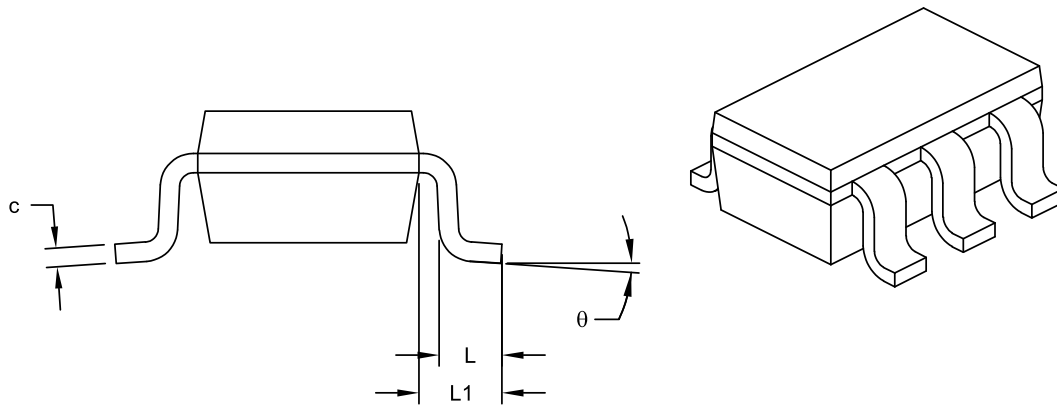
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



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>



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

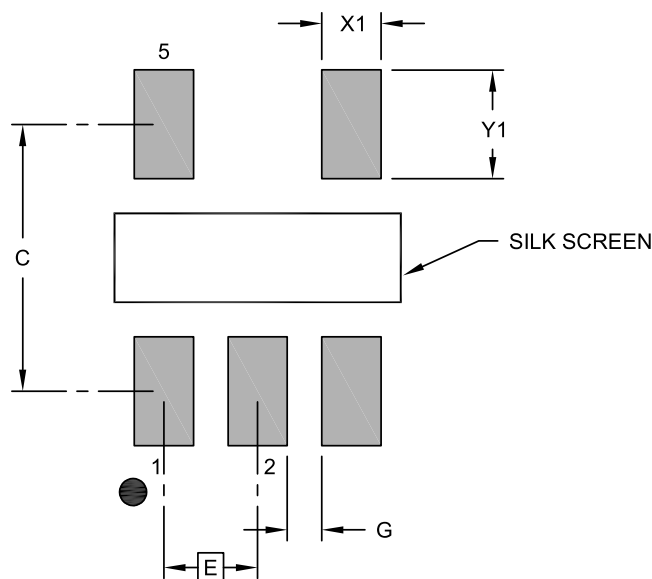
Notes:

- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25mm per side.
- 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

Dimension Limits	Units	MILLIMETERS		
		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

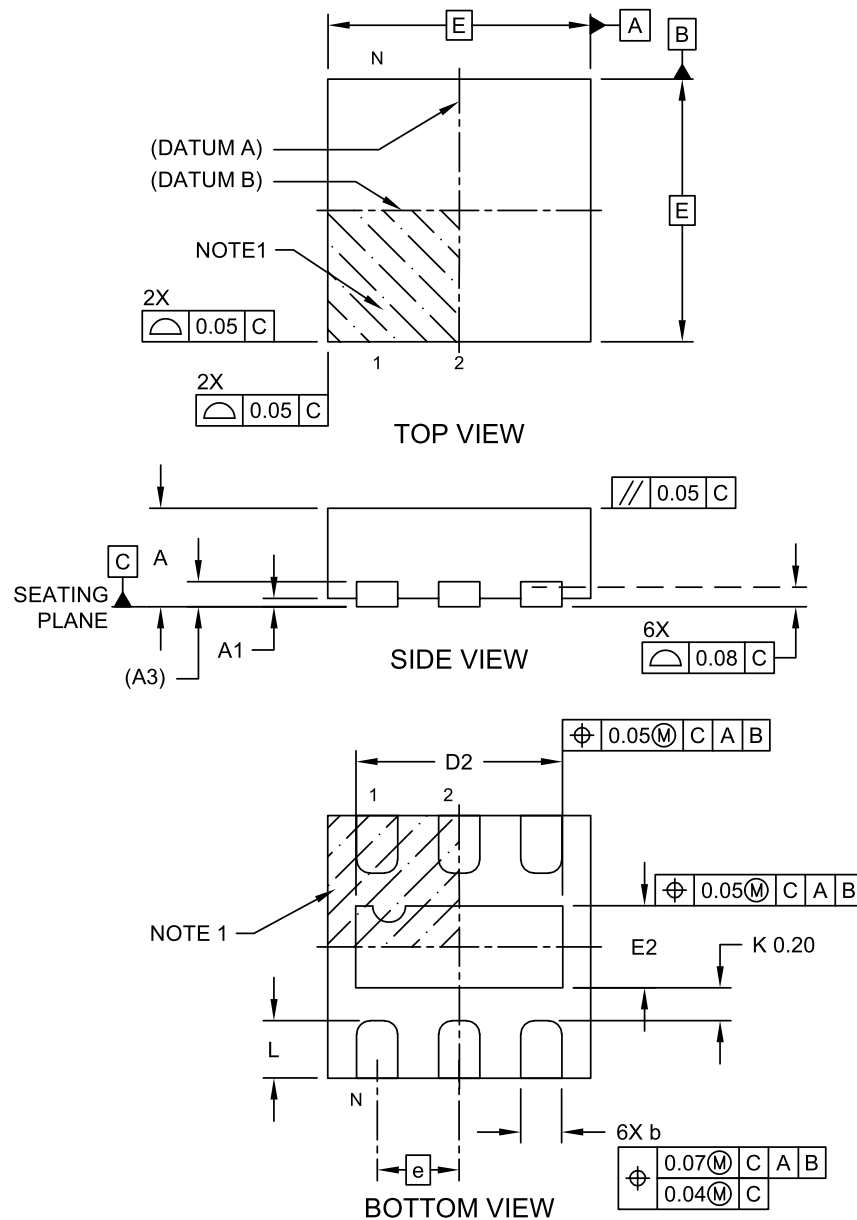
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-3179 Rev A

6-Lead UDFN Package Outline and Recommended Land Pattern

6-Lead Ultra Thin Plastic Dual Flat, No Lead (HKA) - 1.6x1.6x0.6 mm Body [UDFN] With 1.26x0.50 mm Exposed Pad; Micrel Legacy Package TDFN1616-6LD-PL-1

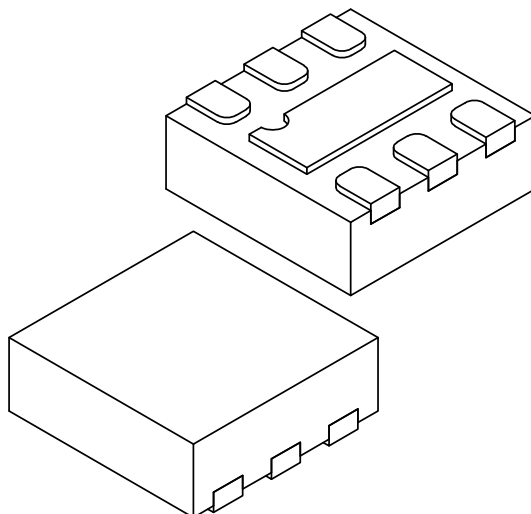
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Microchip Technology Drawing C04-1154 Rev A Sheet 1 of 2

6-Lead Ultra Thin Plastic Dual Flat, No Lead (HKA) - 1.6x1.6x0.6 mm Body [UDFN] With 1.26x0.50 mm Exposed Pad; Micrel Legacy Package TDFN1616-6LD-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 Terminals	N	6		
Pitch	e	0.50 BSC		
Overall Height	A	0.50	0.55	0.60
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3	0.152 REF		
Overall Length	D	1.60 BSC		
Exposed Pad Length	D2	1.21	1.26	1.31
Overall Width	E	1.60 BSC		
Exposed Pad Width	E2	0.45	0.50	0.55
Terminal Width	b	0.20	0.25	0.30
Terminal Length	L	0.30	0.35	0.40
Terminal-to-Exposed-Pad	K	0.20	–	–

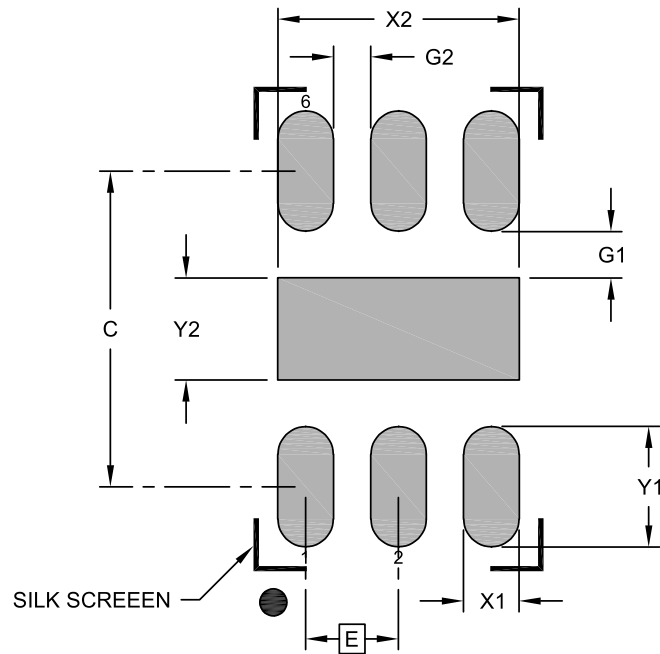
Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Package is saw singulated
- 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 C04-1154 Rev A Sheet 2 of 2

6-Lead Ultra Thin Plastic Dual Flat, No Lead (HKA) - 1.6x1.6x0.6 mm Body [UDFN] With 1.26x0.50 mm Exposed Pad; Micrel Legacy Package TDFN1616-6LD-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

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Center Pad Width	X2			1.30
Center Pad Length	Y2			0.55
Contact Pad Spacing	C		1.70	
Contact Pad Width (X6)	X1			0.30
Contact Pad Length (X6)	Y1			0.65
Contact Pad to Center Pad (X6)	G1	0.25		
Contact Pad to Contact Pad (X4)	G2	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-3154 Rev A

MIC5318

NOTES:

APPENDIX A: REVISION HISTORY

Revision A (August 2021)

- Converted Micrel document MIC5318 to Microchip data sheet template DS20006578A.
- Minor grammatical text changes throughout.

MIC5318

NOTES:

PRODUCT IDENTIFICATION SYSTEM

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

<u>Device</u>	<u>-X.X</u>	<u>X</u>	<u>X</u>	<u>-XX</u>
Part No.	Output Voltage	Temperature Range	Package	Media Type
Device: MIC5318: High Performance 300 mA μ Cap Ultra Low Dropout Regulator Threshold Voltage: <blank>= Adjustable 1.5 = 1.5V 1.8 = 1.8V 2.5 = 2.5V 2.8 = 2.8V 3.3 = 3.3V Temperature Range: Y = -40°C to +125°C Package: MT = 6-Lead UDFN D5 = 5-Lead TSOT-23 Media Type: TR = 3,000/Reel (TSOT package option) TR = 5,000/Reel (UDFN package option)				
Examples: a) MIC5318YMT-TR: MIC5318, Adjustable Output Voltage, 6-Lead UDFN, -40°C to +125°C Temp. Range, 5,000/Reel b) MIC5318-1.8YMT-TR: MIC5318, 1.8V Output Voltage, 6-Lead UDFN, -40°C to +125°C Temp. Range, 5,000/Reel c) MIC5318-3.3YMT-TR: MIC5318, 3.3V Output Voltage, 6-Lead UDFN, -40°C to +125°C Temp. Range, 5,000/Reel d) MIC5318YD5-TR: MIC5318, Adjustable Output Voltage, 5-Lead TSOT-23, -40°C to +125°C Temp. Range, 3,000/Reel e) MIC5318-1.5YD5-TR: MIC5318, 1.5V Output Voltage, 5-Lead TSOT-23, -40°C to +125°C Temp. Range, 3,000/Reel f) MIC5318-2.5YD5-TR: MIC5318, 2.5V Output Voltage, 5-Lead TSOT-23, -40°C to +125°C Temp. Range, 3,000/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 option.				

MIC5318

NOTES:

Note the following details of the code protection feature on Microchip devices:

- Microchip products meet the specifications contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is secure when used in the intended manner and under normal conditions.
- There are dishonest and possibly illegal methods being used in attempts to breach the code protection features of the Microchip devices. We believe that these methods require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Attempts to breach these code protection features, most likely, cannot be accomplished without violating Microchip's intellectual property rights.
- Microchip is willing to work with any customer who is concerned about the integrity of its code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of its code. Code protection does not mean that we are guaranteeing the product is "unbreakable." Code protection is constantly evolving. We at Microchip are committed to continuously improving the code protection features of our products. Attempts to break Microchip's code protection feature may be a violation of the Digital Millennium Copyright Act. If such acts allow unauthorized access to your software or other copyrighted work, you may have a right to sue for relief under that Act.

Information contained in this publication is provided for the sole purpose of designing with and using Microchip products. Information regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications.

THIS INFORMATION IS PROVIDED BY MICROCHIP "AS IS". MICROCHIP MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE OR WARRANTIES RELATED TO ITS CONDITION, QUALITY, OR PERFORMANCE.

IN NO EVENT WILL MICROCHIP BE LIABLE FOR ANY INDIRECT, SPECIAL, PUNITIVE, INCIDENTAL OR CONSEQUENTIAL LOSS, DAMAGE, COST OR EXPENSE OF ANY KIND WHATSOEVER RELATED TO THE INFORMATION OR ITS USE, HOWEVER CAUSED, EVEN IF MICROCHIP HAS BEEN ADVISED OF THE POSSIBILITY OR THE DAMAGES ARE FORESEEABLE. TO THE FULLEST EXTENT ALLOWED BY LAW, MICROCHIP'S TOTAL LIABILITY ON ALL CLAIMS IN ANY WAY RELATED TO THE INFORMATION OR ITS USE WILL NOT EXCEED THE AMOUNT OF FEES, IF ANY, THAT YOU HAVE PAID DIRECTLY TO MICROCHIP FOR THE INFORMATION. Use of Microchip devices in life support and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights unless otherwise stated.

Trademarks

The Microchip name and logo, the Microchip logo, Adaptec, AnyRate, AVR, AVR logo, AVR Freaks, BesTime, BitCloud, chipKIT, chipKIT logo, CryptoMemory, CryptoRF, dsPIC, FlashFlex, flexPWR, HELDO, IGLOO, JukeBlox, KeeLoq, Klear, LANCheck, LinkMD, maXStylus, maXTouch, MediaLB, megaAVR, Microsemi, Microsemi logo, MOST, MOST logo, MPLAB, OptoLyzer, PackTime, PIC, picoPower, PICSTART, PIC32 logo, PolarFire, Prochip Designer, QTouch, SAM-BA, SenGenuity, SpyNIC, SST, SST Logo, SuperFlash, Symmetricom, SyncServer, Tachyon, TimeSource, tinyAVR, UNI/O, Vectron, and XMEGA are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

AgileSwitch, APT, ClockWorks, The Embedded Control Solutions Company, EtherSynch, FlashTec, Hyper Speed Control, HyperLight Load, IntelliMOS, Libero, motorBench, mTouch, Powermite 3, Precision Edge, ProASIC, ProASIC Plus, ProASIC Plus logo, Quiet-Wire, SmartFusion, SyncWorld, Temux, TimeCesium, TimeHub, TimePictra, TimeProvider, WinPath, and ZL are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Adjacent Key Suppression, AKS, Analog-for-the-Digital Age, Any Capacitor, AnyIn, AnyOut, Augmented Switching, BlueSky, BodyCom, CodeGuard, CryptoAuthentication, CryptoAutomotive, CryptoCompanion, CryptoController, dsPICDEM, dsPICDEM.net, Dynamic Average Matching, DAM, ECAN, Espresso T1S, EtherGREEN, IdealBridge, In-Circuit Serial Programming, ICSP, INICnet, Intelligent Paralleling, Inter-Chip Connectivity, JitterBlocker, maxCrypto, maxView, memBrain, Mindi, MiWi, MPASM, MPF, MPLAB Certified logo, MPLIB, MPLINK, MultiTRAK, NetDetach, Omniscient Code Generation, PICDEM, PICDEM.net, PICkit, PICtail, PowerSmart, PureSilicon, QMatrix, REAL ICE, Ripple Blocker, RTAX, RTG4, SAM-ICE, Serial Quad I/O, simpleMAP, SimpliPHY, SmartBuffer, SMART-I.S., storClad, SQI, SuperSwitcher, SuperSwitcher II, Switchtec, SynchroPHY, Total Endurance, TSHARC, USBCheck, VariSense, VectorBlox, VeriPHY, ViewSpan, WiperLock, XpressConnect, and ZENA are trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

SQTP is a service mark of Microchip Technology Incorporated in the U.S.A.

The Adaptec logo, Frequency on Demand, Silicon Storage Technology, and Symmcom are registered trademarks of Microchip Technology Inc. in other countries.

GestIC is a registered trademark of Microchip Technology Germany II GmbH & Co. KG, a subsidiary of Microchip Technology Inc., in other countries.

All other trademarks mentioned herein are property of their respective companies.

© 2021, Microchip Technology Incorporated, All Rights Reserved.

ISBN: 978-1-5224-8826-2

For information regarding Microchip's Quality Management Systems, please visit www.microchip.com/quality.

Worldwide Sales and Service

AMERICAS

Corporate Office
2355 West Chandler Blvd.
Chandler, AZ 85224-6199
Tel: 480-792-7200
Fax: 480-792-7277
Technical Support:
<http://www.microchip.com/support>
Web Address:
www.microchip.com

Atlanta
Duluth, GA
Tel: 678-957-9614
Fax: 678-957-1455

Austin, TX
Tel: 512-257-3370

Boston
Westborough, MA
Tel: 774-760-0087
Fax: 774-760-0088

Chicago
Itasca, IL
Tel: 630-285-0071
Fax: 630-285-0075

Dallas
Addison, TX
Tel: 972-818-7423
Fax: 972-818-2924

Detroit
Novi, MI
Tel: 248-848-4000

Houston, TX
Tel: 281-894-5983

Indianapolis
Noblesville, IN
Tel: 317-773-8323
Fax: 317-773-5453
Tel: 317-536-2380

Los Angeles
Mission Viejo, CA
Tel: 949-462-9523
Fax: 949-462-9608
Tel: 951-273-7800

Raleigh, NC
Tel: 919-844-7510

New York, NY
Tel: 631-435-6000

San Jose, CA
Tel: 408-735-9110
Tel: 408-436-4270

Canada - Toronto
Tel: 905-695-1980
Fax: 905-695-2078

ASIA/PACIFIC

Australia - Sydney
Tel: 61-2-9868-6733

China - Beijing
Tel: 86-10-8569-7000

China - Chengdu
Tel: 86-28-8665-5511

China - Chongqing
Tel: 86-23-8980-9588

China - Dongguan
Tel: 86-769-8702-9880

China - Guangzhou
Tel: 86-20-8755-8029

China - Hangzhou
Tel: 86-571-8792-8115

China - Hong Kong SAR
Tel: 852-2943-5100

China - Nanjing
Tel: 86-25-8473-2460

China - Qingdao
Tel: 86-532-8502-7355

China - Shanghai
Tel: 86-21-3326-8000

China - Shenyang
Tel: 86-24-2334-2829

China - Shenzhen
Tel: 86-755-8864-2200

China - Suzhou
Tel: 86-186-6233-1526

China - Wuhan
Tel: 86-27-5980-5300

China - Xian
Tel: 86-29-8833-7252

China - Xiamen
Tel: 86-592-2388138

China - Zhuhai
Tel: 86-756-3210040

ASIA/PACIFIC

India - Bangalore
Tel: 91-80-3090-4444

India - New Delhi
Tel: 91-11-4160-8631

India - Pune
Tel: 91-20-4121-0141

Japan - Osaka
Tel: 81-6-6152-7160

Japan - Tokyo
Tel: 81-3-6880-3770

Korea - Daegu
Tel: 82-53-744-4301

Korea - Seoul
Tel: 82-2-554-7200

Malaysia - Kuala Lumpur
Tel: 60-3-7651-7906

Malaysia - Penang
Tel: 60-4-227-8870

Philippines - Manila
Tel: 63-2-634-9065

Singapore
Tel: 65-6334-8870

Taiwan - Hsin Chu
Tel: 886-3-577-8366

Taiwan - Kaohsiung
Tel: 886-7-213-7830

Taiwan - Taipei
Tel: 886-2-2508-8600

Thailand - Bangkok
Tel: 66-2-694-1351

Vietnam - Ho Chi Minh
Tel: 84-28-5448-2100

EUROPE

Austria - Wels
Tel: 43-7242-2244-39
Fax: 43-7242-2244-393

Denmark - Copenhagen
Tel: 45-4485-5910
Fax: 45-4485-2829

Finland - Espoo
Tel: 358-9-4520-820

France - Paris
Tel: 33-1-69-53-63-20
Fax: 33-1-69-30-90-79

Germany - Garching
Tel: 49-8931-9700

Germany - Haan
Tel: 49-2129-3766400

Germany - Heilbronn
Tel: 49-7131-72400

Germany - Karlsruhe
Tel: 49-721-625370

Germany - Munich
Tel: 49-89-627-144-0
Fax: 49-89-627-144-44

Germany - Rosenheim
Tel: 49-8031-354-560

Israel - Ra'anana
Tel: 972-9-744-7705

Italy - Milan
Tel: 39-0331-742611
Fax: 39-0331-466781

Italy - Padova
Tel: 39-049-7625286

Netherlands - Drunen
Tel: 31-416-690399
Fax: 31-416-690340

Norway - Trondheim
Tel: 47-7288-4388

Poland - Warsaw
Tel: 48-22-3325737

Romania - Bucharest
Tel: 40-21-407-87-50

Spain - Madrid
Tel: 34-91-708-08-90
Fax: 34-91-708-08-91

Sweden - Gothenberg
Tel: 46-31-704-60-40

Sweden - Stockholm
Tel: 46-8-5090-4654

UK - Wokingham
Tel: 44-118-921-5800
Fax: 44-118-921-5820