

## Enhanced Product (EP) Advanced Single Synchronous Buck Pulse-Width Modulation (PWM) Controller

The ISL6420BMAEP simplifies the implementation of a complete control and protection scheme for a high-performance DC/DC buck converter. It is designed to drive N-Channel MOSFETs in a synchronous rectified buck topology, the ISL6420BMAEP integrates control, output adjustment, monitoring and protection functions into a single package. Additionally, the IC features an external reference voltage tracking mode for externally referenced buck converter applications and DDR termination supplies, as well as a voltage margining mode for system testing in networking DC/DC converter applications.

The ISL6420BMAEP provides simple, single feedback loop, voltage mode control with fast transient response. The output voltage of the converter can be precisely regulated to as low as 0.6V, with a maximum tolerance of  $\pm 2.0\%$  over temperature and line voltage variations.

The operating frequency is fully adjustable from 100kHz to 1.4MHz. High frequency operation offers cost and space savings.

The error amplifier features a 15MHz gain-bandwidth product and 6V/ $\mu$ s slew rate that enables high converter bandwidth for fast transient response. The PWM duty cycle ranges from 0% to 100% in transient conditions. Selecting the capacitor value from the ENSS pin to ground sets a fully adjustable PWM soft-start. Pulling the ENSS pin LOW disables the controller.

The ISL6420BMAEP monitors the output voltage and generates a PGOOD (power good) signal when soft-start sequence is complete and the output is within regulation. A built-in overvoltage protection circuit prevents the output voltage from going above typically 115% of the set point. Protection from overcurrent conditions is provided by monitoring the  $r_{DS(ON)}$  of the upper MOSFET to inhibit the PWM operation appropriately. This approach simplifies the implementation and improves efficiency by eliminating the need for a current sensing resistor.

### Device Information

The specifications for an Enhanced Product (EP) device are defined in a Vendor Item Drawing (VID), which is controlled by the Defense Logistics Agency (DLA). "Hot-links" to the applicable VID and other supporting application information are provided on our website.

### Features

- Specifications per DLA VID V62/07640
- Full Mil-Temp Electrical Performance from -55°C to +125°C
- Controlled Baseline with One Wafer Fabrication Site and One Assembly/Test Site
- Full Homogeneous Lot Processing in Wafer Fab
- No Combination of Wafer Fabrication Lots in Assembly
- Full Traceability Through Assembly and Test by Date/Trace Code Assignment
- Enhanced Process Change Notification
- Enhanced Obsolescence Management
- Eliminates Need for Up-Screening a COTS Component
- Operates from 4.5V thru 5.5V and 5.6V thru 28V Inputs
- Excellent Output Voltage Regulation
  - 0.6V Internal Reference
  - $\pm 2.0\%$  Reference Accuracy Over Line and Temperature
- Resistor-Selectable Switching Frequency
  - 100kHz to 1.4MHz
- Voltage Margining and External Reference Tracking Modes
- Output Can Sink or Source Current
- Lossless, Programmable Overcurrent Protection
  - Uses Upper MOSFET's  $r_{DS(ON)}$
- Programmable Soft-Start
- Drives N-Channel MOSFETs
- Simple Single-Loop Control Design
  - Voltage-Mode PWM Control
- Fast Transient Response
  - High-Bandwidth Error Amplifier
  - Full 0% to 100% Duty Cycle
- Extensive Circuit Protection Functions
  - PGOOD, Overvoltage, Overcurrent, Shutdown
- Diode Emulation during Startup for Pre-Biased Load Applications

### Applications

- Power Supplies for Microprocessors/ASICs
  - DSP and Core Processors
  - DDR SDRAM Bus Termination
- Distributed Power Systems
- Externally Referenced Buck Converters

### Ordering Information

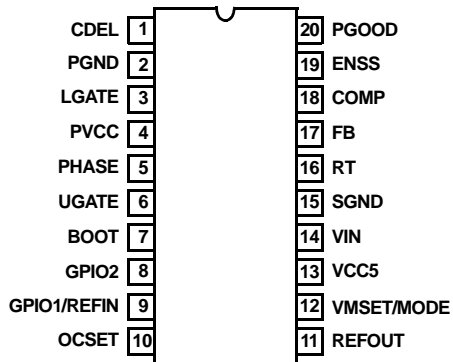
VENDOR PART NUMBER (Notes 1, 2)	VENDOR ITEM DRAWING	TEMP. RANGE (°C)	PACKAGE	PKG. DWG. #
ISL6420BMAEP	V62/07640-01XB	-55 to +125	20 Ld QSOP	M20.15

NOTES:

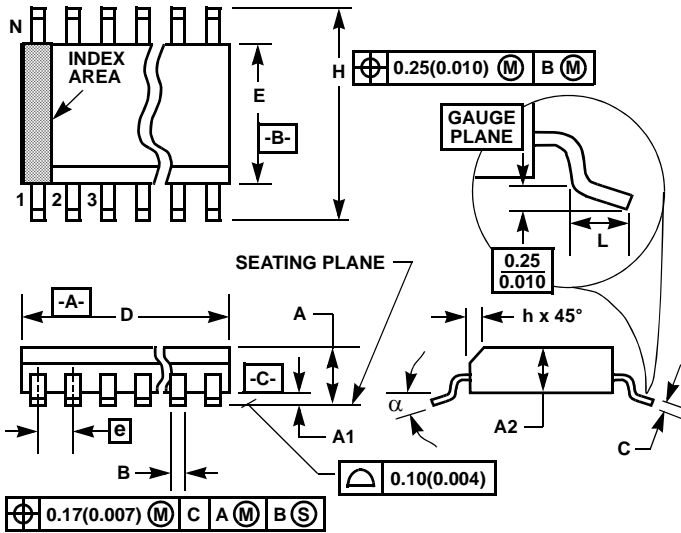
1. Add -TK suffix for 1,000 piece quantity tape and reel. Please refer to TB347 for details on reel specifications.
2. Devices must be procured to the VENDOR PART NUMBER.

### Pinout

ISL6420BMAEP  
(20 LD QSOP)  
TOP VIEW



**Shrink Small Outline Plastic Packages (SSOP)  
Quarter Size Outline Plastic Packages (QSOP)**



**NOTES:**

1. Symbols are defined in the "MO Series Symbol List" in Section 2.2 of Publication Number 95.
2. Dimensioning and tolerancing per ANSI Y14.5M-1982.
3. Dimension "D" does not include mold flash, protrusions or gate burrs. Mold flash, protrusion and gate burrs shall not exceed 0.15mm (0.006 inch) per side.
4. Dimension "E" does not include interlead flash or protrusions. Interlead flash and protrusions shall not exceed 0.25mm (0.010 inch) per side.
5. The chamfer on the body is optional. If it is not present, a visual index feature must be located within the crosshatched area.
6. "L" is the length of terminal for soldering to a substrate.
7. "N" is the number of terminal positions.
8. Terminal numbers are shown for reference only.
9. Dimension "B" does not include dambar protrusion. Allowable dambar protrusion shall be 0.10mm (0.004 inch) total in excess of "B" dimension at maximum material condition.
10. Controlling dimension: INCHES. Converted millimeter dimensions are not necessarily exact.

**M20.15**

**20 LEAD SHRINK SMALL OUTLINE PLASTIC PACKAGE  
(0.150" WIDE BODY)**

SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.053	0.069	1.35	1.75	-
A1	0.004	0.010	0.10	0.25	-
A2	-	0.061	-	1.54	-
B	0.008	0.012	0.20	0.30	9
C	0.007	0.010	0.18	0.25	-
D	0.337	0.344	8.56	8.74	3
E	0.150	0.157	3.81	3.98	4
e	0.025 BSC		0.635 BSC		-
H	0.228	0.244	5.80	6.19	-
h	0.0099	0.0196	0.26	0.49	5
L	0.016	0.050	0.41	1.27	6
N	20		20		7
α	0°	8°	0°	8°	-

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Intersil Corporation's quality certifications can be viewed at [www.intersil.com/design/quality](http://www.intersil.com/design/quality)

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