MAX845

Isolated Transformer Driver for PCMCIA Applications

Internal Power MOSFETs Save Space and Deliver 750mW

Description

The MAX845 provides an isolated power supply small enough to fit in thin PCMCIA cards and space-sensitive applications. It drives a low-profile center-tapped transformer primary from a 5V or 3.3V DC power supply. The secondary can be wound to provide any isolated positive or negative voltage at powers up to 750mW.

The MAX845 consists of an oscillator followed by a toggle flip-flop. The flip-flop generates two 50% duty-cycle square waves, which are complementary at half the oscillator frequency (450kHz, min). These two signals drive the ground-referenced N-channel power switches. Internal circuitry ensures break-before-make action between the two switches.

A low-power shutdown disables both the switches and the oscillator, reducing power consumption. An evaluation kit (MAX845EVKIT-MM) is available to evaluate low-profile 5V 40mA and 5V 100mA applications.

Key Features

- Transformer Driver for Ultra-Thin 5V-µs Transformers
- Isolated DC-to-DC Power Supply for PCMCIA Applications
- 450kHz Minimum Switching Frequency
- Ultra-Low Input Supply Current Ripple
- Single +5V or +3.3V Supply
- 5µW Low-Power Shutdown Mode
- 8-Pin SO and µMAX Packages
- Low Output Ripple Permits Miniature Output Capacitors

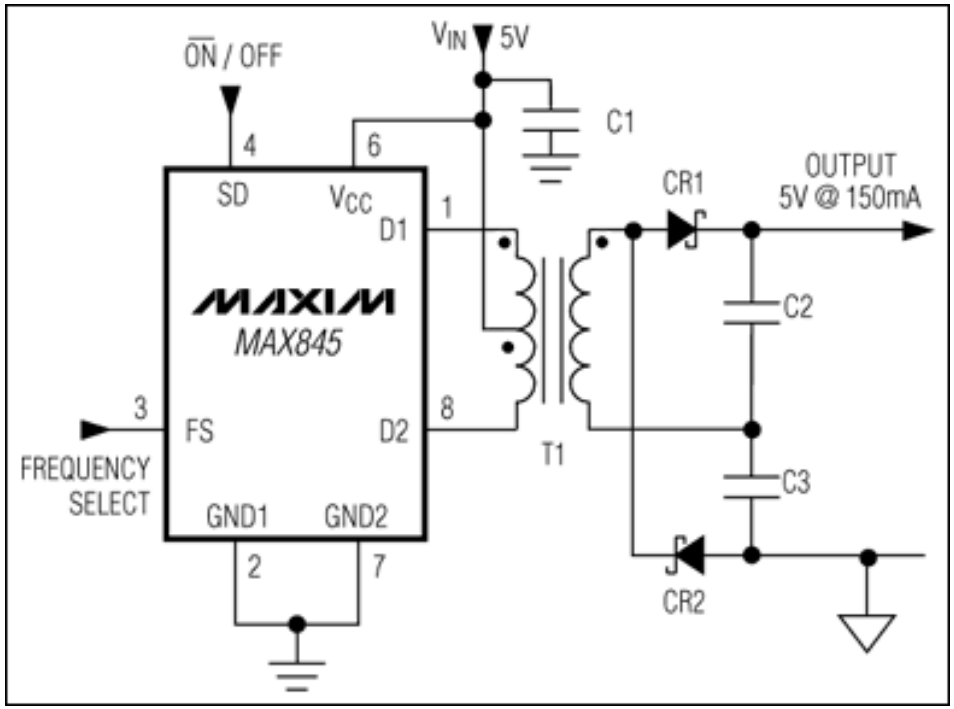
Applications / Uses

Bridge Ground Differentials
Isolated Data Acquisition
Isolated Interface Power Supply
Low-Power LAN Networks
Medical Equipment
Noise-Immunity Communications Interface
PCMCIA Modem Cards
Process Control

Key Specifications: Isolated Power Supplies									
Part Number	V_{IN} (min) (V)	V_{IN} (max) (V)	Topology	Features	Feedback Type	Frequency (kHz)	Operating Current, I_{CC} (max) (mA)	Operating Temp. Range (°C)	
MAX845	2.5	6	Push-Pull	• Thermal Shutdown • UVLO	Open Loop	860	1.1	-40 to +85	
See All Isolated Power Supplies (29)									

Notes:
**This pricing is BUDGETARY, for comparing similar parts. Prices are in U.S. dollars and subject to change. Quantity pricing may vary substantially and international prices may differ due to local duties, taxes, fees, and exchange rates. For volume-specific prices and delivery, please see the price and availability page or contact an authorized distributor.

Diagram



Typical Operating Circuit

Application Notes

Application Note 175: LAN Power Supply Generates Isolated 9V - MAX845
Application Note 998: 5V Step-Down Converter Has Transformer-Isolated Feedback - MAX845
Application Note 1096: Transformer-Driver IC Controls Bidirectional Switch - MAX845
Application Note 3465: Simple Power-FET Driver is Isolated and DC-Coupled - MAX845
Application Note 3754: Single-Wire Serial Bus Carries Isolated Power and Data - MAX845

Evaluation Kits

MAX845EVKIT

Reliability Reports

Show FIT data for:
Reliability Report: MAX845ExA.pdf

Software/Models

none

Ordering Information

Notes:

1. Other options and links for purchasing parts are listed at:
2. Didn't Find What You Need? Ask our applications engineers. Expert assistance in finding parts, usually within one business day.
3. Part number suffixes: T or T&R = tape and reel; + = RoHS/lead-free; # = RoHS/lead-exempt. More: SeeFull Data Sheet or Part Naming Conventions.
4. * Some packages have variations, listed on the drawing. "PkgCode/Variation" tells which variation the product uses. Note that "+", "#", "-" in the part number suffix describes RoHS status. Package drawings may show a different suffix character.

Devices: 1-9 of 9

MAX845	Free Sample	Buy	Package: TYPE PINS FOOTPRINT DRAWING CODE/VAR *	Temp	RoHS/Lead-Free? Materials Analysis
MAX845C/D					See data sheet
MAX845ESA			SOIC;8 pin; Dwg: 21-0041 (PDF) Use pkgcode/variation: S8-4*	-40°C to +85°C	RoHS/Lead-Free: No Materials Analysis
MAX845ESA-T			SOIC;8 pin; Dwg: 21-0041 (PDF) Use pkgcode/variation: S8-4*	-40°C to +85°C	RoHS/Lead-Free: No Materials Analysis
MAX845ESA+			SOIC;8 pin; Dwg: 21-0041 (PDF) Use pkgcode/variation: S8+4*	-40°C to +85°C	RoHS/Lead-Free: Lead Free Materials Analysis

MAX845ESA+T			SOIC;8 pin; Dwg: 21-0041 (PDF) Use pkgcode/variation: S8+4*	-40°C to +85°C	RoHS/Lead-Free: Lead Free Materials Analysis
MAX845EUA			uMAX;8 pin; Dwg: 21-0036 (PDF) Use pkgcode/variation: U8-1*	-40°C to +85°C	RoHS/Lead-Free: No Materials Analysis
MAX845EUA-T			uMAX;8 pin; Dwg: 21-0036 (PDF) Use pkgcode/variation: U8-1*	-40°C to +85°C	RoHS/Lead-Free: No Materials Analysis
MAX845EUA+			uMAX;8 pin; Dwg: 21-0036 (PDF) Use pkgcode/variation: U8+1*	-40°C to +85°C	RoHS/Lead-Free: Lead Free Materials Analysis
MAX845EUA+T			uMAX;8 pin; Dwg: 21-0036 (PDF) Use pkgcode/variation: U8+1*	-40°C to +85°C	RoHS/Lead-Free: Lead Free Materials Analysis

EVALUATION KIT AVAILABLE

Isolated Transformer Driver for PCMCIA Applications

MAX845

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Applications

PCMCIA Modem Cards

Isolated Data Acquisition

Isolated Interface Power Supply

Noise-Immunity Communications Interface

Bridging Ground Differences

Medical Equipment

Process Control

Low-Power LAN Networks

Features

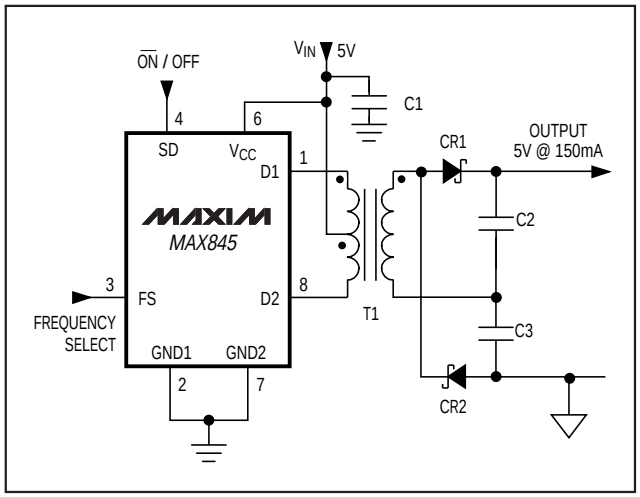
- **Transformer Driver for Ultra-Thin 5V-µs Transformers**
- **Isolated DC-to-DC Power Supply for PCMCIA Applications**
- **450kHz Minimum Switching Frequency**
- **Ultra-Low Input Supply Current Ripple**
- **Single +5V or +3.3V Supply**
- **5µW Low-Power Shutdown Mode**
- **8-Pin SO and µMAX Packages**
- **Low Output Ripple Permits Miniature Output Capacitors**

Ordering Information

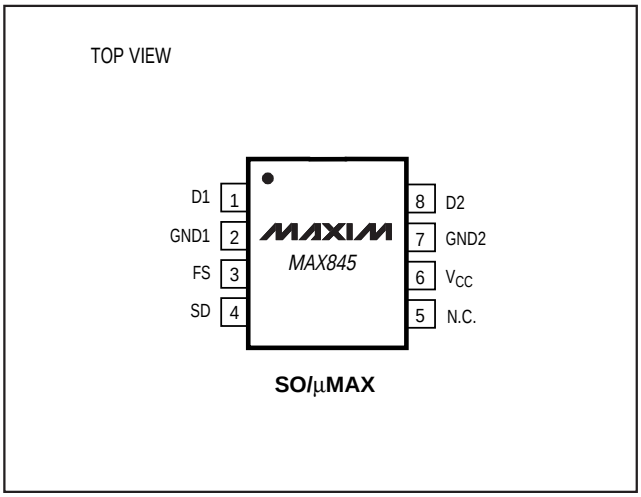
PART	TEMP. RANGE	PIN-PACKAGE
MAX845C/D	0°C to +70°C	Dice*
MAX845ESA	-40°C to +85°C	8 SO
MAX845EUA	-40°C to +85°C	8 µMAX

**Contact factory for dice specifications.*

Typical Operating Circuit



Pin Configuration



SO/µMAX

ABSOLUTE MAXIMUM RATINGS

Supply Voltage (V_{CC}) .....-0.3V to +7V
Control Input Voltage (SD, FS) .....-0.3V to (V_{CC} + 0.3V)
Peak Output Switch Current (D1, D2) 1A
Output Switch Voltage (D1, D2) 12V
Average Output Switch Current (D1, D2) 200mA
Continuous Power Dissipation (T_A = +70°C)
SO (derate 5.88mW/°C above +70°C) 471mW
µMAX (derate 4.10mW/°C above +70°C) 330mW

Operating Temperature Range .....-40°C to +85°C
Storage Temperature Range .....-65°C to +160°C
Junction Temperature .....+150°C
Lead Temperature (soldering, 10sec) .....+300°C

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

(V_{CC} = 5V ±10%, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A = +25°C.)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Switch On-Resistance	D1, D2; 100mA		1.5	4.0	Ω
Switch Frequency	FS = V_{CC} = 4.5V	450	675	900	kHz
	FS = V_{CC} = 5.5V	550	860	1100	
	FS = 0V, V_{CC} = 4.5V		500		
	FS = 0V, V_{CC} = 5.5V		575		
Operating Supply Current (Note 1)	No load, SD = 0V, FS = V_{CC}		1.1	5.0	mA
Shutdown Supply Current (Note 2)	SD = V_{CC}		0.4		µA
Shutdown Input Threshold	High	2.4			V
	Low			0.8	
Shutdown Input Leakage Current			10		pA
FS Input Threshold	High	2.4			V
	Low			0.8	
FS Input Current	FS = 0V			50	µA
	FS = V_{CC}		10		
Minimum Start-Up Voltage		2.5	2.2		V

Note 1: Operating supply current is the current used by the MAX845 only. Load current is not included.
Note 2: Shutdown supply current includes output switch leakage currents.

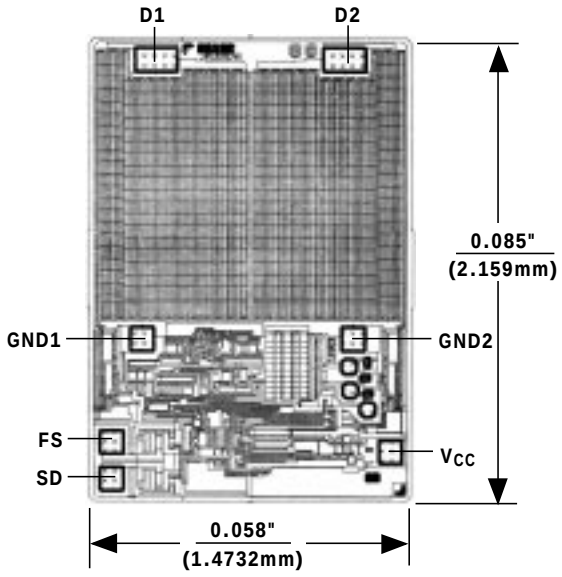
Table 2. Rectifier Topology Trade-Offs

TOPOLOGY	ADVANTAGE	DISADVANTAGE
2-Diode Push/Pull (Figure 11a)	• Only 3 external components • Low output ripple • Single diode drop	• More turns on transformer
4-Diode Bridge (Figure 11b)	• Simpler transformer winding requirements • Low output ripple	• 5 external components • Higher cost • 2 diode drops
Voltage Doubler (Figure 11c)	• Fewest turns on transformer	• 4 external components • Higher output ripple • 2 diode drops

Table 3. Suggested Capacitor Suppliers

CAPACITOR	SUPPLIER
Low-ESR 267 Series	Matsuo USA Phone: (714) 969-2491 FAX: (714) 960-6492
Ceramic	Murata Erie USA Phone: (800) 831-9172 FAX: (404) 436-3030
Very Low-ESR 595D/293D Series	Sprague Electric Co. USA Phone: (603) 224-1961 FAX: (603) 224-1430

Chip Topography

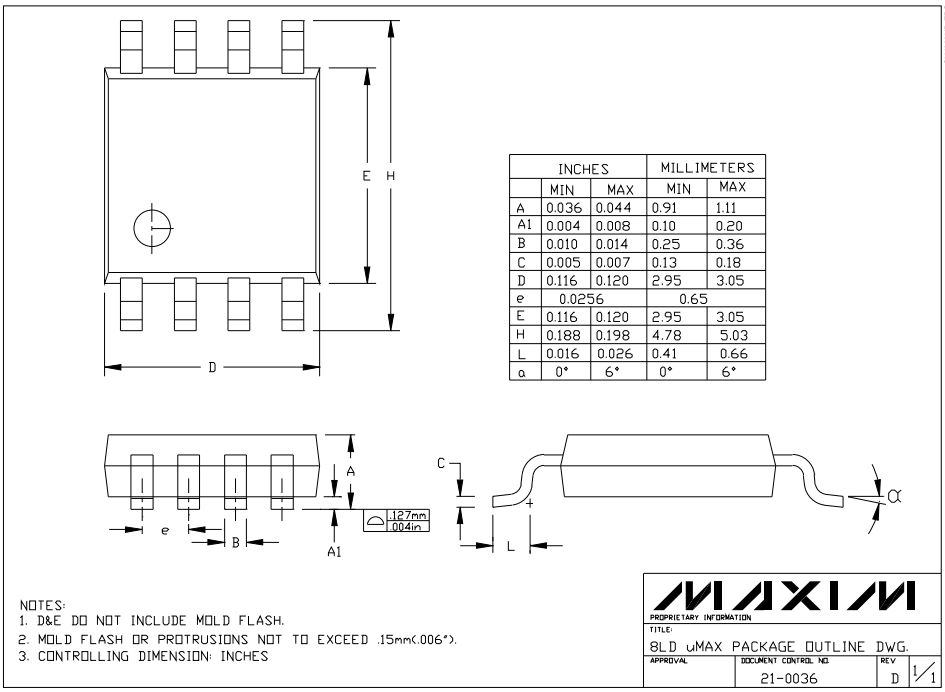


SUBSTRATE CONNECTED TO V_{CC}

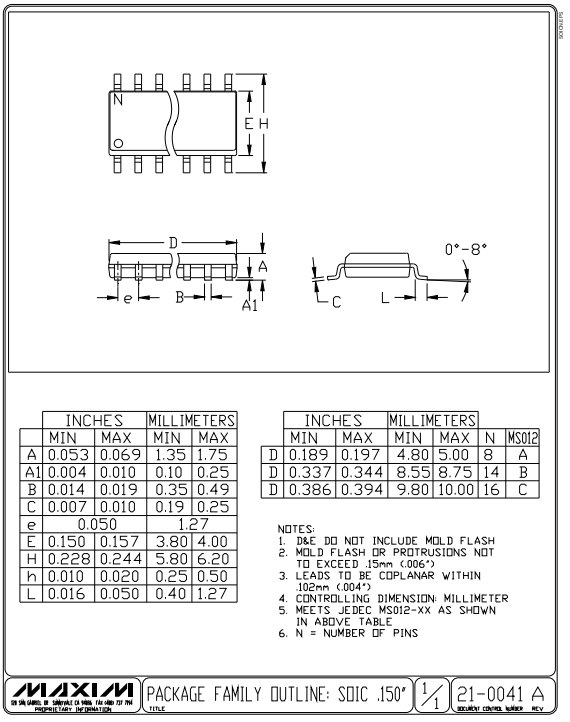
TRANSISTOR COUNT: 31

Isolated Transformer Driver for PCMCIA Applications

Package Information



	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.036	0.044	0.91	1.11
A1	0.004	0.008	0.10	0.20
B	0.010	0.014	0.25	0.36
C	0.005	0.007	0.13	0.18
D	0.116	0.120	2.95	3.05
e	0.0256		0.65	
E	0.116	0.120	2.95	3.05
H	0.188	0.198	4.78	5.03
L	0.016	0.026	0.41	0.66
α	0°	6°	0°	6°



	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.053	0.069	1.35	1.75
A1	0.004	0.010	0.10	0.25
B	0.014	0.019	0.35	0.49
C	0.007	0.010	0.19	0.25
e	0.050		1.27	
E	0.150	0.157	3.80	4.00
H	0.228	0.244	5.80	6.20
h	0.010	0.020	0.25	0.50
L	0.016	0.050	0.40	1.27

	INCHES		MILLIMETERS			
	MIN	MAX	MIN	MAX	N	MS012
D	0.189	0.197	4.80	5.00	8	A
D	0.337	0.344	8.55	8.75	14	B
D	0.386	0.394	9.80	10.00	16	C