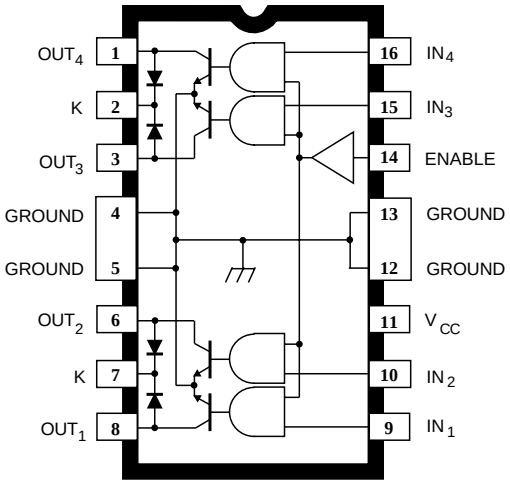
2543

Data Sheet
29317.2B*

PROTECTED QUAD POWER DRIVER

UDN/UDQ2543B (DIP)



Dwg. PP-017-1

ABSOLUTE MAXIMUM RATINGS
at T_A = 25°C

Output Voltage, V_{OUT} . . . . . **60 V**
Over-Current Protected Output Voltage, V_{OUT} . . . . . **25 V**
Output Current, I_{OUT} . . . . . **1.0 A***
Supply Voltage, V_{CC} . . . . . **7.0 V**
Input Voltage, V_{IN} or V_{EN} . . . . . **18 V**
Package Power Dissipation, P_D . . . . . **See Graph**
Operating Temperature Range, T_A
(UDN2543B/EB) . . . . **-20°C to +85°C**
(UDQ2543B/EB) . . . . **-40°C to +85°C**
Storage Temperature Range, T_S . . . . . **-55°C to +150°C**

*Outputs are peak current limited at approximately 1.0 A per driver. See Circuit Description and Applications for further information.

Providing interface between low-level logic and power loads to 100 W, the UDx2543B and UDx2543EB quad power drivers combine AND logic gates and high-current bipolar outputs. Each of the four independent outputs can sink up to 700 mA in the ON state. The outputs have a minimum breakdown voltage (load dump) of 60 V and a sustaining voltage of 35 V. The inputs are compatible with most TTL, DTL, LSTTL, and 5 V CMOS and PMOS logic systems.

Over-current protection has been designed into each channel of the UDx2543B/EB and typically occurs at 1 A. It protects any one channel from output short circuits with supply voltages up to 25 V. When the maximum output current is reached, that output stage is driven linearly. If the over-current condition continues, that output's thermal limiting will operate, limiting that output's power dissipation to approximately 2.4 W. The outputs also include diodes for voltage clamping with inductive loads such as relays, solenoids, or dc stepper motors.

These devices are supplied in a 16-pin power DIP of batwing construction (suffix 'B') to provide for maximum package power dissipation. They are also available in a 28-lead PLCC (suffix 'EB') for surface-mount applications. All devices are rated for continuous operation over the temperature range of -20°C to +85°C (UDN2543B/EB) or for use in automotive applications over an extended temperature range as the UDQ2543B/EB.

FEATURES

- 700 mA Output Current per Channel
- Low Output-Saturation Voltage
- Integral Output Transient-Suppression Diodes
- TTL, CMOS, PMOS, NMOS Compatible Inputs
- Independent Over-Current Protection for Each Output

Always order by complete part number:

Part Number	Package	Operating Temperature
UDN2543B	16-Pin DIP	-20°C to +85°C
UDN2543EB	28-Lead PLCC	-20°C to +85°C
UDQ2543B	16-Pin DIP	-40°C to +85°C
UDQ2543EB	28-Lead PLCC	-40°C to +85°C

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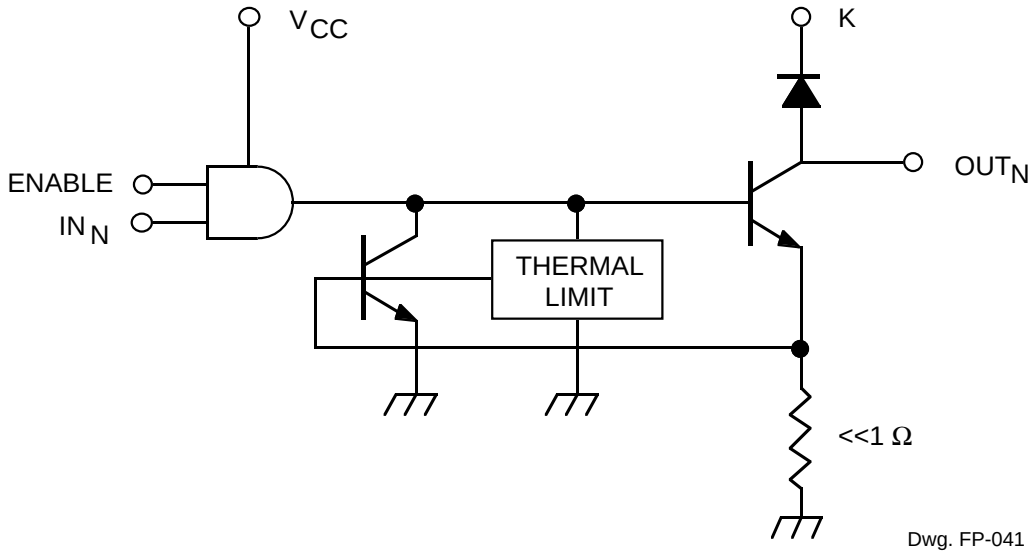
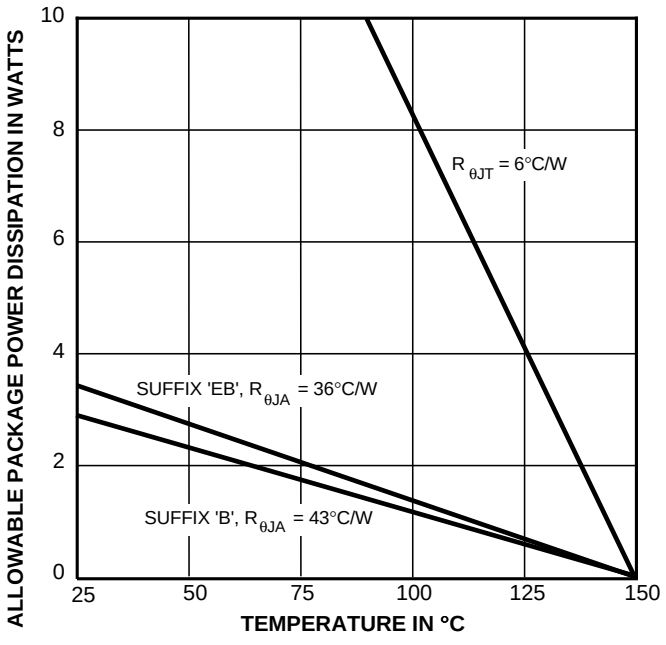
FUNCTIONAL BLOCK DIAGRAM
(1 OF 4 CHANNELS)



Dwg. FP-041

NOTE: These devices do not include an absolute thermal shutdown. Package power dissipation under fault conditions (2.4 W in the faulted channel) must therefore be evaluated at maximum operating temperature.



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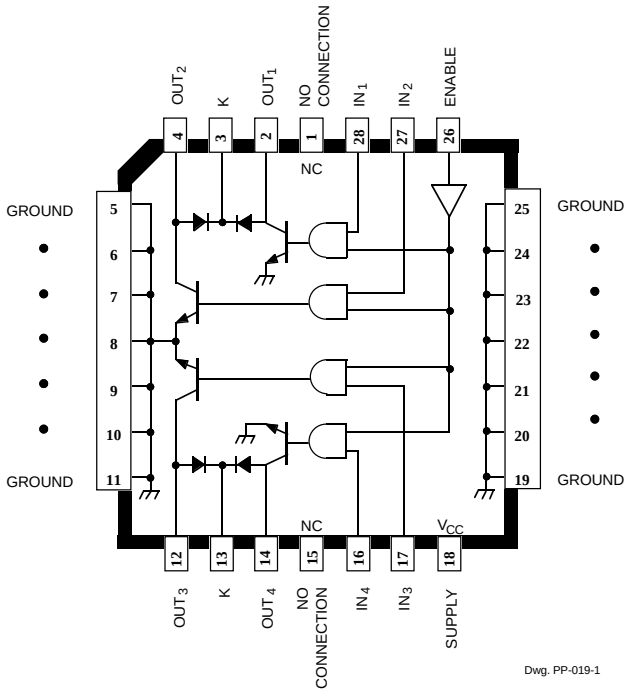
UDN/UDQ2543EB (PLCC)



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ELECTRICAL CHARACTERISTICS at T_A = +25°C (UDN2543B/EB) or over operating temperature range (UDQ2543B/EB only), V_{CC} = 4.75 V to 5.25 V

Characteristic	Symbol	Test Conditions	Limits		
			Min.	Max.	Units
Output Leakage Current	I_{CEX}	V_{OUT} = 60 V, V_{IN} = 0.8 V, V_{EN} = 2.0 V	—	100	µA
		V_{OUT} = 60 V, V_{IN} = 2.0 V, V_{EN} = 0.8 V	—	100	µA
Output Sustaining Voltage	$V_{OUT(SUS)}$	I_{OUT} = 100 mA, V_{IN} = V_{EN} = 0.8 V	35	—	V
Output Saturation Voltage	$V_{OUT(SAT)}$	I_{OUT} = 100 mA, V_{IN} = V_{EN} = 2.0 V	—	200	mV
		I_{OUT} = 400 mA, V_{IN} = V_{EN} = 2.0 V	—	400	mV
		I_{OUT} = 700 mA, V_{IN} = V_{EN} = 2.0 V	—	600	mV
Input Voltage	Logic 1	$V_{IN(1)}$ or $V_{EN(1)}$	2.0	—	V
	Logic 0	$V_{IN(0)}$ or $V_{EN(0)}$	—	0.8	V
Input Current	Logic 1	$V_{IN(1)}$ or $V_{EN(1)}$ = 2.0 V	—	20	µA
	Logic 0	$V_{IN(0)}$ or $V_{EN(0)}$ = 0.8 V	—	-10	µA
Total Supply Current	I_{CC}	I_{OUT} = 700 mA*, V_{IN}† = V_{EN} = 2.0 V	—	65	mA
		Outputs Open, V_{IN}† = 0.8 V, V_{EN} = 2.0 V	—	15	mA
Clamp Diode Forward Voltage	V_F	I_F = 1.0 A	—	1.6	V
		I_F = 1.5 A	—	2.0	V
Clamp Diode Leakage Current	I_R	V_R = 60 V, V_{IN} = V_{EN} = 2.0 V, $D_1 + D_2$ or $D_3 + D_4$	—	50	µA

Negative current is defined as coming out of (sourcing) the specified terminal.
As used here, -100 is defined as greater than +10 (absolute magnitude convention) and the minimum is implicitly zero.
* Pulse test, allowable package power dissipation will be exceeded at increased ambient temperatures.
† All inputs simultaneously, all other tests are performed with each input tested separately.

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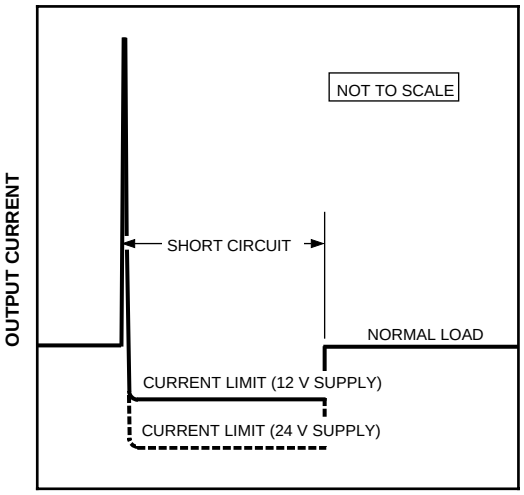
TYPICAL OUTPUT BEHAVIOR



Dwg. WP-013-1

CIRCUIT DESCRIPTION AND APPLICATION

INCANDESCENT LAMP DRIVER

For incandescent lamp applications, the UDx2549B/EB or UDx2559B/EB, with improved shortcircuit protection and thermal limiting, are recommended.

INDUCTIVE LOAD DRIVER

Bifilar (unipolar) stepper motors, relays, or solenoids can be driven directly. The internal flyback diodes prevent damage to the output transistors by suppressing the high-voltage spikes that occur when turning OFF an inductive load. For rapid current decay (fast turn-OFF speeds), the use of Zener diodes will raise the flyback voltage and improve performance. However, the peak voltage must not exceed the specified minimum sustaining voltage ($V_{SUPPLY} + V_Z + V_F \le V_{OUT(SUS)}$).

FAULT CONDITIONS

In the event of a shorted load, the load current will attempt to increase. As described above, the drive current to the affected output stage is diverted, causing the output stage to go linear, limiting the peak output current to approximately 1 A. As the power dissipation of that output stage increases, a thermal gradient sensing circuit will become operational, further decreasing the drive current to the affected output stage and reducing the output current to a value dependent on supply voltage ($I_{OUT} \approx 2.4/V_{SUPPLY}$). If the fault condition is corrected, the output stage will return to its normal saturated condition.

Due to the independent operation of the four channels, only a single channel should be shorted at a time. Multiple overload conditions may be tolerated provided rated package power dissipation is not exceeded.

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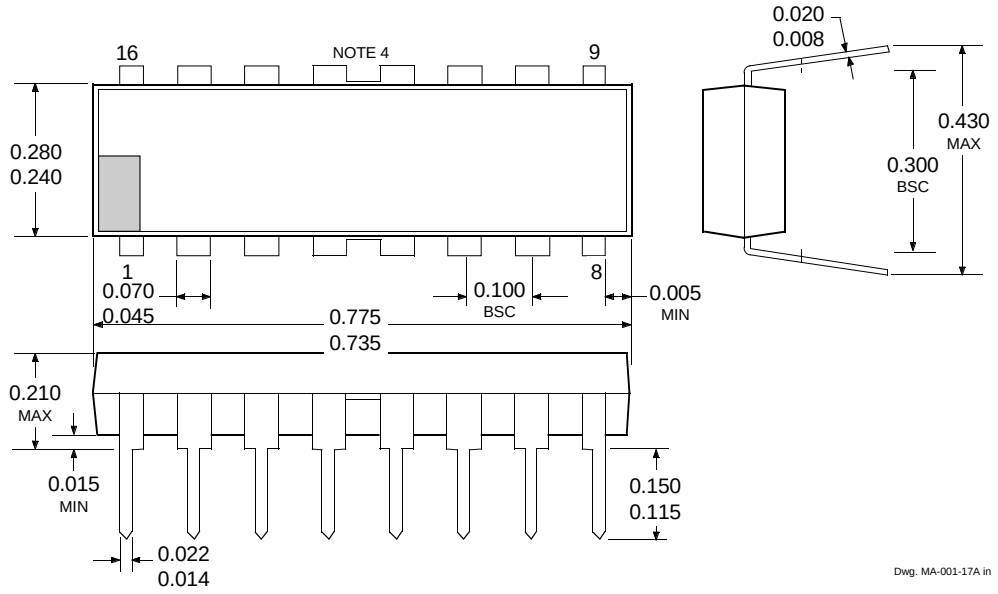
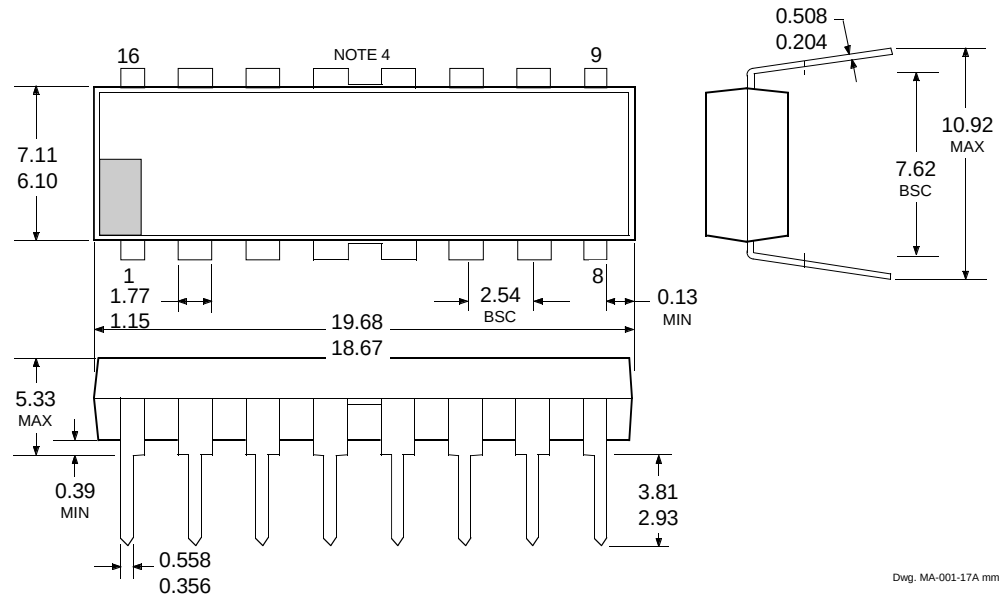
UDN2543B and UDQ2543B
Dimensions in Inches
(controlling dimensions)



Dimensions in Millimeters
(for reference only)



NOTES: 1. Exact body and lead configuration at vendor's option within limits shown.
2. Lead spacing tolerance is non-cumulative
3. Lead thickness is measured at seating plane or below.
4. Webbed lead frame. Leads 4, 5, 12, and 13 are internally one piece.

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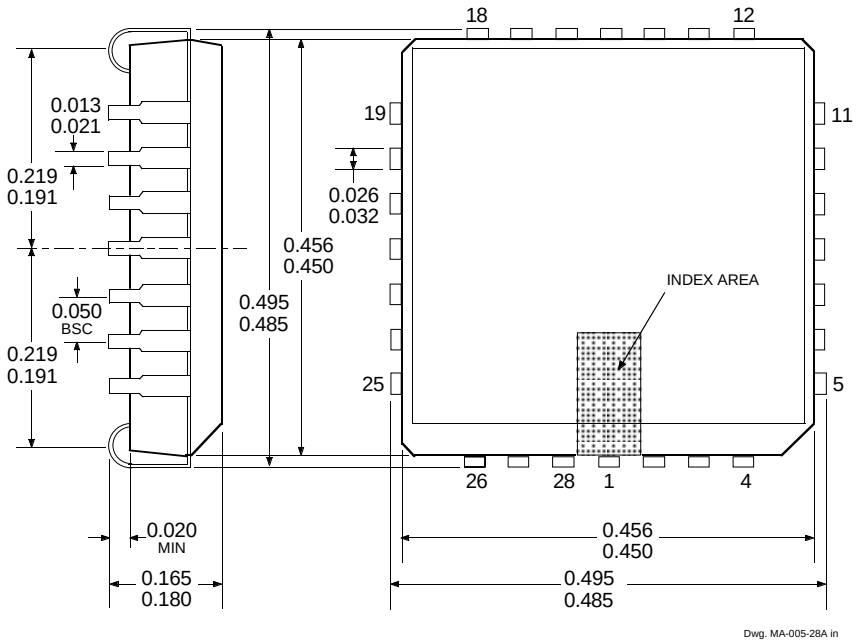
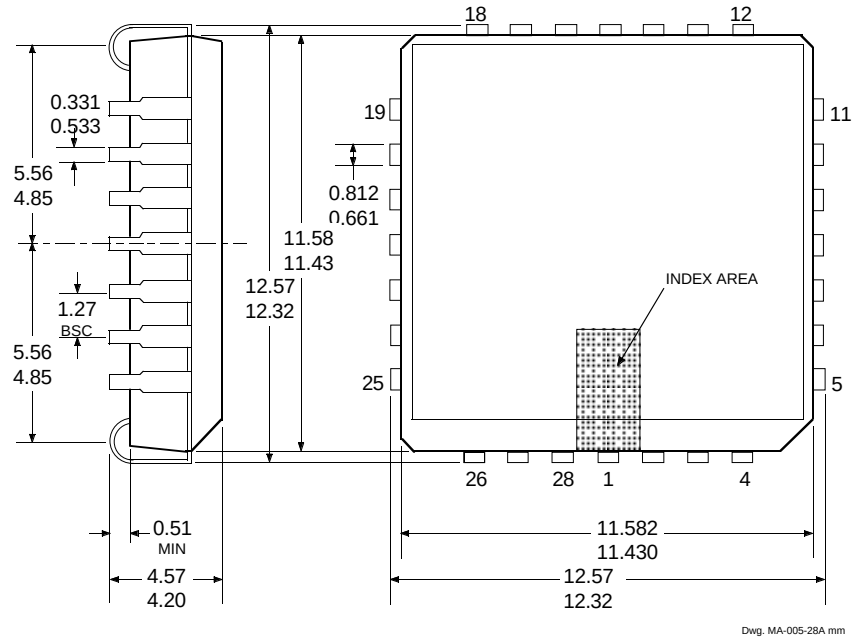
UDN2543EB and UDQ2543EB
Dimensions in Inches
(controlling dimensions)



Dwg. MA-005-28A in

Dimensions in Millimeters
(for reference only)



Dwg. MA-005-28A mm

NOTES: 1. Exact body and lead configuration at vendor's option within limits shown.
2. Lead spacing tolerance is non-cumulative
3. Webbed lead frame. Leads 5 through 11 and 19 through 25 are internally one piece.

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