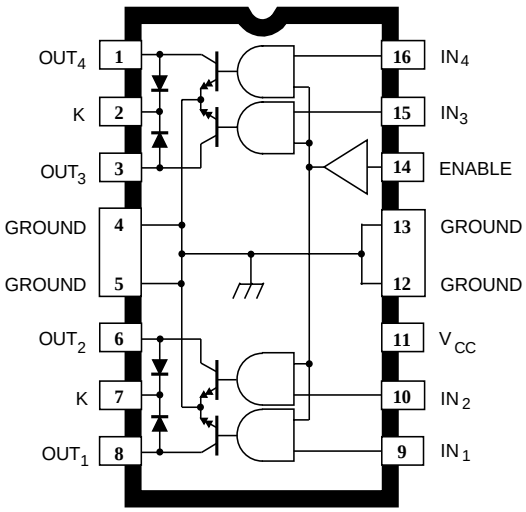
2540

Data Sheet
29317D

QUAD DARLINGTON POWER DRIVER

UDN2540B (DIP)



Dwg. PP-017-2

ABSOLUTE MAXIMUM RATINGS
at T_A = 25°C

Output Voltage, V_{OUT} ..... **50 V**
Output Current, I_{OUT} (peak) ..... **2.5 A**
(continuous) ..... **1.8 A**
Logic Supply Voltage, V_{CC} ..... **7.0 V**
Input Voltage, V_{IN} ..... **7.0 V**
Package Power Dissipation,
P_D ..... **See Graph**
Operating Temperature Range,
T_A ..... **-20°C to +85°C**
Storage Temperature Range,
T_S ..... **-55°C to +150°C**

Combining AND logic gates and inverting high-current bipolar outputs, the UDN2540B and A2540SLB quad Darlington power drivers provide interface between low-level signal-processing circuits and power loads totaling 360 W. Each of the four independent outputs can sink up to 1.8 A in the on state with peak inrush currents to 2.5 A. The four power outputs are each comprised of an open-collector Darlington driver and an internal flyback/clamp diode for switching inductive leads. They feature a minimum breakdown and sustaining voltage of 50 V. The logic inputs are compatible with TTL and 5 V CMOS logic systems.

Typical applications include print heads, relays, solenoids, and dc stepping motors. These drivers can also be used to drive high-current incandescent lamps, LEDS, and heaters.

The UDN2540B is supplied in a 16-pin batwing power DIP; the A2540SLB is supplied in a 20-lead batwing power SOIC for surface-mount applications. The batwing construction provides for maximum package power dissipation in a standard construction. At 25°C, and with pcb copper foil heat dissipators at the ground tabs, either package is capable of safely dissipating more than 2 W.

FEATURES

- 1.8 A Continuous Output Current
- Output Voltage to 50 V
- TTL and 5 V CMOS Compatible Inputs
- Efficient Input/Output Pinning
- Integral Transient-Suppression Diodes
- Replaces L6221A and L6221CD

Always order by complete part number:

Part Number	Package
UDN2540B	16-pin batwing DIP
A2540SLB	20-lead batwing SOIC

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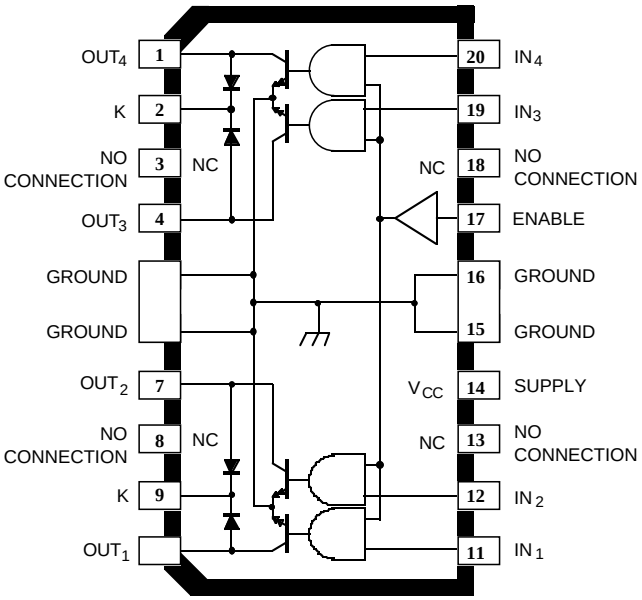
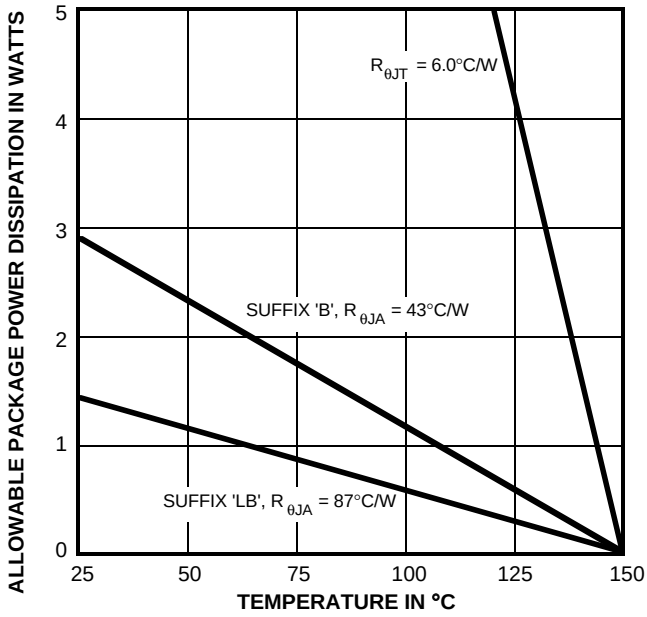
A2540SLB (SOIC)



Dwg. PP-017-3



Dwg. GP-049-3A

$R_{\theta JA}$ is measured on typical two-sided PCB with minimal copper ground area. For the SOIC, adding 3.57 in^2 copper ground area will reduce the thermal resistance to 52°C/W (2.4 W allowable package power dissipation at 25°C). See Application Note 29501.5, *Improving Batwing Power Dissipation*.

TRUTH TABLE

ENABLE	IN_N	OUT_N
H	H	ON
—	L	OFF
L	X	OFF

X = Don't care.

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ELECTRICAL CHARACTERISTICS at T_A = 25°C, $T_J \leq$ 150°C, V_{CC} = 4.75 V to 5.25 V.

Characteristic	Symbol	Test Conditions	Limits			
			Min.	Typ.	Max.	Units
Output Leakage Current	I_{CEX}	V_{OUT} = 50 V, V_{IN} = 0.8 V, V_{EN} = 2.4 V	—	<1.0	100	µA
		V_{OUT} = 50 V, V_{IN} = 2.4 V, V_{EN} = 0.8 V	—	<1.0	100	µA
Output Sustaining Voltage	$V_{CE(sus)}$	I_{OUT} = 1.8 A, L = 3.0 mH	50	—	—	V
Output Saturation Voltage	$V_{CE(SAT)}$	I_{OUT} = 600 mA, V_{IN} = V_{EN} = 2.4 V	—	0.9	1.0	V
		I_{OUT} = 1.0 A, V_{IN} = V_{EN} = 2.4 V	—	1.0	1.2	V
		I_{OUT} = 1.8 A, V_{IN} = V_{EN} = 2.4 V	—	1.3	1.6	V
Input Voltage	Logic 1	$V_{IN(1)}$ or $V_{EN(1)}$	2.4	—	—	V
	Logic 0	$V_{IN(0)}$ or $V_{EN(0)}$	—	—	0.8	V
Input Current	Logic 1	$V_{IN(1)}$ or $V_{EN(1)}$ = 2.4 V	—	—	10	µA
	Logic 0	$V_{IN(0)}$ or $V_{EN(0)}$ = 0.8 V	—	—	-100	µA
Total Supply Current	I_{CC}	V_{IN}* = V_{EN} = 2.4 V, V_{CC} = 5.0 V, Outputs Open	—	14	20	mA
		V_{IN}* = V_{EN} = 0.8 V, V_{CC} = 5.0 V	—	0.4	2.0	mA
Clamp Diode Forward Voltage	V_F	I_F = 1.0 A	—	1.3	1.6	V
		I_F = 1.8 A	—	1.6	2.0	V
Clamp Diode Leakage Current	I_R	V_R = 50 V	—	<1.0	100	µA

Typical Data is for design information only.
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.
*All inputs simultaneously, all other tests are performed with each input tested separately.

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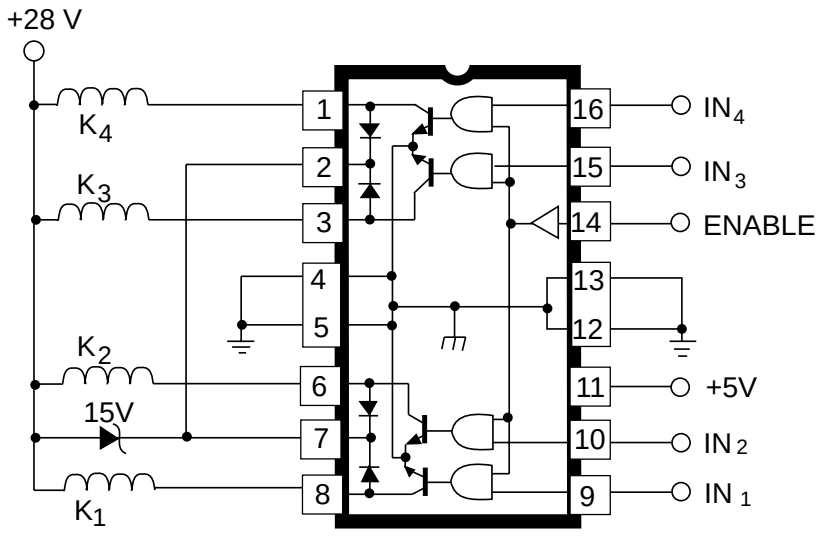
TYPICAL APPLICATION
(QUAD RELAY DRIVER WITH ZENER FLYBACK)



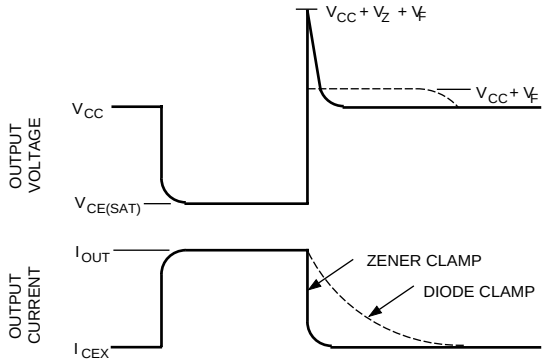
Dwg. EP-016

APPLICATIONS INFORMATION

A typical application is shown for driving four high-current relays, solenoids, or print heads. A Zener diode is used to increase the flyback voltage, providing a much faster inductive load turn-off current decay, resulting in faster dropout (reduced relay contact arcing), and improved performance. The maximum Zener voltage, plus the load supply voltage, plus the flyback diode forward voltage must not exceed the device's rated sustaining voltage.

With external control circuitry, the ENABLE input can be used for chopper (PWM) applications. If the ENABLE input is not used, it should be tied high.

All inputs will float high if open circuited.



Dwg. WP-001

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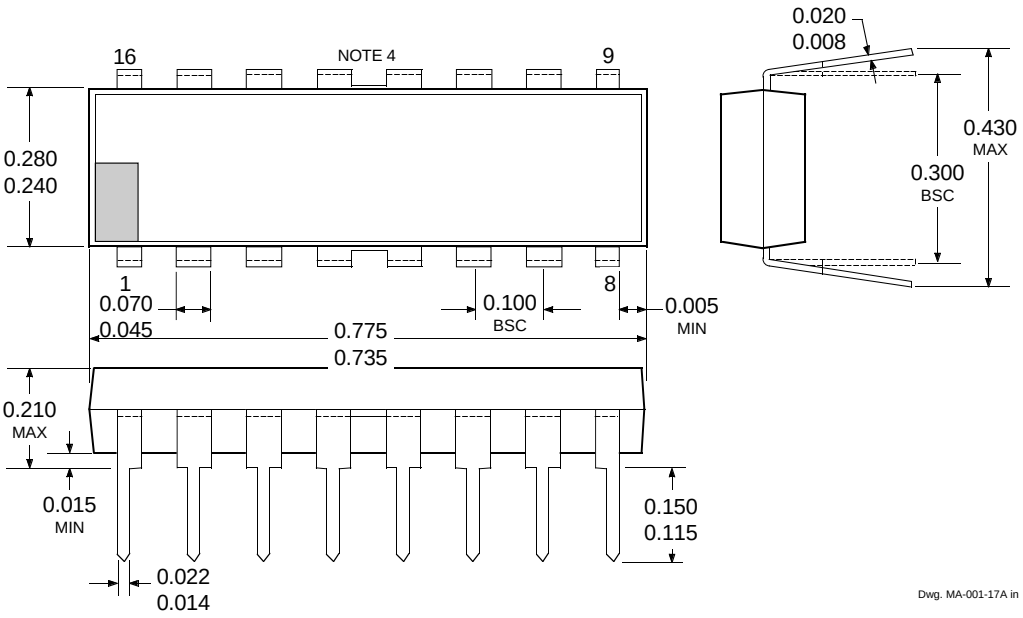
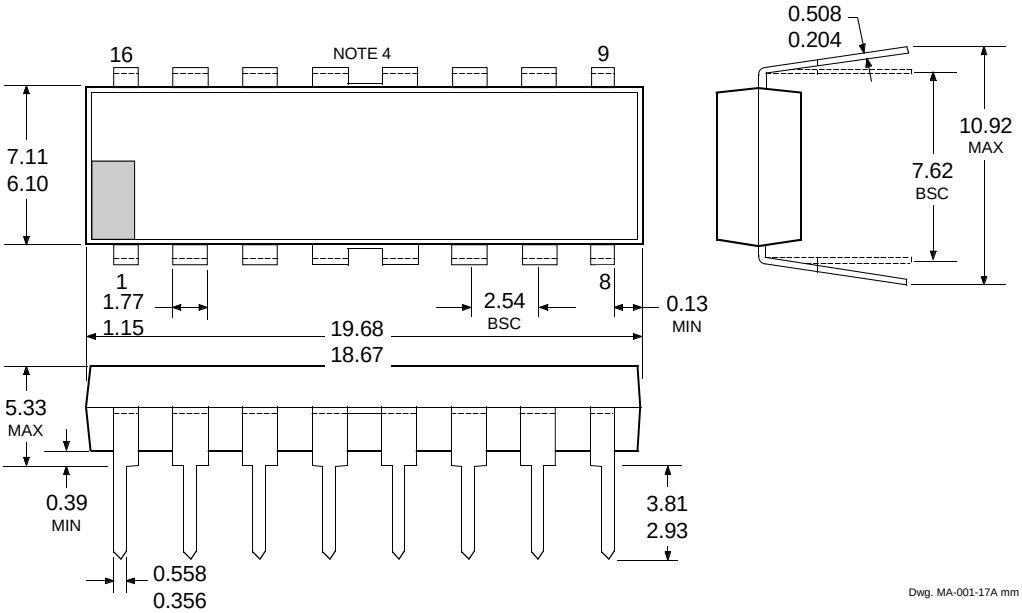
UDN2540B

Dimensions in Inches
(controlling dimensions)



Dimensions in Millimeters
(for reference only)



NOTES: 1. Leads 1, 8, 9, and 16 may be half leads at vendor's option.
2. Lead thickness is measured at seating plane or below.
3. Lead spacing tolerance is non-cumulative.
4. Webbed lead frame. Leads indicated are internally one piece.
5. Exact body and lead configuration at vendor's option within limits shown.

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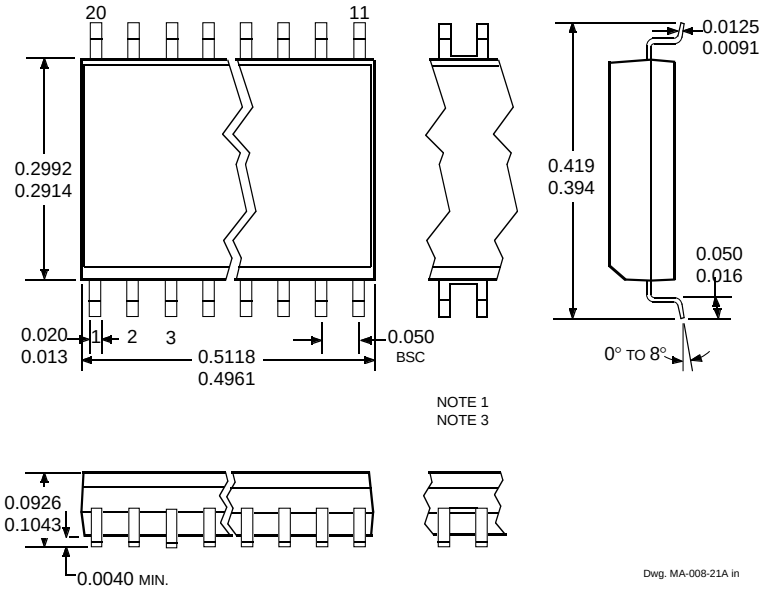
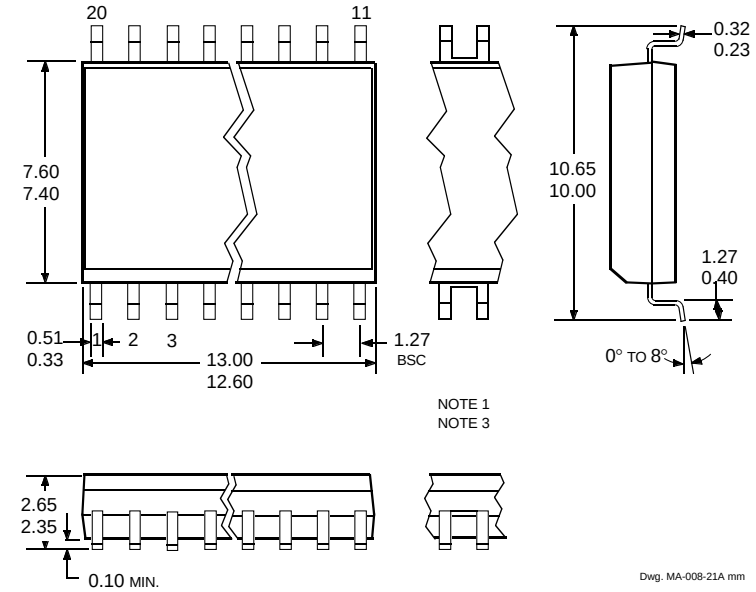
A2540SLB

Dimensions in Inches
(for reference only)



Dwg. MA-008-21A in

Dimensions in Millimeters
(controlling dimensions)



Dwg. MA-008-21A mm

NOTES: 1. Webbed lead frame. Leads 5, 6, 15, and 16 are internally one piece.
2. Lead spacing tolerance is non-cumulative.
3. Exact body and lead configuration at vendor's option within limits shown.

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POWER SINK DRIVERS

IN ORDER OF 1) OUTPUT CURRENT, 2) OUTPUT VOLTAGE, 3) NUMBER OF DRIVERS

Output Ratings *			Features					
mA	V	#	Serial Input	Latched Drivers	Diode Clamp	Outputs	Internal Protection	Part Number†
75	17	8	X	X	–	constant current	–	6275
	17	16	X	X	–	constant current	–	6276
100	20	8	–	–	–	saturated	–	2595
	30	32	X	X	–	–	–	5833
	40	32	X	X	–	saturated	–	5832
	50	8	addressable decoder/driver			DMOS	–	6B259
	50	8	–	X	–	DMOS	–	6B273
	50	8	X	X	–	DMOS	–	6B595
120	24	8	X	X	–	constant current	–	6277
250	50	8	addressable decoder/driver			DMOS	–	6259
	50	8	–	X	–	DMOS	–	6273
	50	8	X	X	–	DMOS	–	6595
	50	8	–	–	X	saturated	–	2596
	60	4	–	–	X	saturated	X	2557
350	50	4	–	X	X	–	–	5800
	50	7	–	–	X	–	–	2003
	50	7	–	–	X	–	–	2004
	50	8	–	–	X	–	–	2803
	50	8	–	X	X	–	–	5801
	50	8	X	X	–	–	–	5821
	50	8	X	X	X	–	–	5841
	50	8	addressable decoder/driver			DMOS	–	6A259
	50	8	X	X	–	DMOS	–	6A595
	80	8	X	X	–	–	–	5822
	80	8	X	X	X	–	–	5842
	95	7	–	–	X	–	–	2023
	95	7	–	–	X	–	–	2024
450	30	28	dual 4- to 14-line decoder/driver			–	–	6817
600	60	4	–	–	–	saturated	X	2547
	60	4	–	–	X	saturated	X	2549 and 2559
700	60	4	–	–	X	saturated	X	2543
750	50	8	–	–	X	saturated	–	2597
1000	46	4	stepper motor controller/driver			MOS	–	7024 and 7029
1200	46	4	microstepping controller/driver			MOS	–	7042
1250	50	4	stepper motor translator/driver			–	X	5804
1800	50	4	–	–	X	–	–	2540
3000	46	4	stepper motor controller/driver			MOS	–	7026
	46	4	microstepping controller/driver			MOS	–	7044

* Current is maximum specified test condition, voltage is maximum rating. See specification for sustaining voltage limits or over-current protection voltage limits.

† Complete part number includes additional characters to indicate operating temperature range and package style.

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