8-Bit Addressable, DMOS Power Driver

Discontinued Product

These parts are no longer in production The device should not be purchased for new design applications. Samples are no longer available.

Date of status change: October 29, 2007

Recommended Substitutions:

NOTE: For detailed information on purchasing options, contact your local Allegro field applications engineer or sales representative.

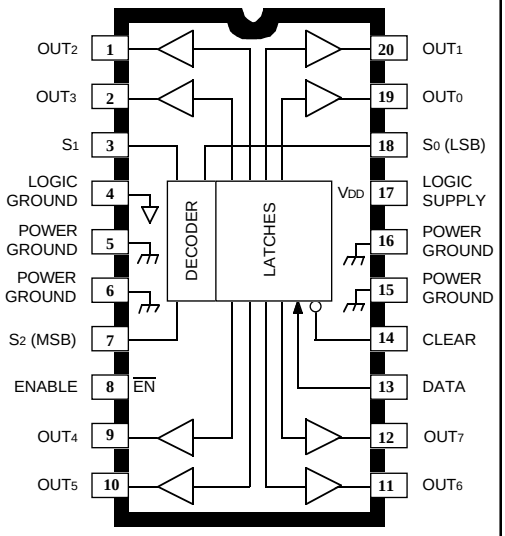
6A259

Data Sheet
26186.121

PRELIMINARY INFORMATION
(Subject to change without notice)
March 24, 2003

8-BIT ADDRESSABLE DMOS POWER DRIVER

A6A259KA (DIP)



Dwg. PP-050-4

ABSOLUTE MAXIMUM RATINGS at T_A = 25°C

Output Voltage, V_O ..... **50 V**
Output Drain Current,
Continuous, I_O ..... **350 mA***
Peak, I_{OM} ..... **1100 mA*†**
Peak, I_{OM} ..... **2.0 A†**
Single-Pulse Avalanche Energy,
E_{AS} ..... **75 mJ**
Logic Supply Voltage, V_{DD} ..... **7.0 V**
Input Voltage Range,
V_I ..... **-0.3 V to +7.0 V**
Package Power Dissipation,
P_D ..... **See Graph**
Operating Temperature Range,
T_A ..... **-40°C to +125°C**
Storage Temperature Range,
T_S ..... **-55°C to +150°C**

*Each output, all outputs on.

† Pulse duration ≤ 100 µs, duty cycle ≤ 2%.

Caution: These CMOS devices have input static protection (Class 3) but are still susceptible to damage if exposed to extremely high static electrical charges.

The A6A259KA and A6A259KLB combine a 3-to-8 line CMOS decoder and accompanying data latches, control circuitry, and DMOS outputs in a multi-functional power driver capable of storing single-line data in the addressable latches or use as a decoder or demuliplexer. Driver applications include relays, solenoids, and other medium-current or high-voltage peripheral power loads.

The CMOS inputs and latches allow direct interfacing with microprocessor-based systems. Use with TTL may require appropriate pull-up resistors to ensure an input logic high. Four modes of operation are selectable with the CLEAR and ENABLE inputs.

The addressed DMOS output inverts the DATA input with all unaddressed outputs remaining in their previous states. All of the output drivers are disabled (the DMOS sink drivers turned off) with the CLEAR input low and the ENABLE input high. The A6A259KA/KLB DMOS open-drain outputs are capable of sinking up to 500 mA.

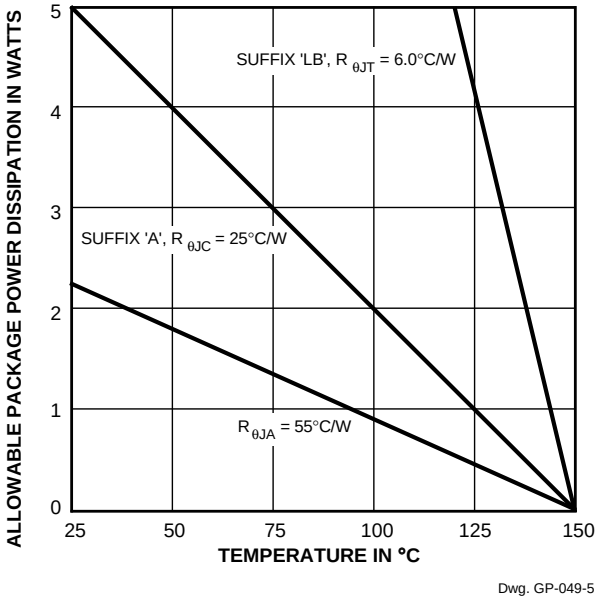
The A6A259KA is furnished in a 20-pin dual in-line plastic package. The A6A259KLB is furnished in a 24-lead wide-body, small-outline plastic batwing package (SOIC) with gull-wing leads for surface-mount applications. Copper lead frames, reduced supply current requirements, and low on-state resistance allow both devices to sink 150 mA from all outputs continuously, to ambient temperatures over 85°C.

FEATURES

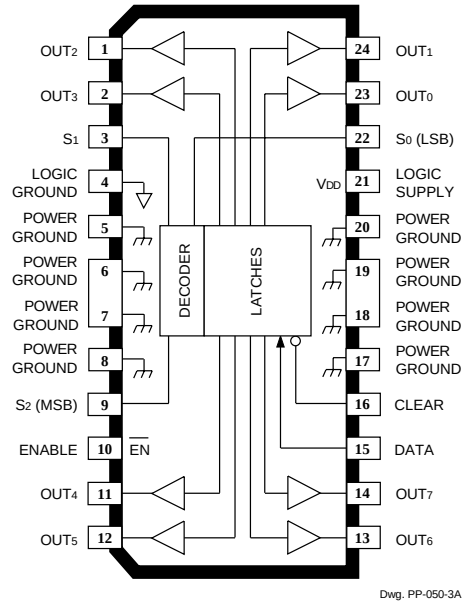
- 50 V Minimum Output Clamp Voltage
- 350 mA Output Current (all outputs simultaneously)
- 1 Ω Typical $r_{DS(on)}$
- Internal Short-Circuit Protection
- Low Power Consumption
- Replacements for TPIC6A259N and TPIC6A259DW

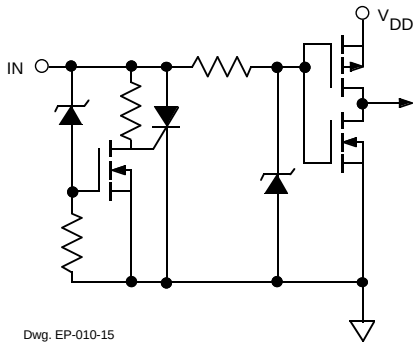
Always order by complete part number:

Part Number	Package	$R_{\theta JA}$	$R_{\theta JC}$	$R_{\theta JT}$
A6A259KA	20-pin DIP	55°C/W	25°C/W	—
A6A259KLB	24-lead SOIC	55°C/W	—	6°C/W

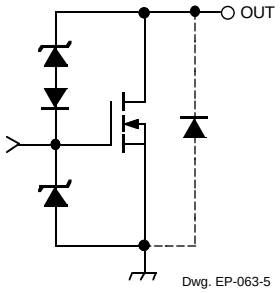


A6A259KLB (SOIC)





LOGIC INPUTS



DMOS POWER DRIVER OUTPUT

FUNCTION TABLE

Inputs			Addressed	Other	
$\overline{\text{CLEAR}}$	$\overline{\text{ENABLE}}$	DATA	OUTPUT	OUTPUTs	Function
H	L	H	L	R	Addressable Latch
H	L	L	H	R	
H	H	X	R	R	Memory
L	L	H	L	H	8-Line Demultiplexer
L	L	L	H	H	
L	H	X	H	H	Clear

L = Low Logic Level H = High Logic Level X = Irrelevant R = Previous State

LATCH SELECTION TABLE

Select Inputs			Addressed
S_2 (MSB)	S_1	S_0 (LSB)	OUTPUT
L	L	L	0
L	L	H	1
L	H	L	2
L	H	H	3
H	L	L	4
H	L	H	5
H	H	L	6
H	H	H	7

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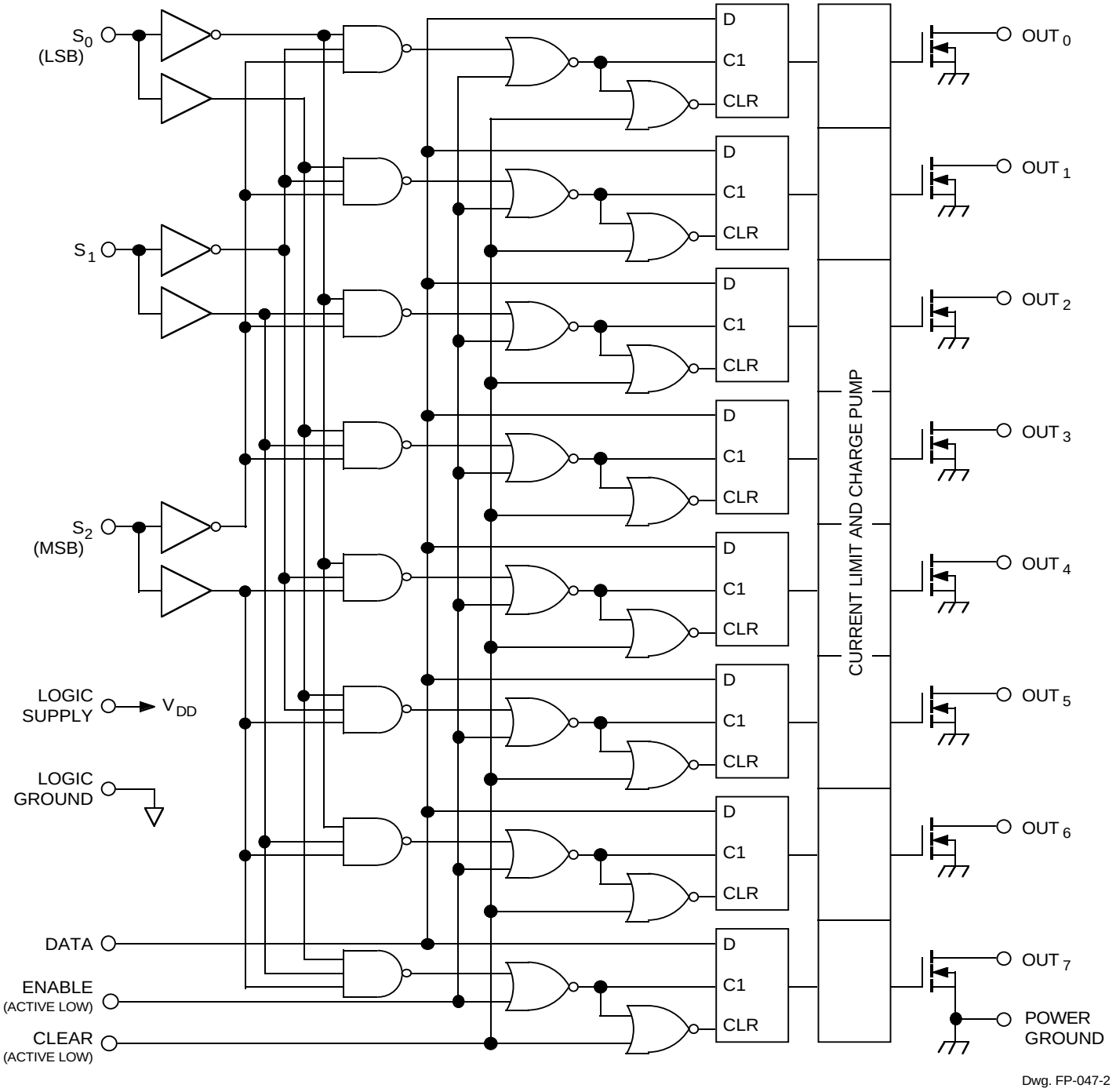
FUNCTIONAL BLOCK DIAGRAM



Dwg. FP-047-2

Power grounds must be connected externally to a single point.

RECOMMENDED OPERATING CONDITIONS

over operating temperature range

Logic Supply Voltage Range, V_{DD} ..... 4.5 V to 5.5 V
High-Level Input Voltage, V_{IH} ..... $\geq 0.85V_{DD}$
Low-level input voltage, V_{IL} ..... $\leq 0.15V_{DD}$

ELECTRICAL CHARACTERISTICS at T_A = +25°C, V_{DD} = 5 V, $t_{ir} = t_{if} \leq 10$ ns (unless otherwise specified).

Characteristic	Symbol	Test Conditions	Limits			
			Min.	Typ.	Max.	Units
Logic Supply Voltage	V_{DD}	Operating	4.5	5.0	5.5	V
Output Breakdown Voltage	$V_{(BR)DSX}$	I_O = 1 mA	50	—	—	V
Off-State Output Current	I_{DSX}	V_O = 40 V	—	0.1	1.0	µA
		V_O = 40 V, T_A = 125°C	—	0.2	5.0	µA
Static Drain-Source On-State Resistance	$r_{DS(on)}$	I_O = 350 mA	—	1.0	1.5	Ω
		I_O = 350 mA, T_A = 125°C	—	1.7	2.5	Ω
Source-to-Drain Diode Voltage	V_{SD}	I_F = 350 mA	—	1.0	—	V
Nominal Output Current	$I_{O(nom)}$	$V_{DS(on)}$ = 0.5 V, T_A = 85°C	—	350	—	mA
Output Current	$I_{O(chop)}$	I_O at which chopping starts, T_C = 25°C	0.6	0.8	1.1	A
Logic Input Current	I_{IH}	$V_I = V_{DD}$ = 5.5 V	—	—	1.0	µA
	I_{IL}	V_I = 0, V_{DD} = 5.5 V	—	—	-1.0	µA
Prop. Delay Time	t_{PLH}	I_O = 350 mA, C_L = 30 pF	—	100	—	ns
	t_{PHL}	I_O = 350 mA, C_L = 30 pF	—	60	—	ns
Output Rise Time	t_r	I_O = 350 mA, C_L = 30 pF	—	55	—	ns
Output Fall Time	t_f	I_O = 350 mA, C_L = 30 pF	—	40	—	ns
Supply Current	$I_{DD(off)}$	V_{DD} = 5.5 V, Outputs OFF	—	0.75	1.0	mA
	$I_{DD(on)}$	V_{DD} = 5.5 V, Outputs ON	—	2.0	3.0	mA

Typical Data is at V_{DD} = 5 V and is for design information only.

NOTE — Pulse test, duration ≤ 100 µs, duty cycle ≤ 2%.

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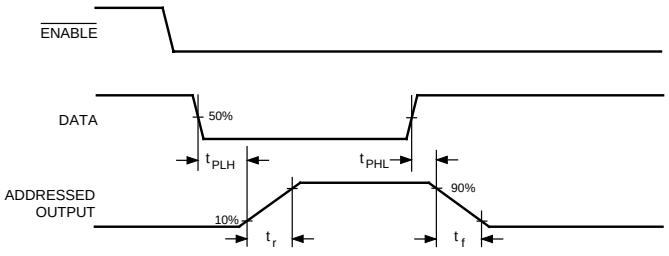
FUNCTIONAL DESCRIPTION and INPUT REQUIREMENTS



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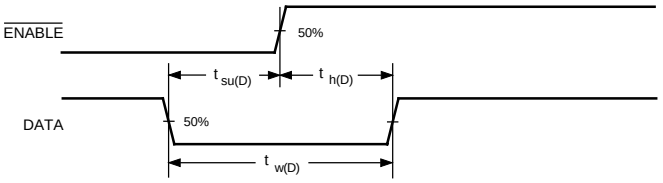
OUTPUT SWITCHING TIME



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DATA INPUT REQUIREMENTS

Data Active Time Before Enable
(Data Set-Up Time), $t_{su(D)}$ ..... **20 ns**
Data Active Time After Enable
(Data Hold Time), $t_{h(D)}$ ..... **20 ns**
Data Pulse Width, $t_{w(D)}$ ..... **40 ns**
Input Logic High, V_{IH} ..... **≥ 0.85V_{DD}**
Input Logic Low, V_{IL} ..... **≤ 0.15V_{DD}**

Four modes of operation are selectable by controlling the CLEAR and ENABLE inputs as shown above.

In the addressable-latch mode, data at the DATA input is written into the addressed transparent latch. The addressed output inverts the data input with all other outputs remaining in their previous states.

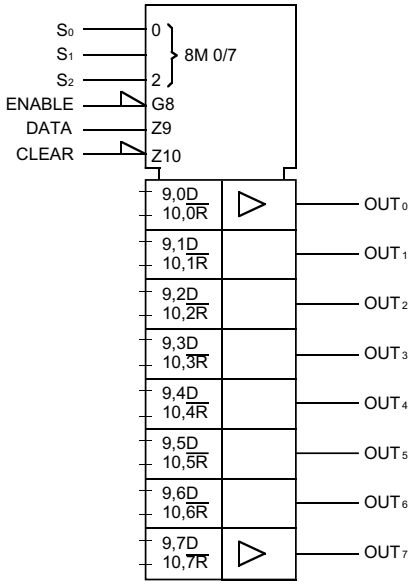
In the memory mode, all outputs remain in their previous states and are unaffected by the DATA or address (S_n) inputs. To prevent entering erroneus data in the latches, ENABLE should be held HIGH while the address lines are changing.

In the demultiplexing/decoding mode, the addressed output inverts the data input and all other outputs are OFF.

In the clear mode, all outputs are OFF and are unaffected by the DATA or address (S_N) inputs.

Given the appropriate inputs, when DATA is LOW for a given address, the output is OFF; when DATA is HIGH, the output is ON and can sink current.

LOGIC SYMBOL



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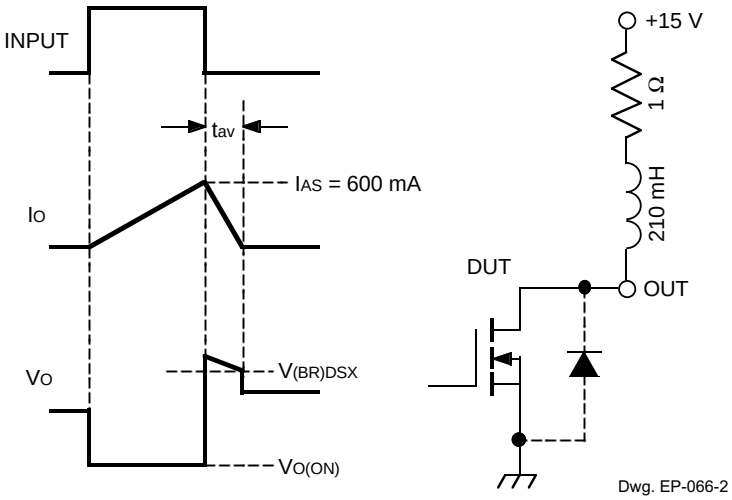
TEST CIRCUITS



$$E_{AS} = I_{AS} \times V_{(BR)DSX} \times t_{AV}/2$$

Single-Pulse Avalanche Energy Test Circuit and Waveforms

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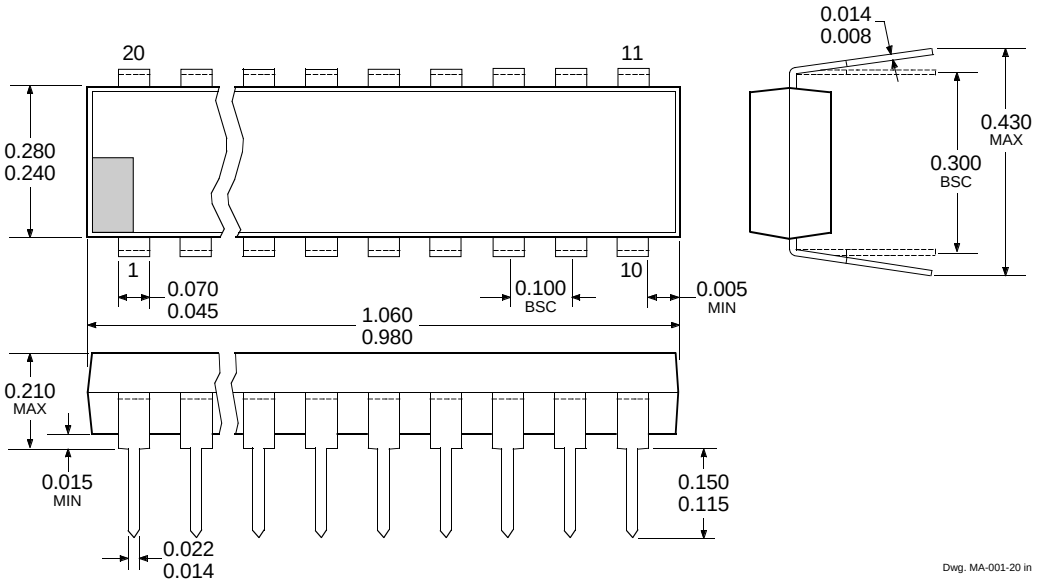
TERMINAL DESCRIPTIONS

A6A259KA (DIP) Terminal No.	A6A259KLB (SOIC) Terminal No.	Terminal Name	Function
1	1	OUT_2	Current-sinking, open-drain DMOS output, address 010.
2	2	OUT_3	Current-sinking, open-drain DMOS output, address 011.
3	3	S_1	Binary-coded output-select input.
4	4	LOGIC GROUND	Reference terminal for input voltage measurements.
5	5, 6	POWER GROUND	Reference terminal for output voltage measurements (OUT_{0-3}).
6	7, 8	POWER GROUND	Reference terminal for output voltage measurements (OUT_{4-7}).
7	9	S_2	Binary-coded output-select input, most-significant bit.
8	10	ENABLE	Mode control input; see Function Table.
9	11	OUT_4	Current-sinking, open-drain DMOS output, address 100.
10	12	OUT_5	Current-sinking, open-drain DMOS output, address 101.
11	13	OUT_6	Current-sinking, open-drain DMOS output, address 110.
12	14	OUT_7	Current-sinking, open-drain DMOS output, address 111.
13	15	DATA	CMOS data input to the addressed output latch. When enabled, the addressed output inverts the data input (DATA = HIGH, OUTPUT = LOW).
14	16	CLEAR	Mode control input; see Function Table.
15	17, 18	POWER GROUND	Reference terminal for output voltage measurements (OUT_{4-7}).
16	19, 20	POWER GROUND	Reference terminal for output voltage measurements (OUT_{0-3}).
17	21	LOGIC SUPPLY	(V_{DD}) The logic supply voltage (typically 5 V).
18	22	S_0	Binary-coded output-select input, least-significant bit.
19	23	OUT_0	Current-sinking, open-drain DMOS output, address 000.
20	24	OUT_1	Current-sinking, open-drain DMOS output, address 001.

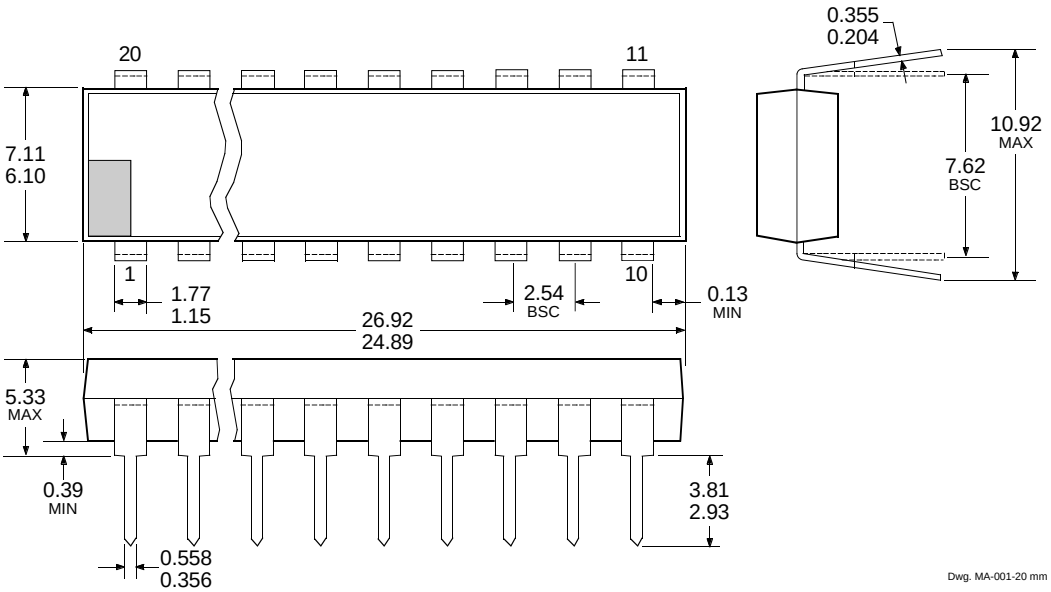
NOTE —Power grounds must be connected together externally.

A6A259KA (DIP)

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. Supplied in standard sticks/tubes of 18 devices.

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A6A259KLB (SOIC)

Dimensions in Inches
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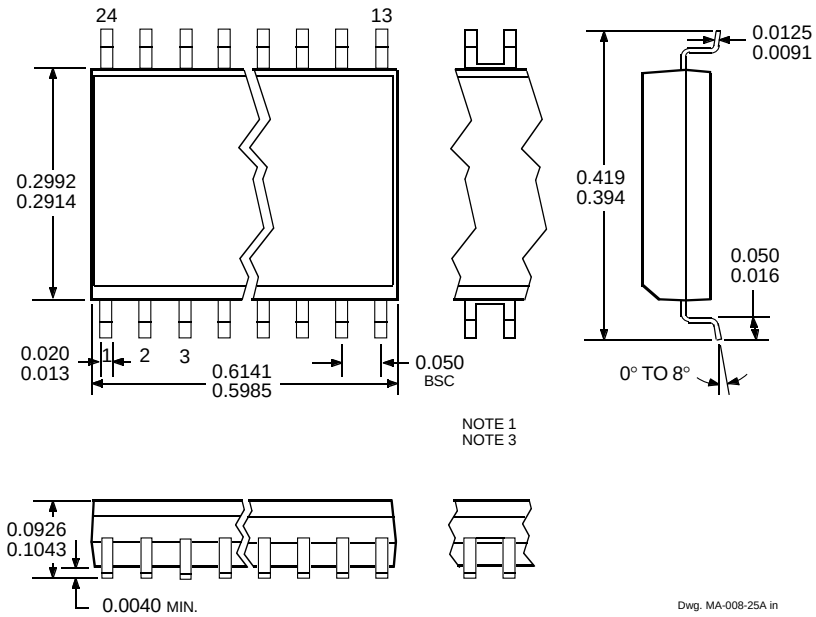
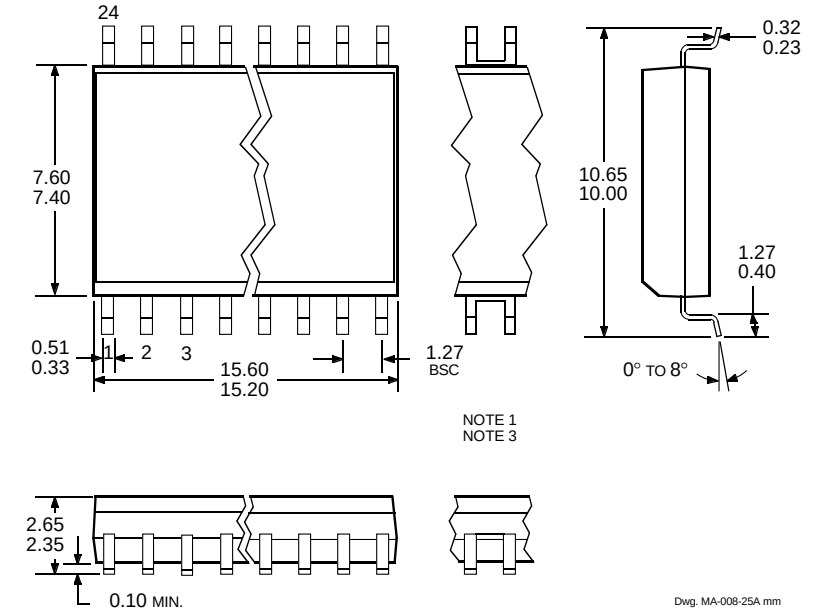


Dimensions in Millimeters
(controlling dimensions)



NOTES:
1. Webbed lead frame. Leads 6, 7, 18, and 19 are internally one piece.
2. Lead spacing tolerance is non-cumulative.
3. Exact body and lead configuration at vendor's option within limits shown.
4. Supplied in standard sticks/tubes of 31 devices, or add "TR" to part number for tape and reel.

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