

RD5CYD08

IGBT Driver

REJ03D0180-0400Z

Rev.4.00

Jul. 12, 2004

Description

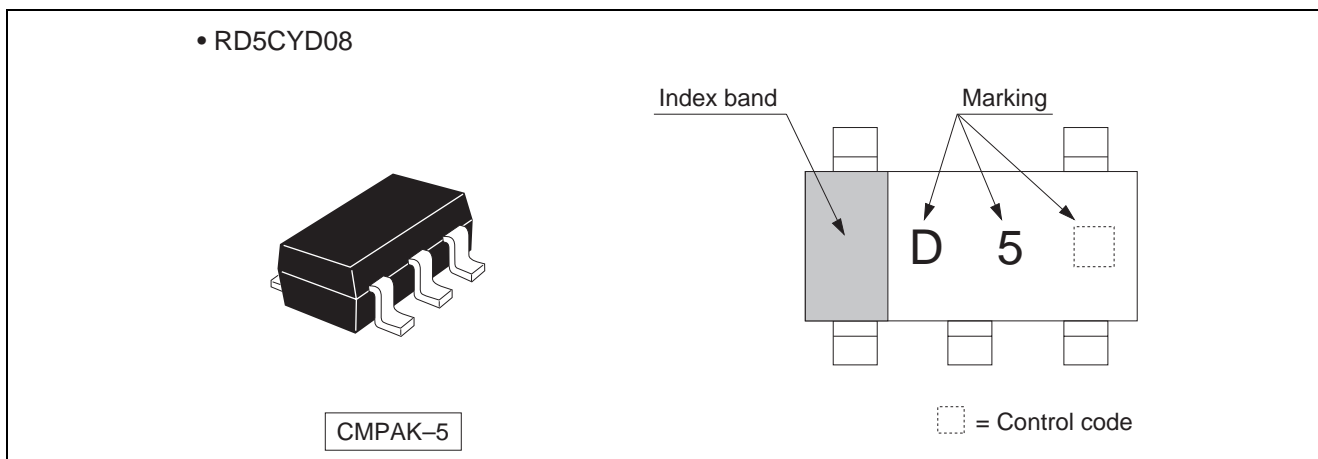
The RD5CYD08 has two-input AND gate in a 5 pin package. This product is suited as IGBT Driver IC for the strobe.

Features

- Supplied on emboss taping for high-speed automatic mounting.
- Supply voltage range : 4.0 to 6.0 V
Operating temperature range: -40 to +85°C
- High drive current
 $I_{OH\ short} = -130\text{ mA (min) (@}V_{CC} = 5.0\text{ V)}$
- Low sink current
 $I_{OL\ short} = 40\text{ mA (max) (@}V_{CC} = 5.0\text{ V)}$
- Ordering Information

| Part Name | Package Type | Package Code | Package Abbreviation | Taping Abbreviation (Quantity) |
|-------------|--------------|--------------|----------------------|--------------------------------|
| RD5CYD08CME | CMPAK-5 pin | CMPAK-5V | CM | E (3,000 pcs/reel) |
| | | CMPAK-5V(O) | | |

Outline and Article Indication



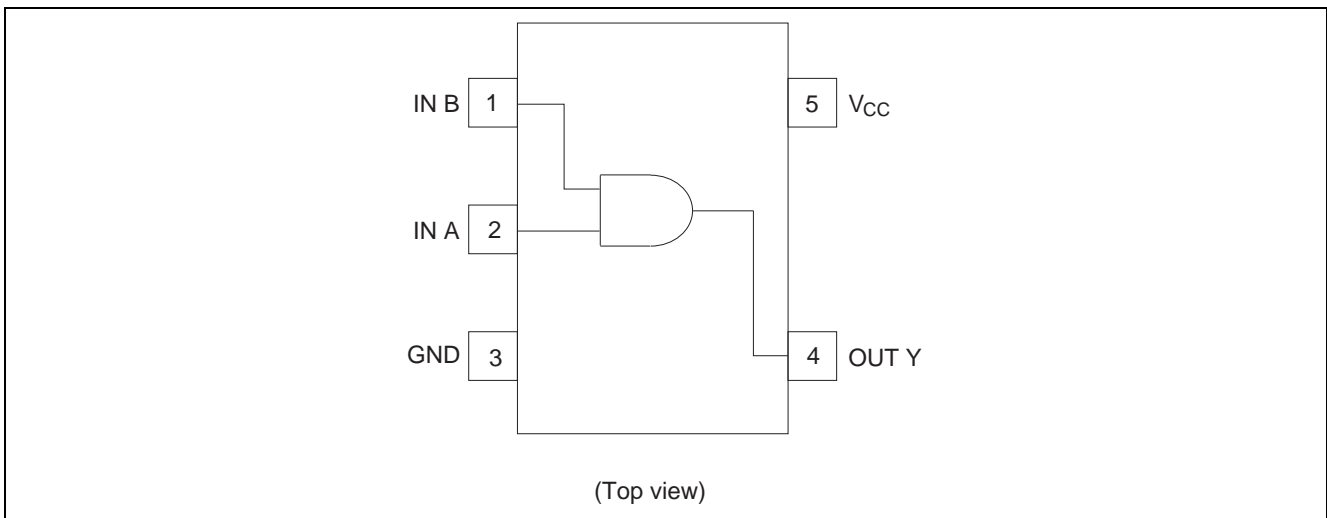
Function Table

| Inputs | | Output Y |
|--------|---|----------|
| A | B | |
| L | L | L |
| H | L | L |
| L | H | L |
| H | H | H |

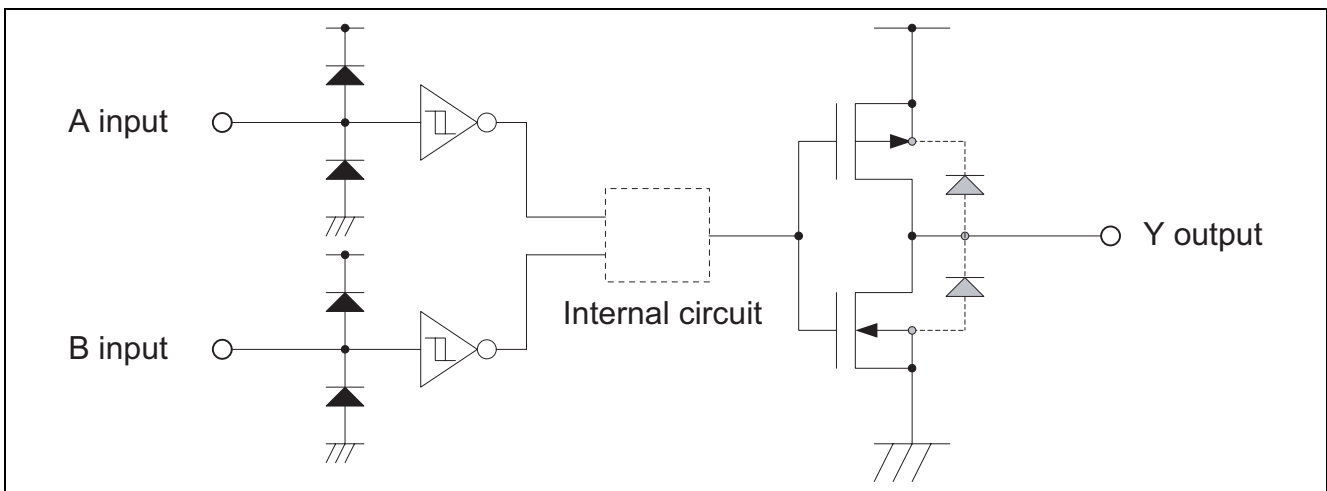
H : High level

L : Low level

Pin Arrangement



Block Diagram



Absolute Maximum Ratings

| Item | Symbol | Ratings | Unit | Test Conditions |
|--|-----------------------|------------------------|------|-----------------------------|
| Supply voltage range | V_{CC} | -0.5 to 7.0 | V | |
| Input voltage range ^{*1} | V_I | -0.5 to $V_{CC} + 0.5$ | V | |
| Output voltage range ^{*1, 2} | V_O | -0.5 to $V_{CC} + 0.5$ | V | |
| Input clamp current | I_{IK} | ±20 | mA | $V_I < 0$ or $V_I > V_{CC}$ |
| Output clamp current | I_{OK} | ±50 | mA | $V_O < 0$ or $V_O > V_{CC}$ |
| Continuous output current | I_O | -200 | mA | $V_O = 0$ |
| | | 100 | | $V_O = V_{CC}$ |
| Continuous current through V_{CC} or GND | I_{CC} or I_{GND} | ±200 | mA | |
| Maximum power dissipation at $T_a = 25^\circ\text{C}$ (in still air) ^{*3} | P_T | 200 | mW | |
| Storage temperature | T_{stg} | -65 to 150 | °C | |

Notes: The absolute maximum ratings are values, which must not individually be exceeded, and furthermore no two of which may be realized at the same time.

1. The input and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed. When Over shoot / Under shoot pulse width is under 10 ns, input and output voltage permit to -1.5 V or $V_{CC}+1.5$ V.
2. This value is limited to 5.5 V maximum.
3. The maximum package power dissipation was calculated using a junction temperature of 150°C.

Recommended Operating Conditions

| Item | Symbol | Min | Max | Unit | Conditions |
|--------------------------------|----------|-----|----------|------|------------|
| Supply voltage range | V_{CC} | 4.0 | 6.0 | V | |
| Input voltage range | V_I | 0 | V_{CC} | V | |
| Output voltage range | V_O | 0 | V_{CC} | V | |
| Operating free-air temperature | T_a | -40 | 85 | °C | |

Note: Unused or floating inputs must be held high or low.

Electrical Characteristic

$T_a = -40$ to 85°C

| Item | Symbol | V_{CC} (V) | Min | Typ | Max | Unit | Test condition |
|--------------------------|----------------|--------------|---------------------|------|---------------------|------|-------------------------------------|
| Input voltage | V_{IH} | 4.0 | $V_{CC} \times 0.7$ | — | — | V | |
| | | 4.5 to 5.5 | $V_{CC} \times 0.7$ | — | — | | |
| | V_{IL} | 4.0 | — | — | $V_{CC} \times 0.3$ | | |
| | | 4.5 to 5.5 | — | — | $V_{CC} \times 0.3$ | | |
| | V_H | 4.0 | — | 0.35 | — | | |
| | | 5.0 | — | 0.40 | — | | |
| Output current | I_{OH} short | 4.0 | -65 | -85 | -105 | mA | $V_O = 0$ V |
| | | 5.0 | -100 | -130 | -160 | | |
| | I_{OL} short | 4.0 | 20 | 28 | 40 | | $V_O = V_{CC}$ |
| | | 5.0 | 30 | 40 | 50 | | |
| Input current | I_{IN} | 5.5 | — | — | ±5 | μA | $V_{IN} = 5.5$ V or GND |
| Quiescent supply current | I_{CC} | 5.5 | — | — | 10 | μA | $V_{IN} = V_{CC}$ or GND, $I_O = 0$ |
| Input capacitance | C_{IN} | 5.0 | — | 2.5 | — | pF | $V_{IN} = V_{CC}$ or GND |

Switching Characteristics

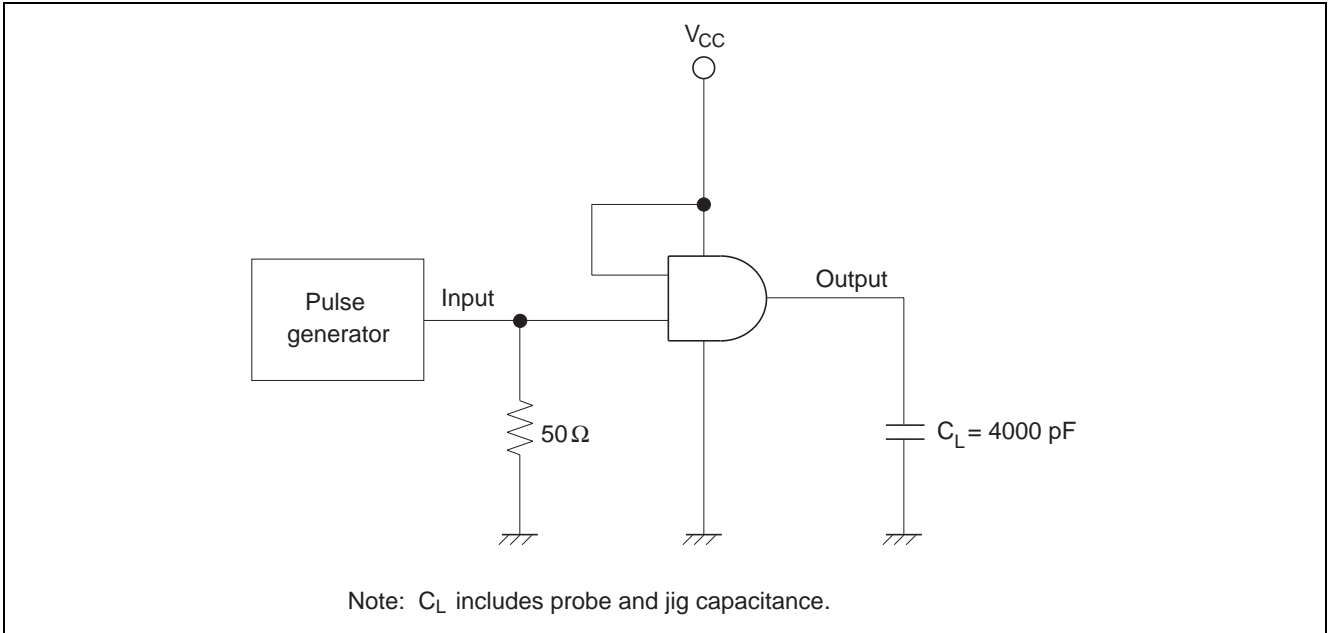
 $V_{CC} = 4.0\text{ V}$

| Item | Symbol | Ta = -40 to 85°C | | | Unit | Test Conditions | FROM (Input) | TO (Output) |
|------------------------|--------------|------------------|-----|------|------|------------------------|--------------|-------------|
| | | Min | Typ | Max | | | | |
| Propagation delay time | $t_{d(ON)}$ | — | — | 80 | ns | $C_L = 4000\text{ pF}$ | A or B | Y |
| | $t_{d(OFF)}$ | — | — | 160 | | | | |
| Output rise time | t_r | — | — | 1000 | | | | |
| Output fall time | t_f | — | — | 2000 | | | | |

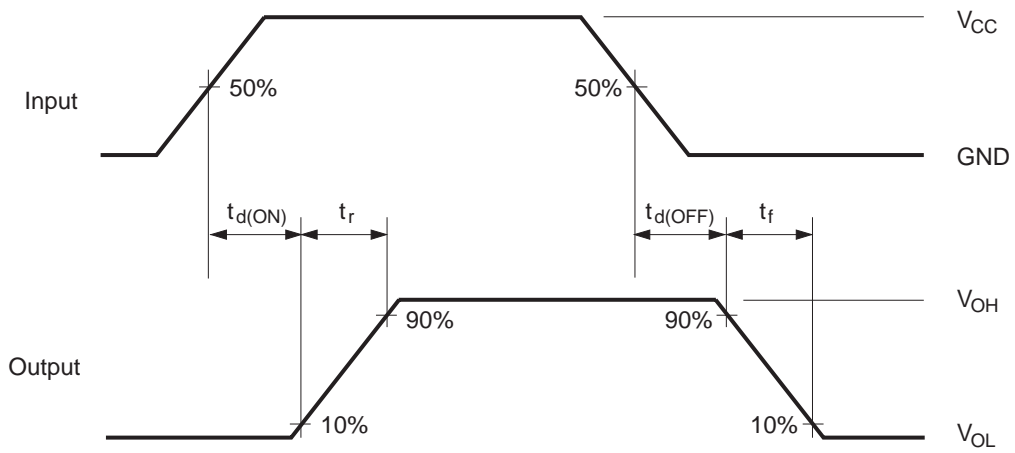
 $V_{CC} = 5.0 \pm 0.5\text{ V}$

| Item | Symbol | Ta = -40 to 85°C | | | Unit | Test Conditions | FROM (Input) | TO (Output) |
|------------------------|--------------|------------------|-----|------|------|------------------------|--------------|-------------|
| | | Min | Typ | Max | | | | |
| Propagation delay time | $t_{d(ON)}$ | — | — | 70 | ns | $C_L = 4000\text{ pF}$ | A or B | Y |
| | $t_{d(OFF)}$ | — | — | 140 | | | | |
| Output rise time | t_r | — | — | 800 | | | | |
| Output fall time | t_f | — | — | 1500 | | | | |

Test Circuit

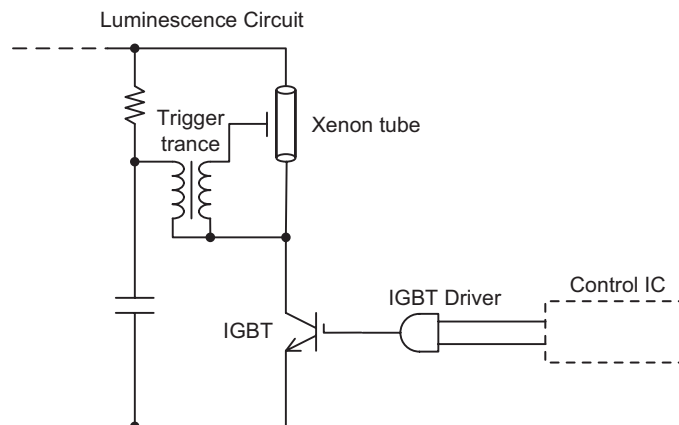


• Waveforms



Note: Input waveform : duty cycle 50%

Application Note (Strobe circuit)



Combination example

| SYSTEM | IGBT | IGBT Driver | Control IC |
|--------|--------------------------|-------------|--------------|
| 5.0 V | CY25BAJ-8F CY25AAJ-8F | RD5CYD08 | 5.0 V signal |
| | | RD5CYDT08 | 3.3 V signal |
| 3.3 V | CY25BAH-8F | RD3CYD08 | 3.3 V signal |

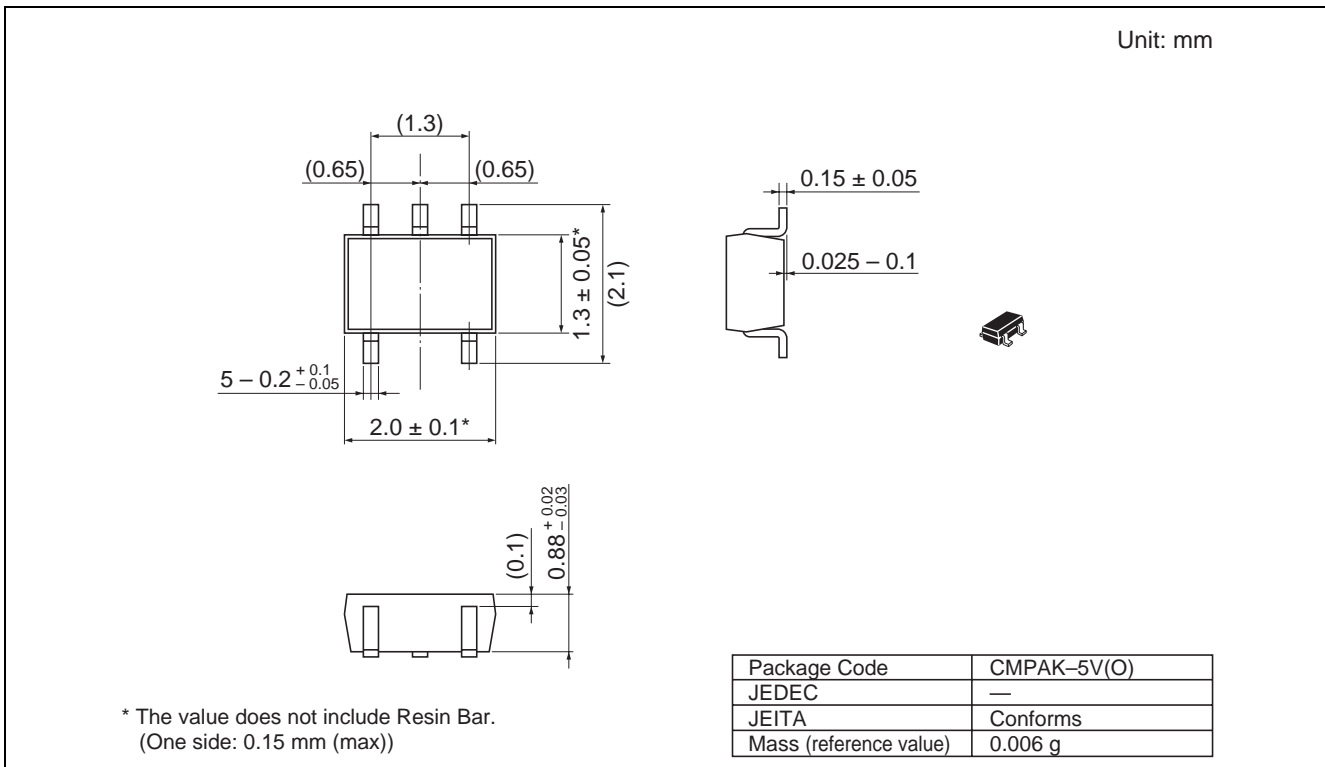
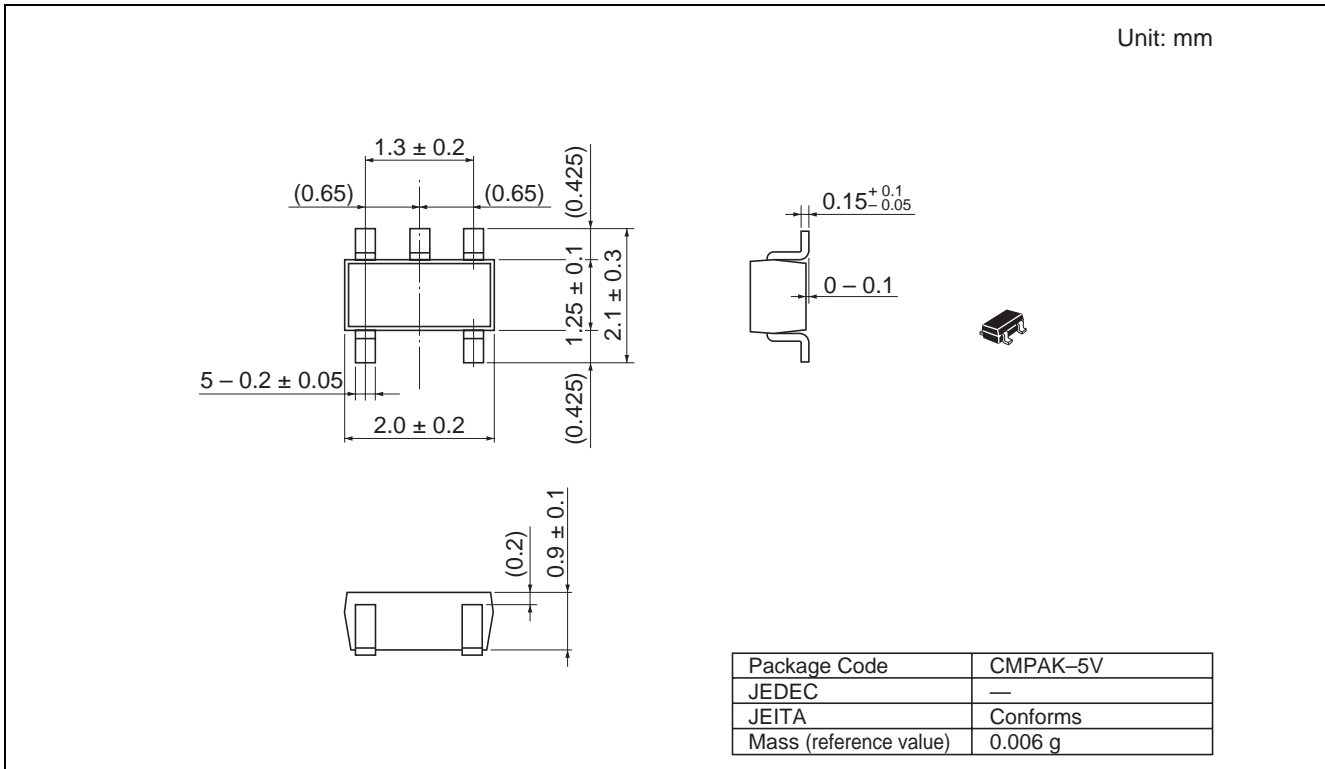
IGBT Driver Lineup

| TYPE No. | Specification | Package |
|-----------|--|---------|
| RD5CYD08 | V _{CC} = 4.0 to 6.0V CMOS level input I _{OH} (short) = -130mA(typ) @ V _{CC} =5.0V I _{OL} (short) = 40mA(typ) @ V _{CC} =5.0V | CMPAK-5 |
| RD5CYDT08 | V _{CC} = 4.0 to 6.0V TTL level input I _{OH} (short) = -130mA(typ) @ V _{CC} =5.0V I _{OL} (short) = 40mA(typ) @ V _{CC} =5.0V | |
| RD3CYD08 | V _{CC} = 2.0 to 3.6V CMOS level input I _{OH} (short) = -130mA(typ) @ V _{CC} =3.3V I _{OL} (short) = 45mA(typ) @ V _{CC} =3.3V | |

IGBT Lineup

| TYPE No. | Specification | Package |
|------------|---|---------|
| CY25AAJ-8F | V _{CES} = 400V(max), I _{CP} = 150A(max), 4V drive | TSSOP-8 |
| CY25BAJ-8F | V _{CES} = 400V(max), I _{CP} = 150A(max), 4V drive | |
| CY25BAH-8F | V _{CES} = 400V(max), I _{CP} = 150A(max), 2.5V drive | SOP-8 |

Package Dimensions



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