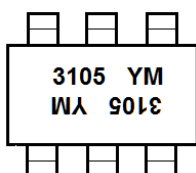
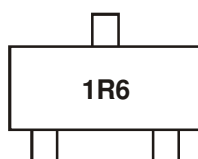


## Marking Information



1R6 = SOT23, Product Type Marking Code  
3105 = SOT26, Product Type Marking Code  
YM = Date Code Marking  
Y or Y = Year (ex: C = 2015)  
M or M = Month (ex: 9 = September)

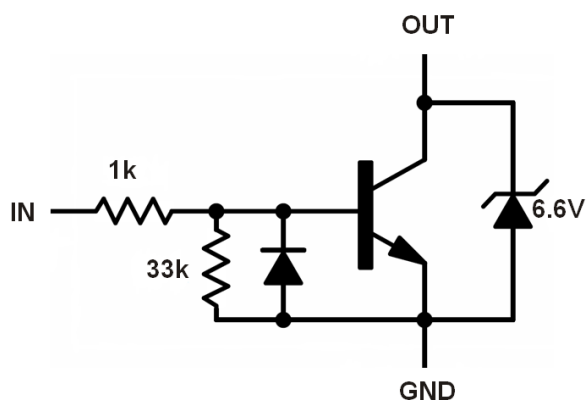
Date Code Key

| Year | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | C    | D    | E    | F    | G    | H    | I    | J    | K    | L    | M    |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code  | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | O   | N   | D   |

## Internal Device Schematic



# Absolute Maximum Ratings (@T<sub>A</sub> = +25 °C, unless otherwise specified.)

| Characteristic                                         | Symbol               | Limit | Unit |
|--------------------------------------------------------|----------------------|-------|------|
| Supply Voltage                                         | V <sub>CC</sub>      | 6.0   | V    |
| Input Voltage (Forward)                                | V <sub>IN(FWD)</sub> | 6.0   | V    |
| Input Voltage (Reverse)                                | V <sub>IN(REV)</sub> | -0.5  | V    |
| Output Sink Continuous Current                         | I <sub>O</sub>       | 500   | mA   |
| Repetitive Pulse Zener Energy Limit (Duty Cycle 0.01%) | E <sub>zpk</sub>     | 50    | mJ   |

# Thermal Characteristics for DRDC3105F (SOT23) (@T<sub>A</sub> = +25 °C, unless otherwise specified.)

| Characteristic                          | Symbol                            | Value       | Unit |
|-----------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation                       | P <sub>D</sub>                    | 310         | mW   |
|                                         |                                   | 350         |      |
| Thermal Resistance, Junction to Ambient | R <sub>θJA</sub>                  | 403         | °C/W |
|                                         |                                   | 357         |      |
| Thermal Resistance, Junction to Leads   | R <sub>θJL</sub>                  | 350         | °C/W |
| Operating and Storage Temperature Range | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

# Thermal Characteristics for DRDC3105E6 (SOT26) (@T<sub>A</sub> = +25 °C, unless otherwise specified.)

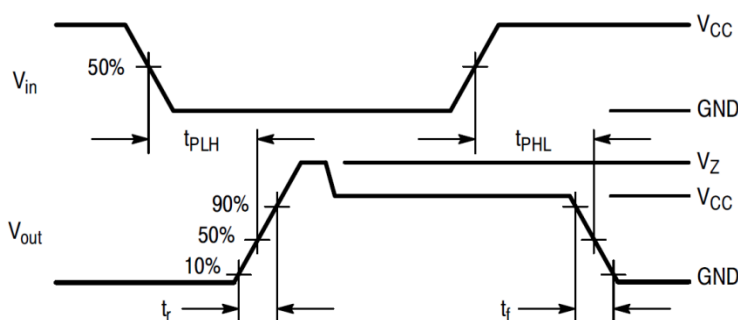
| Characteristic                              | Symbol                            | Value       | Unit       |
|---------------------------------------------|-----------------------------------|-------------|------------|
| Power Dissipation<br>Linear Derating Factor | P <sub>D</sub>                    | 0.9         | W<br>mW/°C |
|                                             |                                   | 7.2         |            |
|                                             |                                   | 1.1         |            |
|                                             |                                   | 8.8         |            |
| Thermal Resistance, Junction to Ambient     | R <sub>θJA</sub>                  | 1.7         | °C/W       |
|                                             |                                   | 13.6        |            |
|                                             |                                   | 139         |            |
|                                             |                                   | 113         |            |
| Thermal Resistance, Junction to Leads       | R <sub>θJL</sub>                  | 73          | °C/W       |
|                                             |                                   | 100         |            |
| Operating and Storage Temperature Range     | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C         |

- Notes:
- For a device mounted on minimum recommended pad layout 1oz weight copper that is on a single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  - Same as Note 5, except the device is mounted on 15mm X 15mm 1oz copper.
  - Same as Note 5, except the device is mounted on 25mm X 25mm 1oz copper.
  - Same as Note 7, except the device is measured at < 5 seconds.
  - For a device with one active die.
  - For a device with two die running at equal power.
  - Thermal resistance from junction to solder-point (at the end of the "OUT" lead).

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

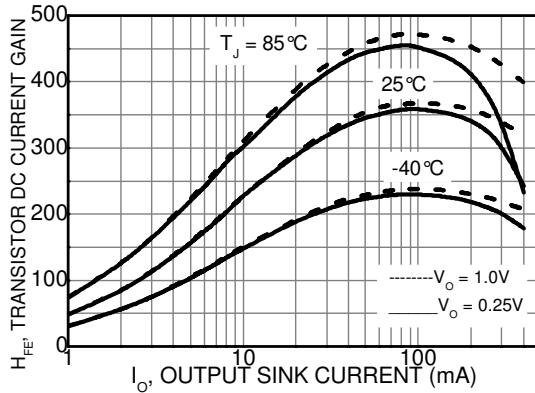
| Characteristic                                       | Symbol                                      | Min      | Typ         | Max       | Unit | Test Condition                                                                                   |
|------------------------------------------------------|---------------------------------------------|----------|-------------|-----------|------|--------------------------------------------------------------------------------------------------|
| <b>OFF CHARACTERISTICS</b>                           |                                             |          |             |           |      |                                                                                                  |
| Output Zener Breakdown Voltage                       | BV <sub>(out)</sub><br>BV <sub>(-out)</sub> | 6.2<br>- | 6.6<br>0.67 | 7.0<br>-  | V    | @ I <sub>T</sub> = 10 mA Pulse                                                                   |
| Output Leakage Current @ 0 Input Voltage             | I <sub>OO</sub>                             | —        | —           | 0.1<br>30 | μA   | V <sub>O</sub> = 5.5 V, T <sub>A</sub> = +25°C<br>V <sub>O</sub> = 5.5 V, T <sub>A</sub> = +85°C |
| "ON" State Input Voltage (Note 12)                   | V <sub>in(on)</sub>                         | —        | 0.99        | 1.5       | V    | I <sub>O</sub> = 100 mA, V <sub>O</sub> = 150mV                                                  |
| "OFF" State Input Voltage (Note 13)                  | V <sub>in(off)</sub>                        | 400      | 540         | —         | mV   | I <sub>O</sub> = 100 μA, V <sub>O</sub> = 4.9V                                                   |
| <b>ON CHARACTERISTICS</b>                            |                                             |          |             |           |      |                                                                                                  |
| Input Bias Current (H <sub>FE</sub> Limited)         | I <sub>in</sub>                             | —        | 0.7         | 1.6       | mA   | I <sub>O</sub> = 250 mA, V <sub>O</sub> = 0.25V                                                  |
| Output Saturation Voltage                            | V <sub>O(sat)</sub>                         | —        | 125         | 160       | mV   | I <sub>O</sub> = 250 mA, I <sub>in</sub> = 1.5 mA                                                |
| Output Sink Current – Continuous                     | I <sub>O(on)</sub>                          | 250      | 430         | —         | mA   | V <sub>CE</sub> = 0.25 V, I <sub>in</sub> = 1.5 mA                                               |
| <b>SWITCHING CHARACTERISTICS</b> (Refer to Figure 1) |                                             |          |             |           |      |                                                                                                  |
| Propagation Delay Times:                             |                                             |          |             |           |      |                                                                                                  |
| High to Low Propagation Delay; (5.0V 74HC04)         | t <sub>PHL</sub>                            | —        | 20.4        | —         | ns   | —                                                                                                |
| Low to High Propagation Delay; (5.0V 74HC04)         | t <sub>PLH</sub>                            | —        | 1.43        | —         | μs   | —                                                                                                |
| High to Low Propagation Delay; 13 (3.0V 74HC04)      | t <sub>PHL</sub>                            | —        | 32.2        | —         | ns   | —                                                                                                |
| Low to High Propagation Delay; 13 (3.0V 74HC04)      | t <sub>PLH</sub>                            | —        | 760         | —         | ns   | —                                                                                                |
| High to Low Propagation Delay; 14 (5.0V 74LS04)      | t <sub>PHL</sub>                            | —        | 25.3        | —         | ns   | —                                                                                                |
| Low to High Propagation Delay; 14 (5.0V 74LS04)      | t <sub>PLH</sub>                            | —        | 2.57        | —         | μs   | —                                                                                                |
| Transition Times:                                    |                                             |          |             |           |      |                                                                                                  |
| Fall Time; (5.0V 74HC04)                             | t <sub>f</sub>                              | —        | 12.5        | —         | ns   | —                                                                                                |
| Rise Time; (5.0V 74HC04)                             | t <sub>r</sub>                              | —        | 411         | —         | ns   | —                                                                                                |
| Fall Time; 13 (3.0V 74HC04)                          | t <sub>f</sub>                              | —        | 21.1        | —         | ns   | —                                                                                                |
| Rise Time; 13 (3.0V 74HC04)                          | t <sub>r</sub>                              | —        | 220         | —         | ns   | —                                                                                                |
| Fall Time; 14 (5.0V 74LS04)                          | t <sub>f</sub>                              | —        | 15.1        | —         | ns   | —                                                                                                |
| Rise Time; 14 (5.0V 74LS04)                          | t <sub>r</sub>                              | —        | 849         | —         | ns   | —                                                                                                |

Notes: 12. The device is guaranteed to be in "ON" state with V<sub>in(on)</sub> above 1.5V.  
13. The device is guaranteed to be in "OFF" state with V<sub>in(off)</sub> below 400mV.

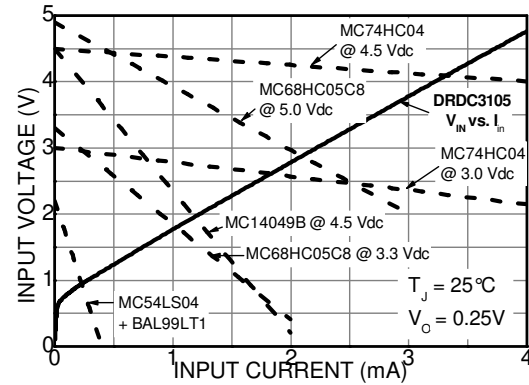


**Figure 1. Switching Waveforms**

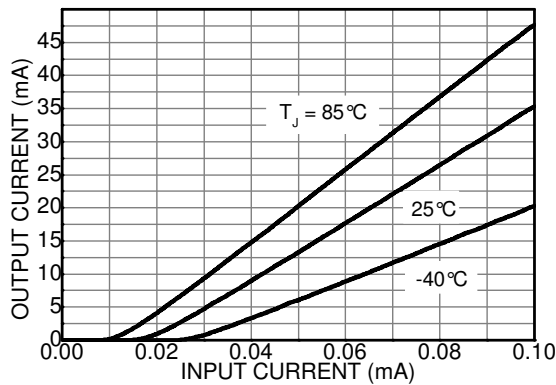
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



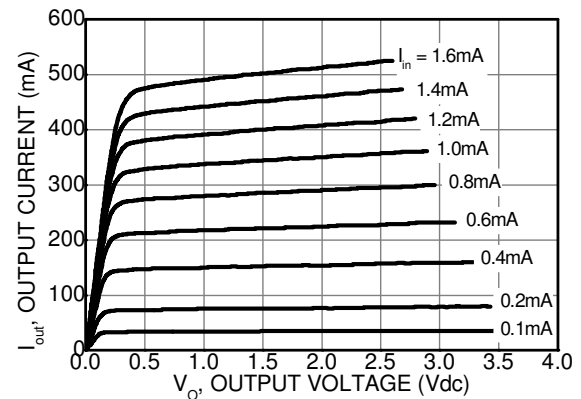
**Figure 2. Transistor DC Current Gain**



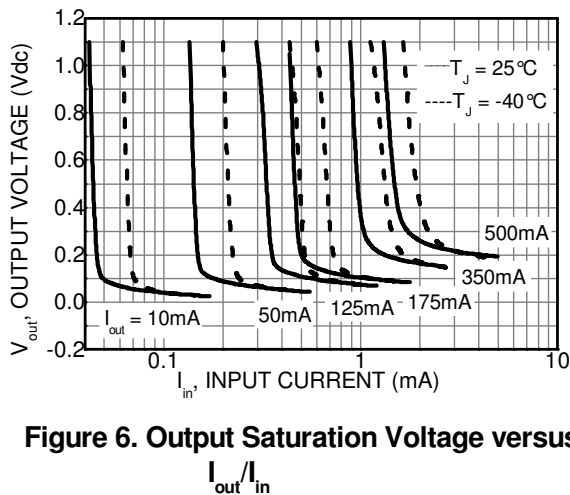
**Figure 3. Input V-I Requirement Compared to Possible Source Logic Outputs**



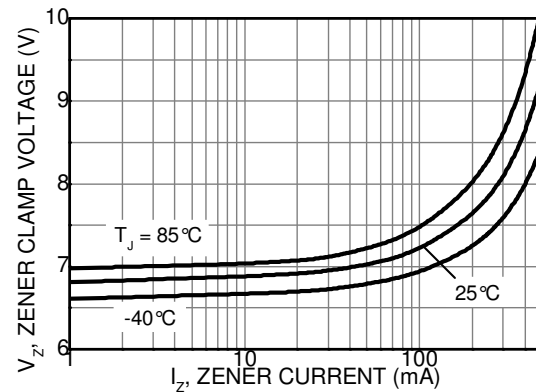
**Figure 4. Threshold Effects**



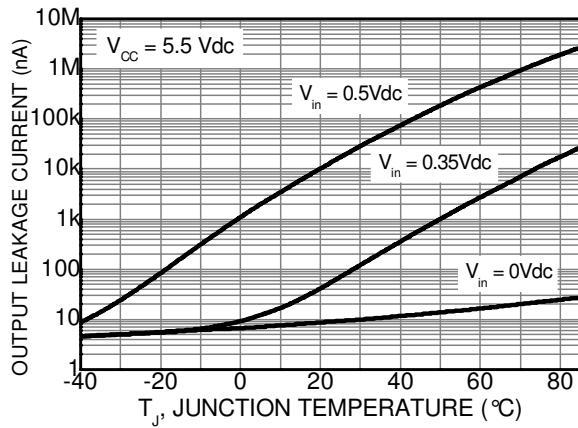
**Figure 5. Transistor Output V-I Characteristic**



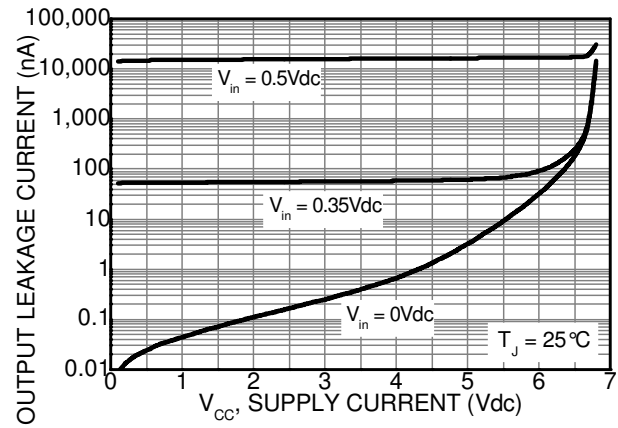
**Figure 6. Output Saturation Voltage versus  $I_{out}/I_{in}$**



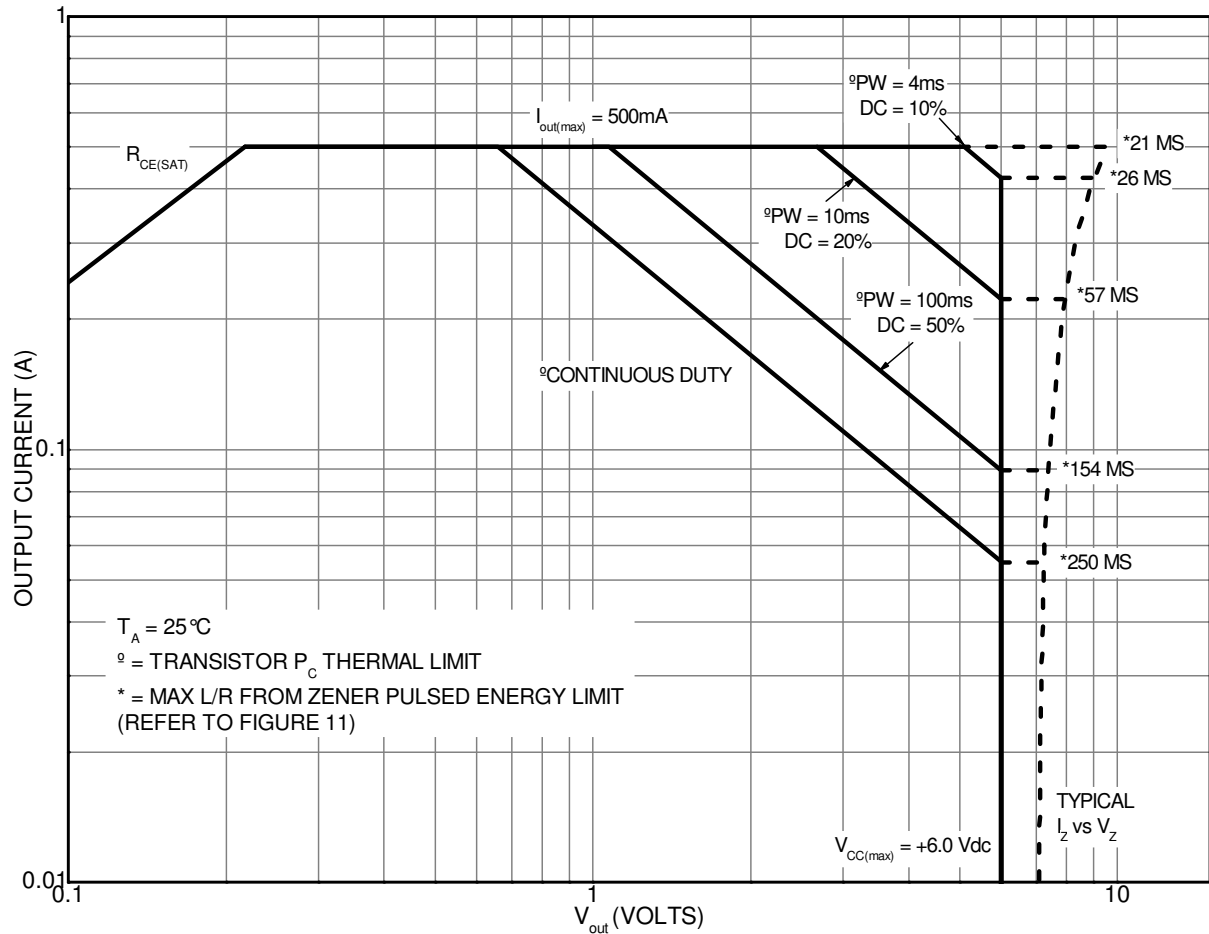
**Figure 7. Zener Clamp Voltage versus Zener Current**



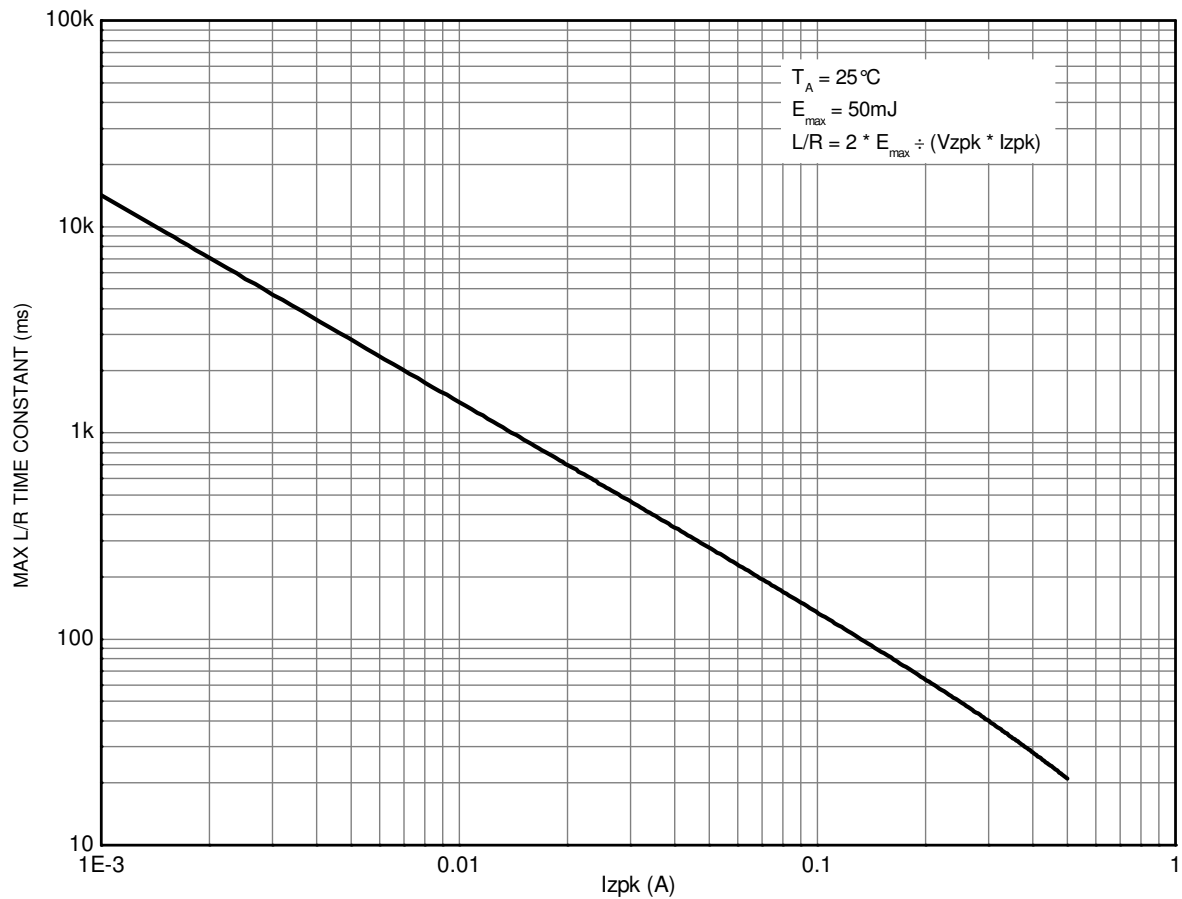
**Figure 8. Output Leakage Current versus Temperature**



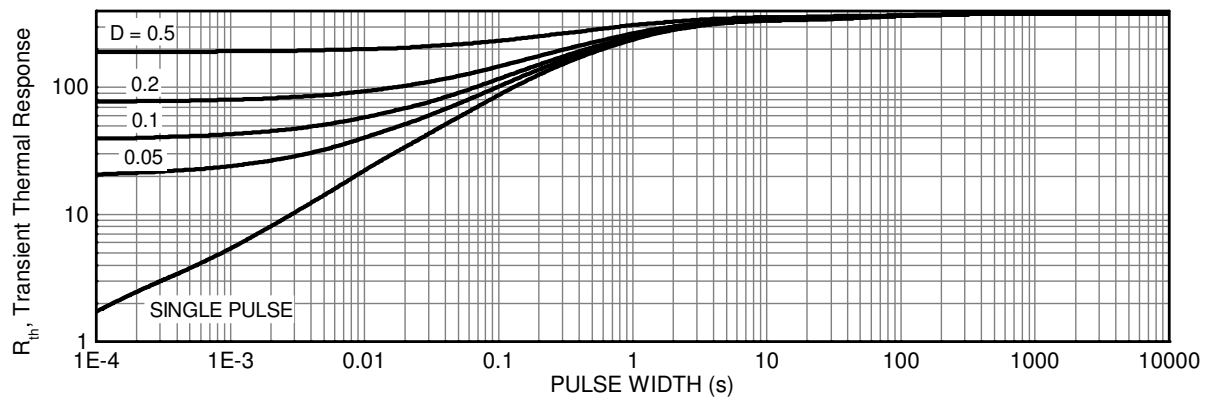
**Figure 9. Output Leakage Current versus Supply Voltage**



**Figure 10. Safe Operating Area**



**Figure 11. Zener Repetitive Pulse Energy Limit on L/R Time Constant**

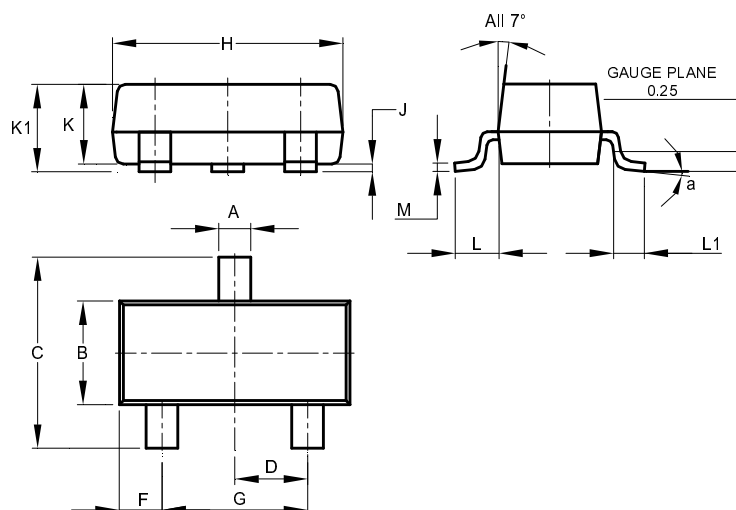


**Figure 12. Transient Thermal Response**

## Package Outline Dimensions

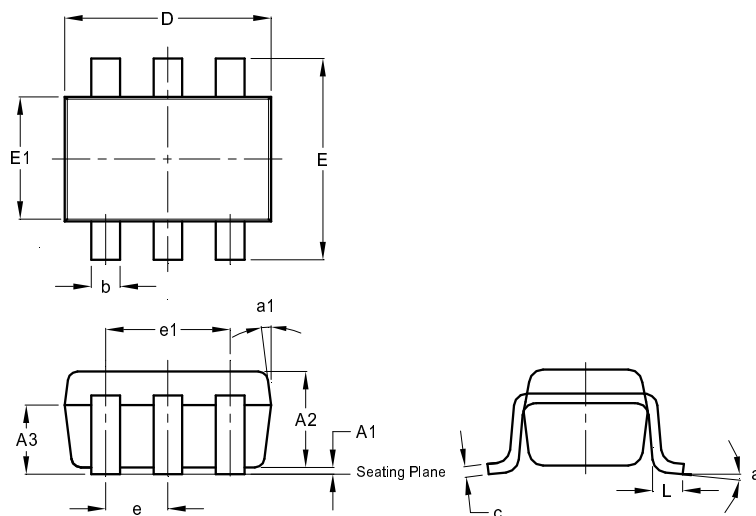
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.

### Package Type: SOT23



| SOT23                |       |       |       |
|----------------------|-------|-------|-------|
| Dim                  | Min   | Max   | Typ   |
| A                    | 0.37  | 0.51  | 0.40  |
| B                    | 1.20  | 1.40  | 1.30  |
| C                    | 2.30  | 2.50  | 2.40  |
| D                    | 0.89  | 1.03  | 0.915 |
| F                    | 0.45  | 0.60  | 0.535 |
| G                    | 1.78  | 2.05  | 1.83  |
| H                    | 2.80  | 3.00  | 2.90  |
| J                    | 0.013 | 0.10  | 0.05  |
| K                    | 0.890 | 1.00  | 0.975 |
| K1                   | 0.903 | 1.10  | 1.025 |
| L                    | 0.45  | 0.61  | 0.55  |
| L1                   | 0.25  | 0.55  | 0.40  |
| M                    | 0.085 | 0.150 | 0.110 |
| a                    | 8°    |       |       |
| All Dimensions in mm |       |       |       |

### Package Type: SOT26

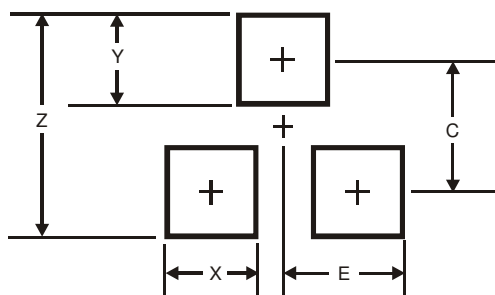


| SOT26                |       |      |      |
|----------------------|-------|------|------|
| Dim                  | Min   | Max  | Typ  |
| A1                   | 0.013 | 0.10 | 0.05 |
| A2                   | 1.00  | 1.30 | 1.10 |
| A3                   | 0.70  | 0.80 | 0.75 |
| b                    | 0.35  | 0.50 | 0.38 |
| c                    | 0.10  | 0.20 | 0.15 |
| D                    | 2.90  | 3.10 | 3.00 |
| e                    | -     | -    | 0.95 |
| e1                   | -     | -    | 1.90 |
| E                    | 2.70  | 3.00 | 2.80 |
| E1                   | 1.50  | 1.70 | 1.60 |
| L                    | 0.35  | 0.55 | 0.40 |
| a                    | -     | -    | 8°   |
| a1                   | -     | -    | 7°   |
| All Dimensions in mm |       |      |      |

## Suggested Pad Layout

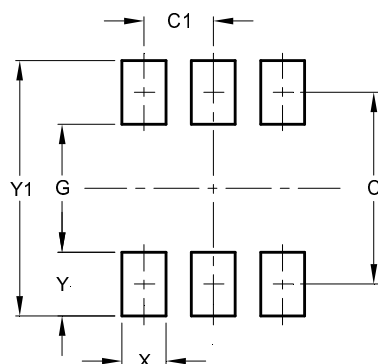
Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.

Package Type: SOT23



| Dimensions | Value (in mm) |
|------------|---------------|
| Z          | 2.9           |
| X          | 0.8           |
| Y          | 0.9           |
| C          | 2.0           |
| E          | 1.35          |

Package Type: SOT26



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 2.40          |
| C1         | 0.95          |
| G          | 1.60          |
| X          | 0.55          |
| Y          | 0.80          |
| Y1         | 3.20          |

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