# BSS126SK-7 Datasheet


https://www.DiGi-Electronics.com

| | |
|---|---|
| DiGi Electronics Part Number | BSS126SK-7-DG |
| Manufacturer | Diodes Incorporated |
| Manufacturer Product Number | BSS126SK-7 |
| Description | DIODE GP SOT23 |
| Detailed Description | N-Channel 600 V 30mA (Ta) 1W (Ta) Surface Mount SOT-23-3 |

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## Purchase and inquiry

| Manufacturer Product Number: | Manufacturer: |
| --- | --- |
| BSS126SK-7 | Diodes Incorporated |
| Series: | Product Status: |
| - | Obsolete |
| FET Type: | Technology: |
| N-Channel | MOSFET (Metal Oxide) |
| Drain to Source Voltage (Vdss): | Current - Continuous Drain (Id) @ 25°C: |
| 600 V | 30mA (Ta) |
| Drive Voltage (Max Rds On, Min Rds On): | Rds On (Max) @ Id, Vgs: |
| 0V, 10V | 500Ohm @ 16mA, 10V |
| Vgs(th) (Max) @ Id: | Gate Charge (Qg) (Max) @ Vgs: |
| 1.4V @ 8µA | 2 nC @ 5 V |
| Vgs (Max): | Input Capacitance (Ciss) (Max) @ Vds: |
| ±20V | 30.9 pF @ 25 V |
| FET Feature: | Power Dissipation (Max): |
| Depletion Mode | 1W (Ta) |
| Operating Temperature: | Mounting Type: |
| -55°C ~ 150°C (TJ) | Surface Mount |
| Supplier Device Package: | Package / Case: |
| SOT-23-3 | TO-236-3, SC-59, SOT-23-3 |
| Base Product Number: | |
| BSS126 | |

## Environmental & Export classification

| RoHS Status: | ECCN: |
| --- | --- |
| ROHS3 Compliant | EAR99 |
| HTSUS: | |
| 8541.29.0095 | |

NOT RECOMMENDED FOR NEW DESIGN
CONTACT US

Lead-free Green

**BSS126SK**

**N-CHANNEL DEPLETION MODE MOSFET**

## Product Summary

| $BV_{DSX}$ | $R_{DS(ON)}$ Max | $I_{DSS}$ Min $T_A$ = +25°C |
|---|---|---|
| 600V | 700Ω @ $V_{GS}$ = 0V | 7mA |

## Features and Benefits

- N-Channel
- ESD Protected
- Depletion Mode
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative.**
  **https://www.diodes.com/quality/product-definitions/**

## Description and Applications

This new generation uses advanced planar technology MOSFET, provide excellent high voltage and fast switching, making it ideal for small-signal and level shift applications.

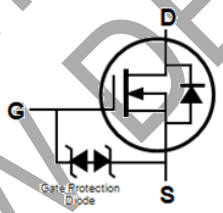
- Motor Control
- Backlighting
- DC-DC Converters
- Power Management Functions

## Mechanical Data

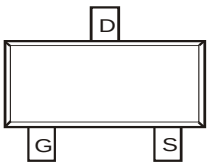
- Case: SOT23
- Case Material: Molded Plastic "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Terminal Connections: See Diagram
- Weight: 0.008 grams (Approximate)


SOT23

Top View




Equivalent Circuit




Top View

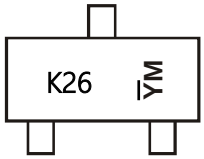
## Ordering Information (Note 4)

| Part Number | Case | Packaging |
|---|---|---|
| BSS126SK-7 | SOT23 | 3000/Tape & Reel |
| BSS126SK-13 | SOT23 | 10000/Tape & Reel |

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

## Marking Information

SOT23




K26 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: I = 2021)
M = Month (ex: 9 = September)

Date Code Key

| Year | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | H | I | J | K | L | M | N | O | P | R | S | T |

| 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 |

## Maximum Ratings (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | | | Symbol | Value | Unit |
|---|---|---|---|---|---|
| Drain-Source Voltage | | | $V_{DSS}$ | 600 | V |
| Gate-Source Voltage | | | $V_{GSS}$ | ±20 | V |
| Continuous Drain Current (Note 5) $V_{GS}$ = 10V | Steady State | $T_A$ = +25°C<br>$T_A$ = +70°C | $I_D$ | 30<br>24 | mA |
| Continuous Drain Current (Note 6) $V_{GS}$ = 10V | Steady State | $T_A$ = +25°C<br>$T_A$ = +70°C | $I_D$ | 35<br>28 | mA |
| Continuous Source Current (Note 5) $V_{GS}$ = 10V | Steady State | $T_A$ = +25°C<br>$T_A$ = +70°C | $I_S$ | 30<br>24 | mA |
| Continuous Source Current (Note 6) $V_{GS}$ = 10V | Steady State | $T_A$ = +25°C<br>$T_A$ = +70°C | $I_S$ | 35<br>28 | mA |
| Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%) | | | $I_{DM}$ | 0.09 | A |
| Pulsed Source Current (10µs Pulse, Duty Cycle = 1%) | | | $I_{SM}$ | 0.09 | A |

## Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Power Dissipation, @$T_A$ = +25°C (Note 5) | $P_D$ | 1 | W |
| Thermal Resistance, Junction to Ambient @$T_A$ = +25°C (Note 5) | $R_{\theta JA}$ | 124.7 | °C/W |
| Power Dissipation, @$T_A$ = +25°C (Note 6) | $P_D$ | 1.3 | W |
| Thermal Resistance, Junction to Ambient @$T_A$ = +25°C (Note 6) | $R_{\theta JA}$ | 95.5 | °C/W |
| Operating and Storage Temperature Range | $T_J$, $T_{STG}$ | -55 to +150 | °C |

## Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS (Note 7)** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSX}$ | 600 | — | — | V | $V_{GS}$ = -5V, $I_D$ = 250µA |
| Drain-Source Cutoff Current | $I_{D(OFF)}$ | — | — | 0.1 | µA | $V_{GS}$ = -5V, $V_{DS}$ = 600V |
| Gate-Source Leakage | $I_{GSS}$ | — | — | ±10 | µA | $V_{GS}$ = ±20V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS (Note 7)** | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | -2.7 | -2.2 | -1.4 | V | $V_{DS}$ = 3V, $I_D$ = 8µA |
| On-State Drain Current | $I_{DSS}$ | 7 | — | — | mA | $V_{GS}$ = 0V, $V_{DS}$ = 25V |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | — | 111 | 500 | Ω | $V_{GS}$ = 10V, $I_D$ = 16mA |
| | | — | 101 | 700 | | $V_{GS}$ = 0V, $I_D$ = 3mA |
| Diode Forward Voltage | $V_{SD}$ | — | 0.7 | 1.3 | V | $V_{GS}$ = -5V, $I_S$ = 16mA |
| **DYNAMIC CHARACTERISTICS (Note 8)** | | | | | | |
| Input Capacitance | $C_{iss}$ | — | 30.9 | — | pF | $V_{GS}$ = -5V, $V_{DS}$ = 25V, f = 1MHz |
| Output Capacitance | $C_{oss}$ | — | 4.2 | — | | |
| Reverse Transfer Capacitance | $C_{rss}$ | — | 0.8 | — | | |
| Gate Resistance | $R_G$ | — | 121 | — | Ω | $V_{DS}$ = 0V, $V_{GS}$ = 0V, f = 1MHz |
| Total Gate Charge | $Q_g$ | — | 2 | — | nC | $V_{DD}$ = 400V,<br>$I_D$ = 10mA,<br>$V_{GS}$ = -3V to 5V |
| Gate-Source Charge | $Q_{gs}$ | — | 0.03 | — | | |
| Gate-Drain Charge | $Q_{gd}$ | — | 1.7 | — | | |
| Turn-On Delay Time | $t_{D(ON)}$ | — | 5.2 | — | ns | $V_{DD}$ = 300V,<br>$V_{GS}$ = -3V to 7V,<br>$I_D$ = 0.01A, $R_G$ = 6Ω |
| Turn-On Rise Time | $t_R$ | — | 17 | — | ns | |
| Turn-Off Delay Time | $t_{D(OFF)}$ | — | 67 | — | ns | |
| Turn-Off Fall Time | $t_F$ | — | 873 | — | ns | |
| Reverse Recovery Time | $t_{RR}$ | — | 164 | — | ns | $V_R$ = -100V, $I_F$ = -1A, $V_{GS}$ = -5V<br>di/dt = 100A/µs |
| Reverse Recovery Charge | $Q_{RR}$ | — | 382 | — | nC | |

Notes: 5. Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
6. Device mounted on 1" × 1" FR-4 PCB with high coverage 2 oz. copper, single sided.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

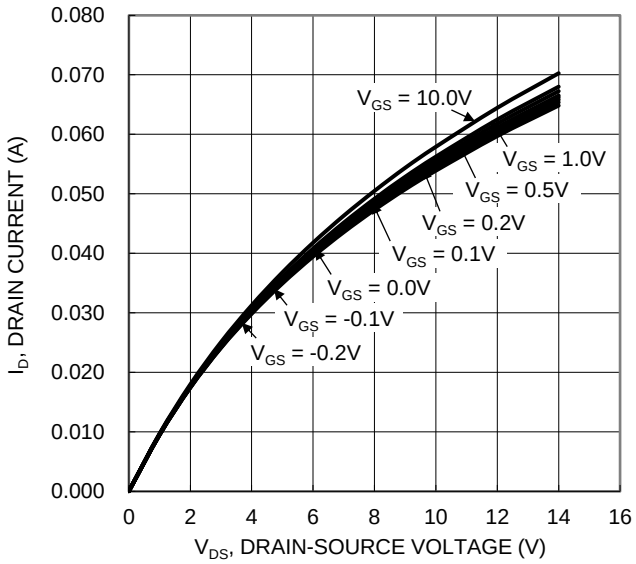



Figure 1. Typical Output Characteristic

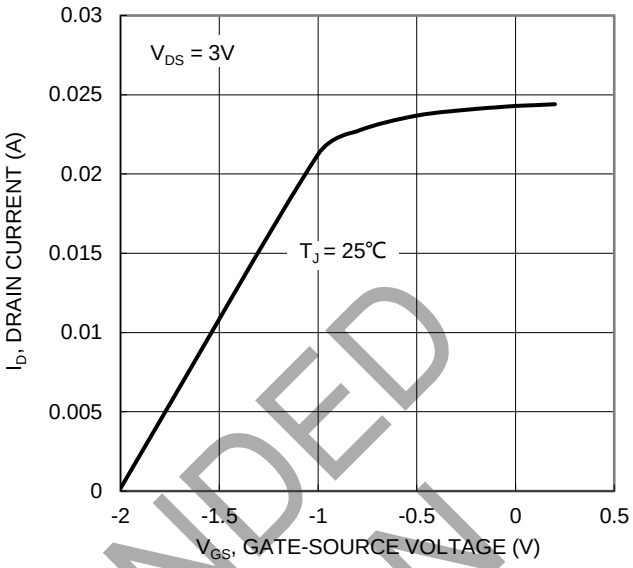



Figure 2. Typical Transfer Characteristic

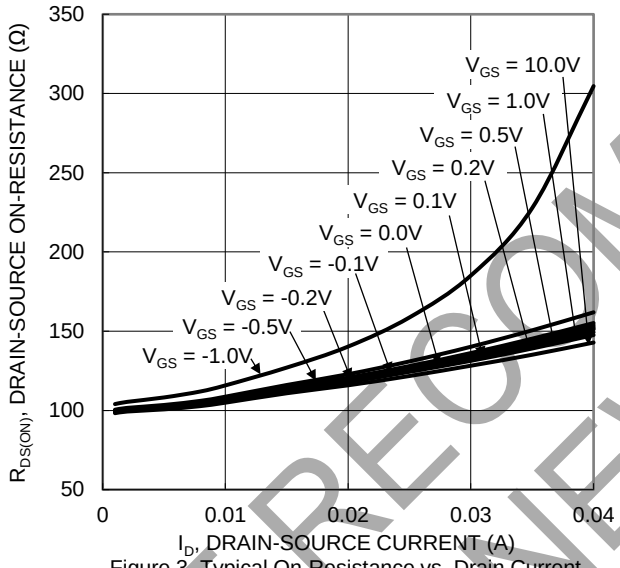



Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

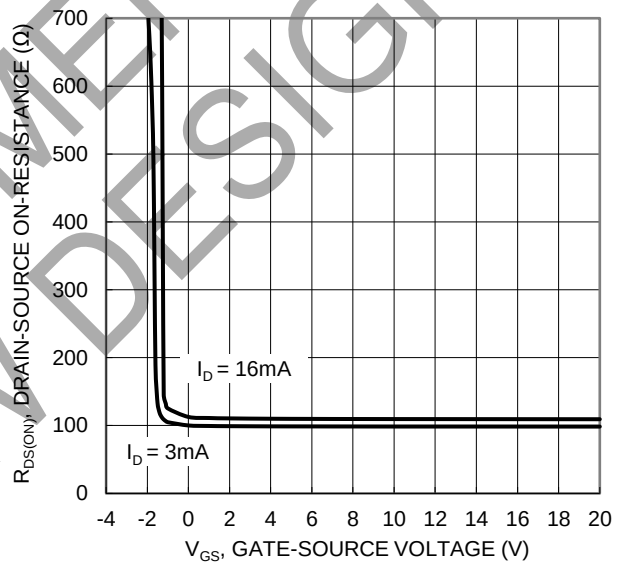



Figure 4. Typical Transfer Characteristic

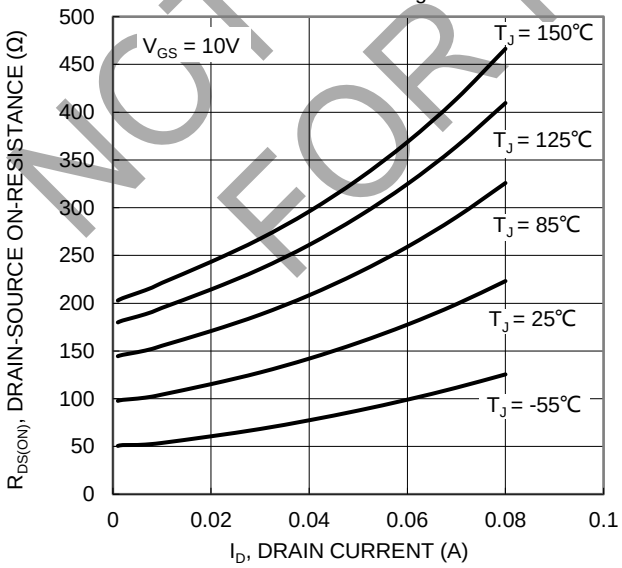



Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

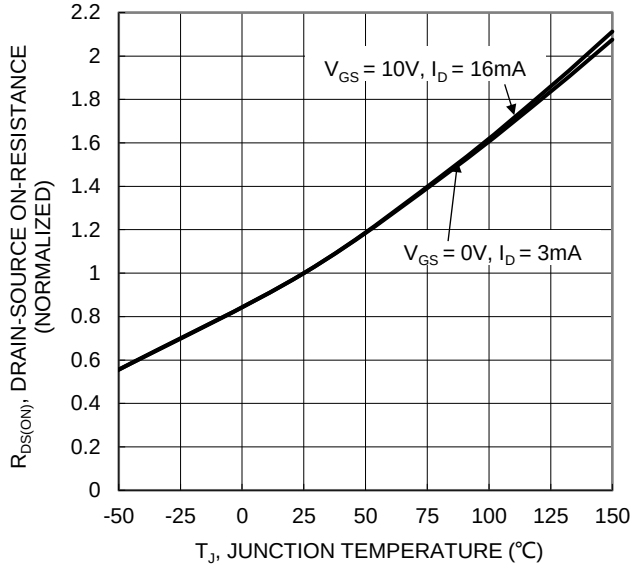



Figure 6. On-Resistance Variation with Junction Temperature

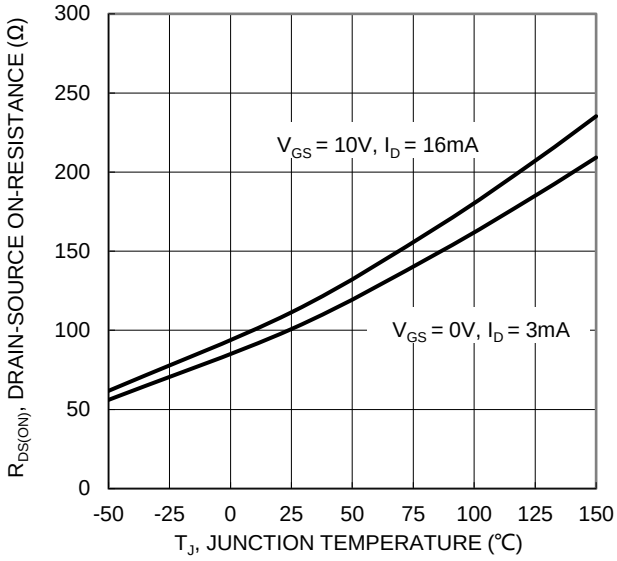



Figure 7. On-Resistance Variation with Junction Temperature

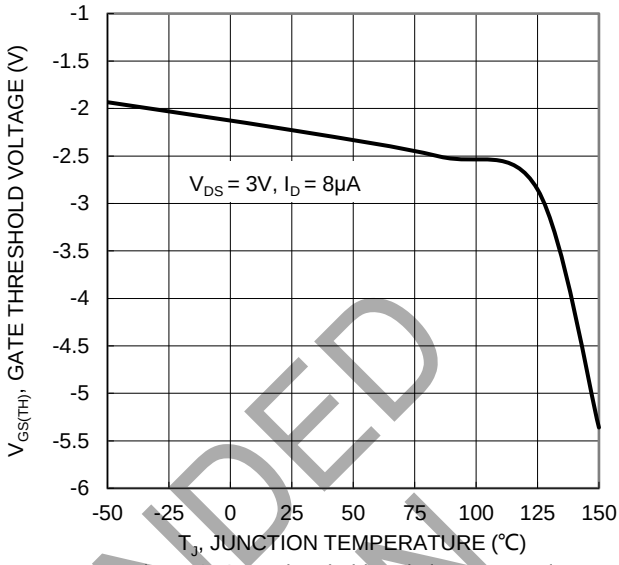



Figure 8. Gate Threshold Variation vs. Junction Temperature

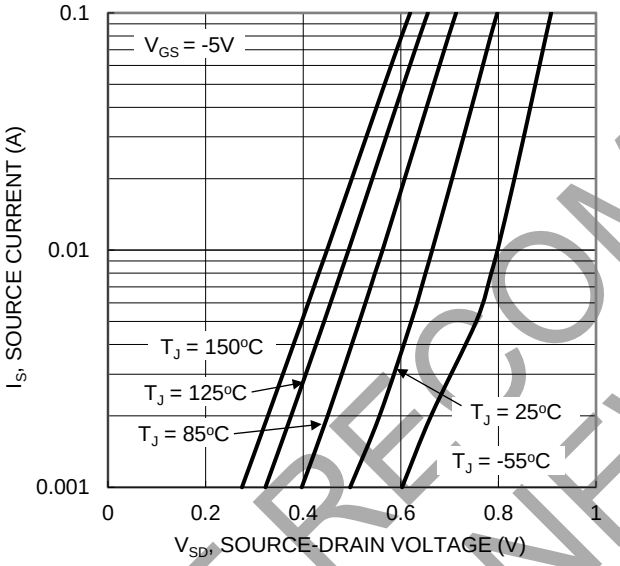



Figure 9. Diode Forward Voltage vs. Current

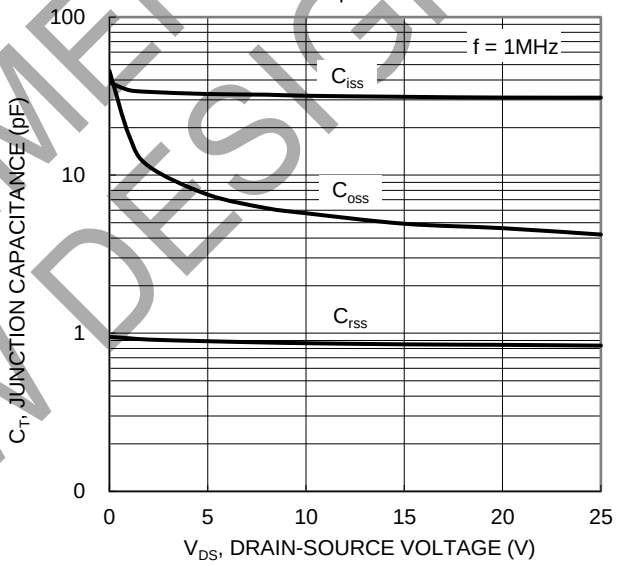



Figure 10. Typical Junction Capacitance

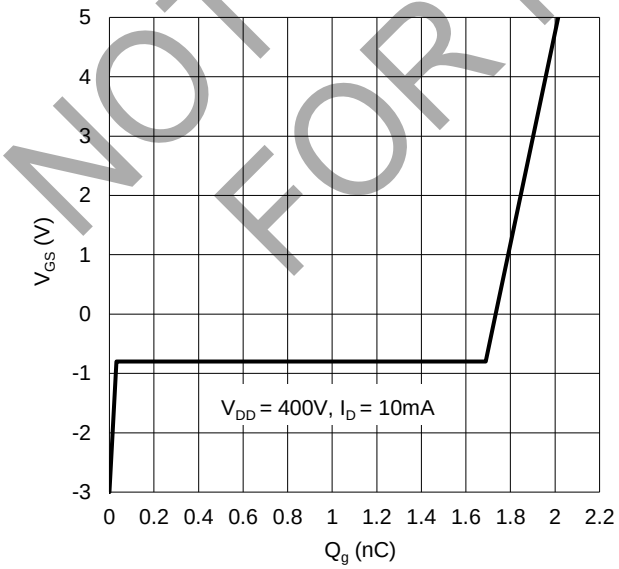



Figure 11. Gate Charge

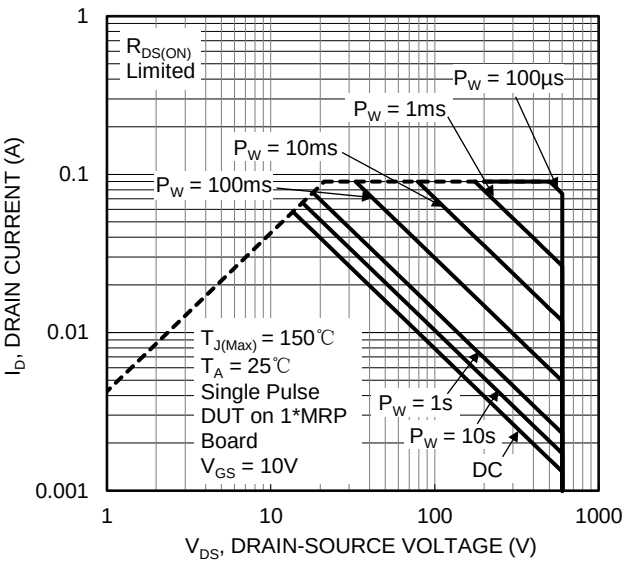



Figure 12. SOA, Safe Operation Area

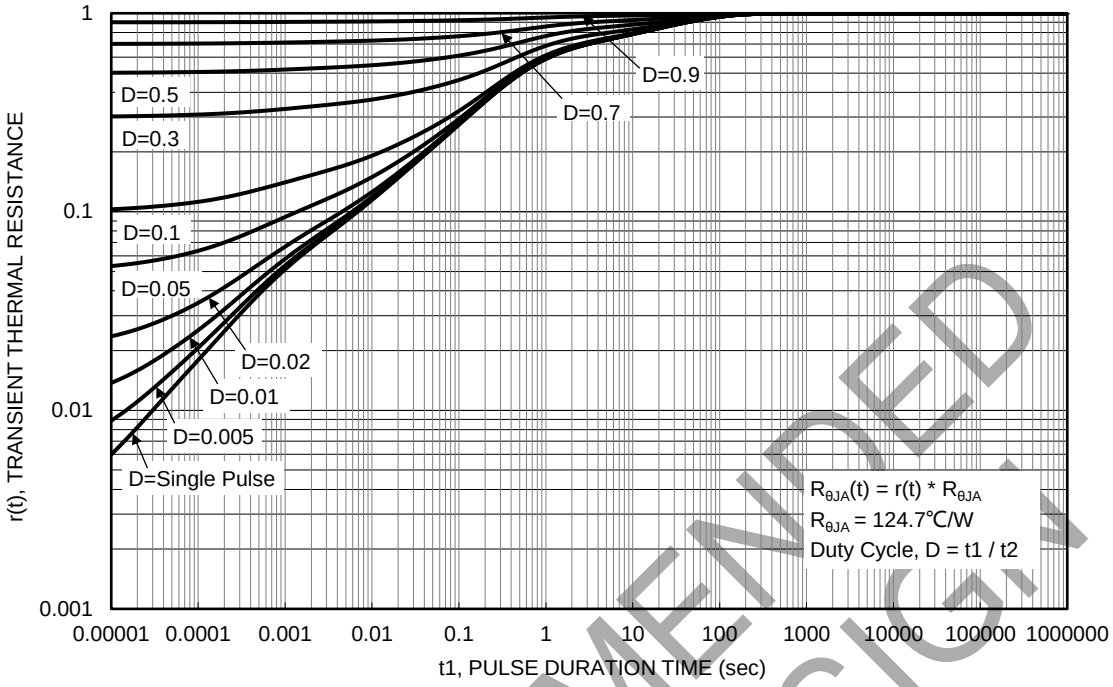
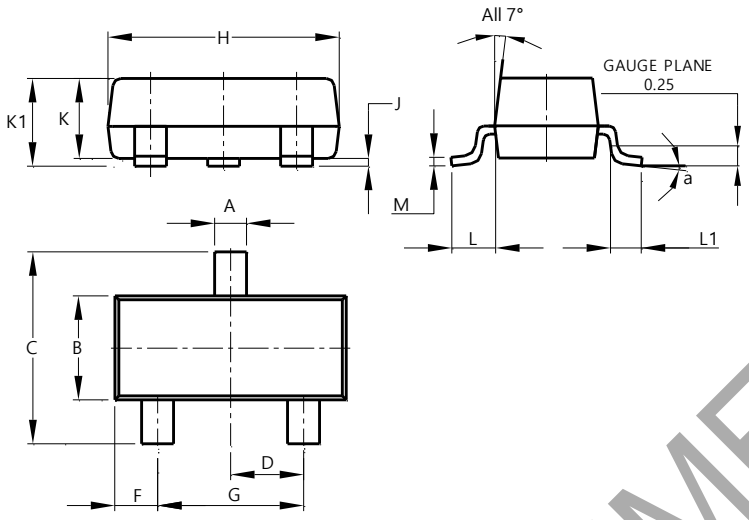



Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

**SOT23**

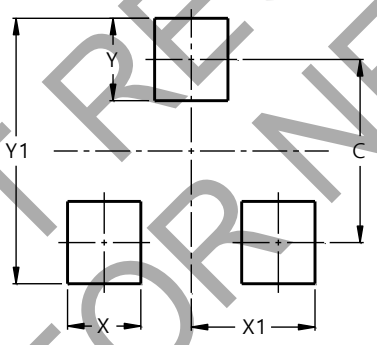



| SOT23 | | | |
|---|---|---|---|
| Dim | Min | Max | Typ |
| A | 0.37 | 0.51 | 0.40 |
| B | 1.20 | 1.40 | 1.30 |
| C | 2.30 | 2.50 | 2.40 |
| D | 0.89 | 1.03 | 0.915 |
| F | 0.45 | 0.60 | 0.535 |
| G | 1.78 | 2.05 | 1.83 |
| H | 2.80 | 3.00 | 2.90 |
| J | 0.013 | 0.10 | 0.05 |
| K | 0.890 | 1.00 | 0.975 |
| 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 | 0° | 8° | -- |
| All Dimensions in mm | | | |

## Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

**SOT23**




| Dimensions | Value (in mm) |
|---|---|
| C | 2.0 |
| X | 0.8 |
| X1 | 1.35 |
| Y | 0.9 |
| Y1 | 2.9 |

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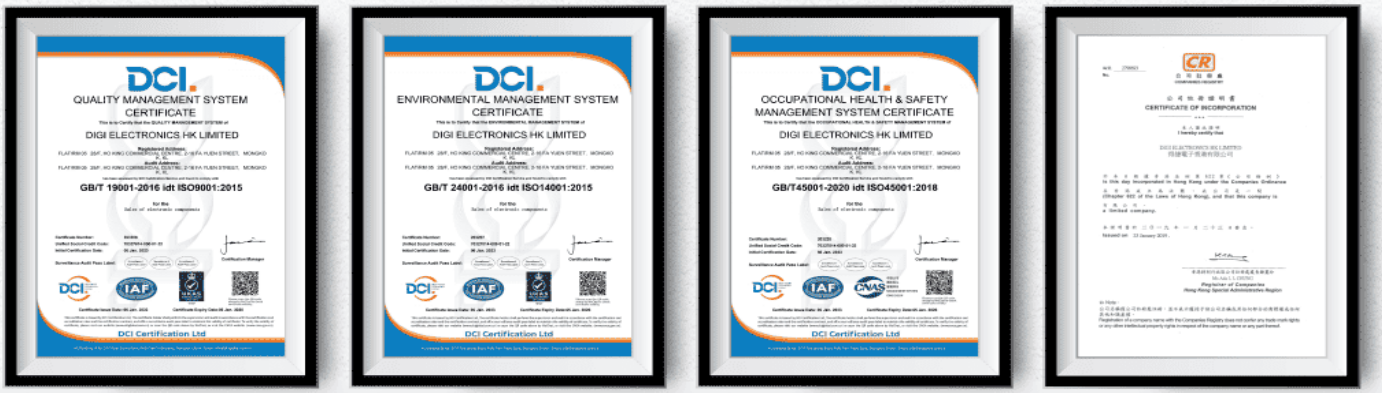



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