

N-CHANNEL ENHANCEMENT MODE MOSFET
Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ | I_D $T_A = 25^\circ C$ |
|---------------|------------------------------|-----------------------------|
| 100V | 6.0Ω @ $V_{GS} = 10V$ | 0.17 |

Features and Benefits

- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- High Drain-Source Voltage Rating
- **Lead, Halogen and Antimony Free, RoHS Compliant**
- "Green" Device (Notes 1 and 2)

Description and Applications

These N-Channel enhancement mode field effect transistors are produced using DIODES proprietary, high density, uses advanced trench technology. These products have been designed to minimize on-state resistance while provide rugged, reliable, and fast switching performance. These products are particularly suited for low voltage, low current applications such as

- Small servo motor control
- Power MOSFET gate drivers
- Switching applications

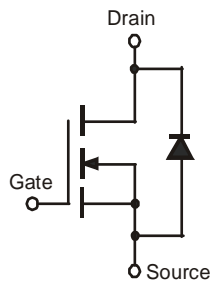
Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish annealed over Alloy 42 Leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Weight: 0.008 grams (approximate)

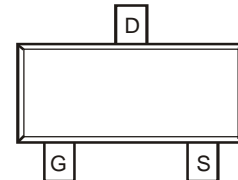
SOT23



Top View



Equivalent Circuit

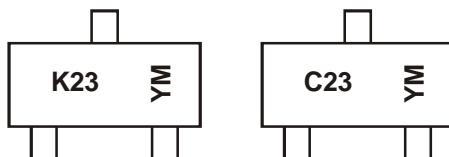


Top View

Ordering Information (Note 3)

| Part Number | Qualification | Case | Packaging |
|-------------|---------------|-------|----------------------|
| BSS123-7-F | Commercial | SOT23 | 3,000 / Tape & Reel |
| BSS123Q-13 | Automotive | SOT23 | 10,000 / Tape & Reel |
| BSS123Q-7 | Automotive | SOT23 | 3,000 / Tape & Reel |

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. No purposely added lead. Halogen and Antimony free.
 2. Product manufactured with Date Code V9 (week 33, 2008) and newer are built with Green Molding Compound. Product manufactured prior to Date Code V9 are built with Non-Green Molding Compound and may contain Halogens or Sb_2O_3 Fire Retardants.
 3. For packaging details, go to our website at <http://www.diodes.com>

Marking Information


K = SAT (Shanghai Assembly / Test site)
 C = CAT (Chengdu Assembly / Test site)
 23 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: T = 2006)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | T | U | V | W | X | Y | Z | A | B | C | D | E |
| 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} | 100 | V |
| Gate-Source Voltage | V _{GSS} | ±20 | V |
| Continuous Drain Current (Note 4) V _{GS} = 10V | I _D | 170 | mA |
| | I _{DM} | 680 | |

Thermal Characteristics @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Max | Unit |
|---|-----------------------------------|-------------|------|
| Power Dissipation (Note 4) | P _D | 300 | mW |
| Thermal Resistance, Junction to Ambient @T _A = 25°C (Note 4) | R _{θJA} | 417 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

Electrical Characteristics @ T_A = 25°C unless otherwise stated

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|-----------------------------------|----------------------|-----|------|-----|------|---|
| OFF CHARACTERISTICS (Note 5) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 100 | - | - | V | V _{GS} = 0V, I _D = 250μA |
| Zero Gate Voltage Drain Current | I _{DSS} | - | - | 0.1 | μA | V _{DS} = 100V, V _{GS} = 0V |
| | | - | - | 10 | nA | V _{DS} = 20V, V _{GS} = 0V |
| Gate-Source Leakage , Forward | I _{GSSF} | - | - | 50 | nA | V _{GS} = 20V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 5) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | 0.8 | 1.4 | 2.0 | V | V _{DS} = V _{GS} , I _D = 1mA |
| Static Drain-Source On-Resistance | R _{DS (ON)} | - | - | 6.0 | Ω | V _{GS} = 10V, I _D = 0.17A |
| | | - | - | 10 | | V _{GS} = 4.5V, I _D = 0.17A |
| Forward Transfer Admittance | g _{FS} | 80 | 370 | - | mS | V _{DS} =10V, I _D = 0.17A, f = 1.0KHz |
| Diode Forward Voltage | V _{SD} | - | 0.84 | 1.3 | V | V _{GS} = 0V, I _S = 0.34A, |
| DYNAMIC CHARACTERISTICS | | | | | | |
| Input Capacitance | C _{iss} | - | 29 | 60 | pF | V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{oss} | - | 10 | 15 | | |
| Reverse Transfer Capacitance | C _{rss} | - | 2 | 6 | | |
| SWITCHING CHARACTERISTICS | | | | | | |
| Turn-On Delay Time | t _{D(on)} | - | - | 8 | ns | V _{GS} = 10V, V _{DD} = 30V, I _D = 0.28A, R _{GEN} = 50Ω |
| Turn-On Rise Time | t _r | - | - | 8 | ns | |
| Turn-Off Delay Time | t _{D(off)} | - | - | 13 | ns | |
| Turn-Off Fall Time | t _f | - | - | 16 | ns | |

Notes: 4. Part mounted on FR-4 board with recommended pad layout, which can be found on our website at <http://www.diodes.com>.
5. Short duration pulse test used to minimize self-heating effect.

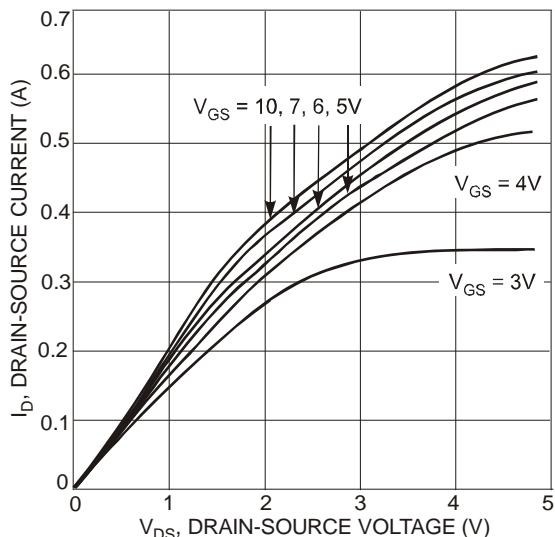


Fig. 1 On-Region Characteristics

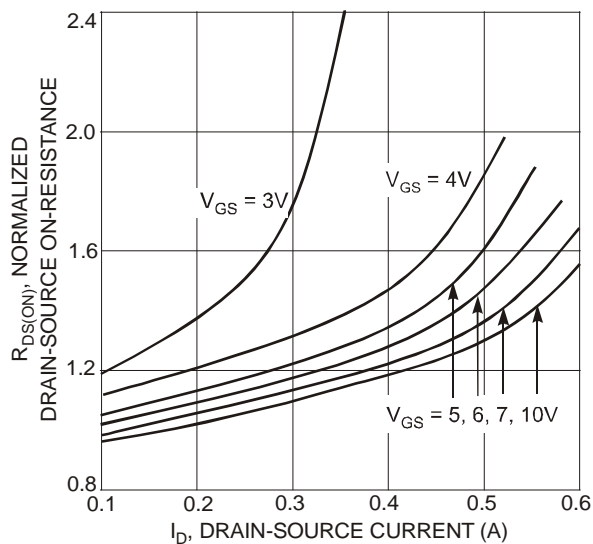


Fig. 2 On-Resistance Variation with Gate Voltage and Drain-Source Current

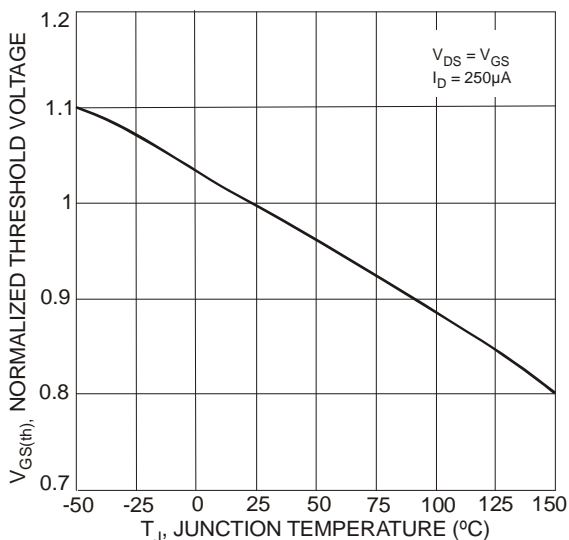


Fig. 3 Gate Threshold Variation with Temperature

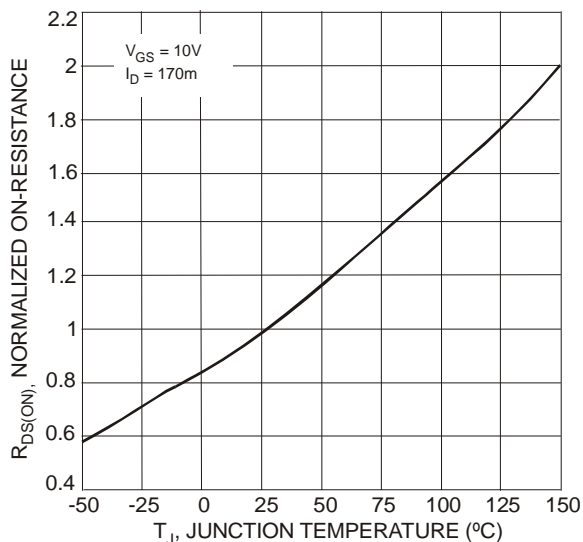


Fig. 4 On-Resistance Variation with Temperature

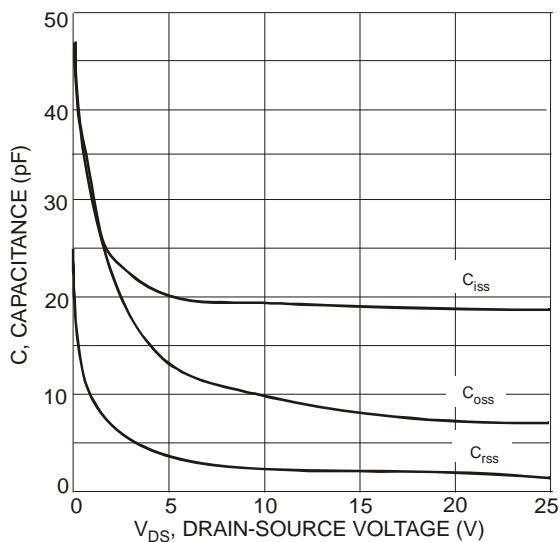
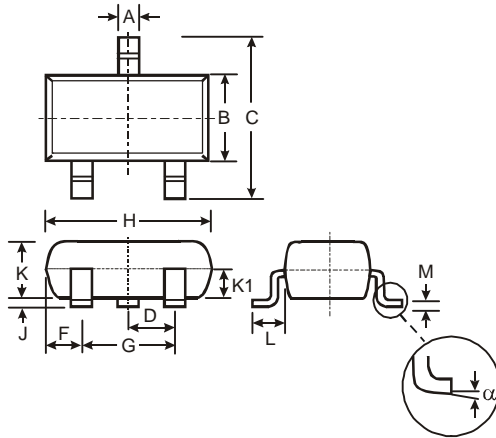


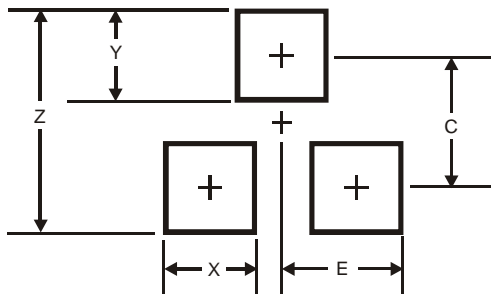
Fig. 5 Typical Capacitance

Package Outline Dimensions



| 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 | 0.903 | 1.10 | 1.00 |
| K1 | - | - | 0.400 |
| L | 0.45 | 0.61 | 0.55 |
| M | 0.085 | 0.18 | 0.11 |
| α | 0° | 8° | - |
| All Dimensions in mm | | | |

Suggested Pad Layout



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

IMPORTANT NOTICE

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel. Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

LIFE SUPPORT

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

A. Life support devices or systems are devices or systems which:

1. are intended to implant into the body, or
2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

Copyright © 2012, Diodes Incorporated

www.diodes.com

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Diodes Inc.:](#)

[BSS123-7-F](#) [BSS123-7](#)