

**30V N-CHANNEL ENHANCEMENT MODE MOSFET IN SOT23**

**Product Summary**

| $V_{(BR)DSS}$ | Max $R_{DS(on)}$                | $I_D$ Max (Note 5)<br>$T_A = 25^\circ C$ |
|---------------|---------------------------------|--|
| 30V           | 460m $\Omega$ @ $V_{GS} = 4.5V$ | 0.94A                                    |
|               | 560m $\Omega$ @ $V_{GS} = 2.5V$ | 0.85A                                    |

**Description and Applications**

This MOSFET has been designed to minimize the on-state resistance ( $R_{DS(on)}$ ) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

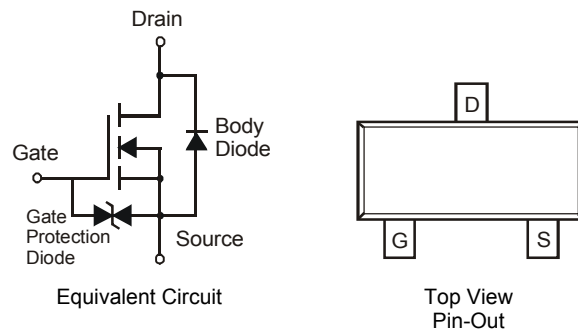
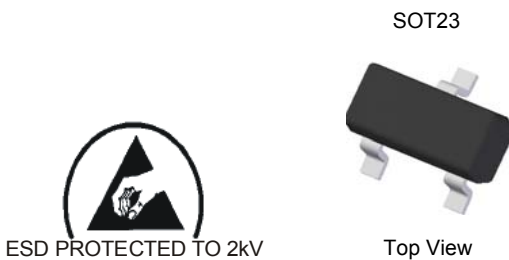
- Load switch
- Portable applications
- Power Management Functions

**Features and Benefits**

- Low  $V_{GS(th)}$ , can be driven directly from a battery
- Low  $R_{DS(on)}$
- "Lead Free", RoHS Compliant (Note 1)
- Halogen and Antimony Free. "Green" Device (Note 2)
- ESD Protected Gate 2kV
- Qualified to AEC-Q101 Standards for High Reliability

**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.
- Weight: 0.08 grams (approximate)

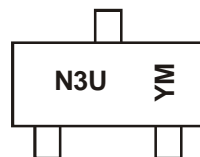


**Ordering Information** (Note 3)

| Part Number | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-------------|---------|--------------------|-----------------|-------------------|
| DMN3730U-7  | N3U     | 7                  | 8               | 3,000             |

- Notes:
1. No purposefully added lead
  2. Diodes Inc's "Green" policy can be found on our website at <http://www.diodes.com>.
  3. For packaging details, go to our website at <http://www.diodes.com>.

**Marking Information**



N3U = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: Y = 2011)  
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|------|------|------|------|------|------|------|------|
| Code | 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** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

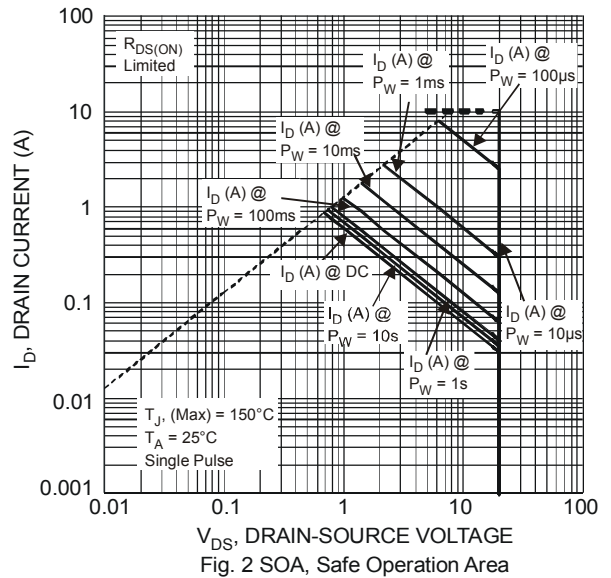
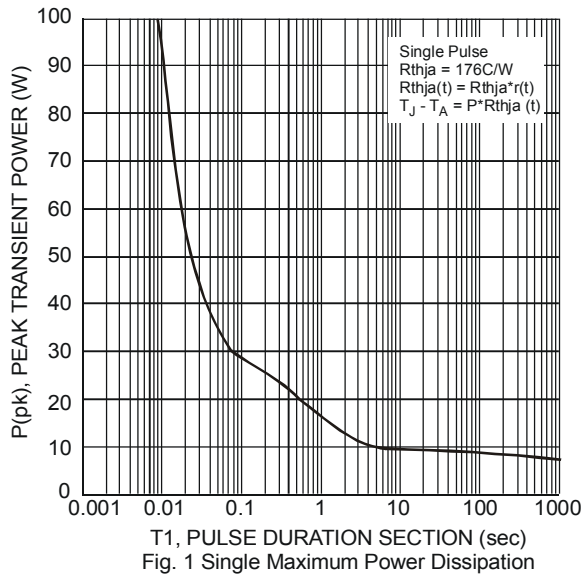
| Characteristic                |              |                                   | Symbol    | Value   | Unit |
|-------------------------------|--------------|-----------------------------------|-----------|---------|------|
| Drain-Source Voltage          |              |                                   | $V_{DSS}$ | 30      | V    |
| Gate-Source Voltage           |              |                                   | $V_{GSS}$ | $\pm 8$ | V    |
| Continuous Drain Current      | Steady State | $T_A = 25^\circ\text{C}$ (Note 5) | $I_D$     | 0.94    | A    |
|                               |              | $T_A = 85^\circ\text{C}$ (Note 5) |           | 0.68    |      |
|                               |              | $T_A = 25^\circ\text{C}$ (Note 4) |           | 0.75    |      |
| Pulsed Drain Current (Note 6) |              |                                   | $I_{DM}$  | 10      | A    |

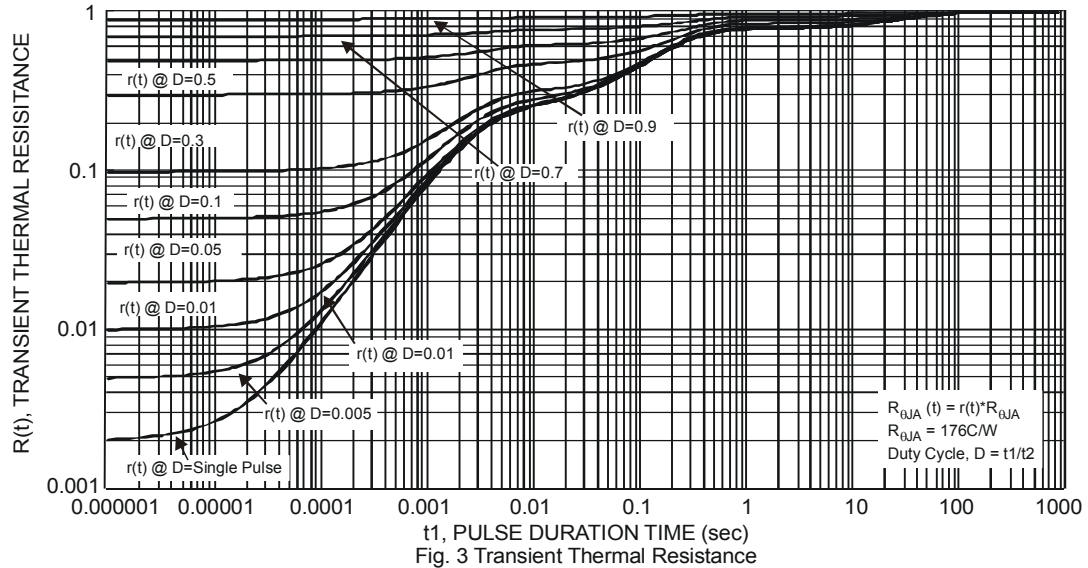
**Thermal Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

| Characteristic                          |          | Symbol          | Value       | Unit               |
|---|----------|-----------------|-------------|--------------------|
| Power Dissipation                       | (Note 4) | $P_D$           | 0.45        | W                  |
|   | (Note 5) |                 | 0.71        | W                  |
| Thermal Resistance, Junction to Ambient | (Note 4) | $R_{\theta JA}$ | 275         | $^\circ\text{C/W}$ |
|   | (Note 5) |                 | 177         | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range |          | $T_J, T_{STG}$  | -55 to +150 | $^\circ\text{C}$   |

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout
  - Device mounted on 25mm X 25mm square copper plate with FR-4 substrate PC board, 2oz copper
  - Device mounted on minimum recommended pad layout test board, 10 $\mu\text{s}$  pulse duty cycle = 1%.

**Thermal Characteristics**





**Electrical Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

| Characteristic                             | Symbol       | Min  | Typ  | Max  | Unit       | Test Condition  |
|--|--------------|------|------|------|------------|---|
| <b>OFF CHARACTERISTICS</b>                 |              |      |      |      |            |   |
| Drain-Source Breakdown Voltage             | $BV_{DSS}$   | 30   | -    | -    | V          | $V_{GS} = 0V, I_D = 10\mu A$                          |
| Zero Gate Voltage Drain Current            | $I_{DSS}$    | -    | -    | 1    | $\mu A$    | $V_{DS} = 30V, V_{GS} = 0V$                           |
| Gate-Source Leakage                        | $I_{GSS}$    | -    | -    | 3    | $\mu A$    | $V_{GS} = \pm 8V, V_{DS} = 0V$                        |
| <b>ON CHARACTERISTICS</b>                  |              |      |      |      |            |   |
| Gate Threshold Voltage                     | $V_{GS(th)}$ | 0.45 | -    | 0.95 | V          | $V_{DS} = V_{GS}, I_D = 250\mu A$                     |
| Static Drain-Source On-Resistance (Note 7) | $R_{DS(on)}$ | -    | -    | 460  | m $\Omega$ | $V_{GS} = 4.5V, I_D = 200mA$                          |
|  |              |      |      | 560  |            | $V_{GS} = 2.5V, I_D = 100mA$                          |
|  |              |      |      | 730  |            | $V_{GS} = 1.8V, I_D = 75mA$                           |
| Forward Transfer Admittance                | $ Y_{fs} $   | 40   | -    | -    | mS         | $V_{DS} = 3V, I_D = 10mA$                             |
| Diode Forward Voltage (Note 7)             | $V_{SD}$     | -    | 0.7  | 1.2  | V          | $V_{GS} = 0V, I_S = 300mA$                            |
| <b>DYNAMIC CHARACTERISTICS (Note 8)</b>    |              |      |      |      |            |   |
| Input Capacitance                          | $C_{iss}$    | -    | 64.3 | -    | pF         | $V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz$               |
| Output Capacitance                         | $C_{oss}$    | -    | 6.1  | -    | pF         |   |
| Reverse Transfer Capacitance               | $C_{rss}$    | -    | 4.5  | -    | pF         |   |
| Gate Resistance                            | $R_g$        | -    | 70   | -    | $\Omega$   | $V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$                  |
| Total Gate Charge                          | $Q_g$        | -    | 1.6  | -    | nC         | $V_{GS} = 4.5V, V_{DS} = 15V, I_D = 1A$               |
| Gate-Source Charge                         | $Q_{gs}$     | -    | 0.2  | -    | nC         |   |
| Gate-Drain Charge                          | $Q_{gd}$     | -    | 0.2  | -    | nC         |   |
| Turn-On Delay Time                         | $t_{D(on)}$  | -    | 3.5  | -    | ns         | $V_{DS} = 10V, I_D = 1A, V_{GS} = 10V, R_G = 6\Omega$ |
| Turn-On Rise Time                          | $t_r$        | -    | 2.8  | -    | ns         |   |
| Turn-Off Delay Time                        | $t_{D(off)}$ | -    | 38   | -    | ns         |   |
| Turn-Off Fall Time                         | $t_f$        | -    | 13   | -    | ns         |   |

Notes: 7. Measured under pulsed conditions to minimize self-heating effect. Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$   
8. For design aid only, not subject to production testing.

**DMN3730U**

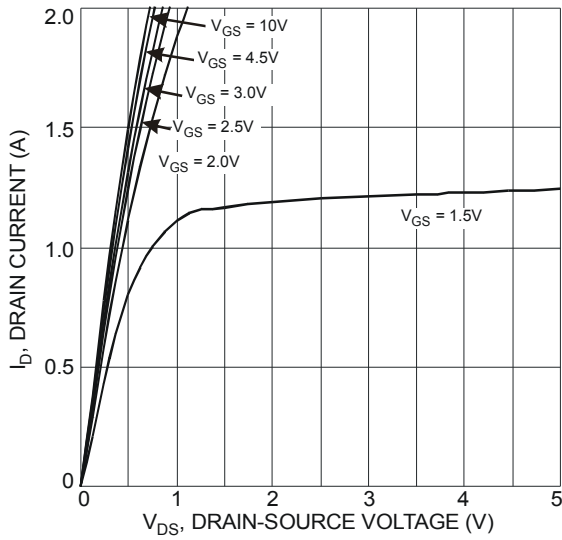


Fig. 4 Typical Output Characteristic

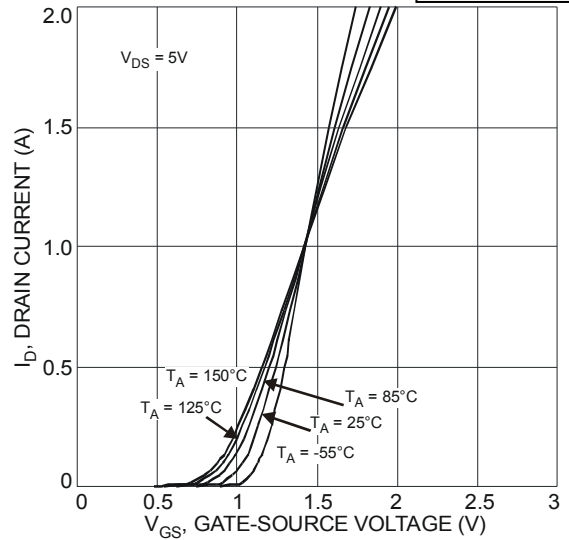


Fig. 5 Typical Transfer Characteristic

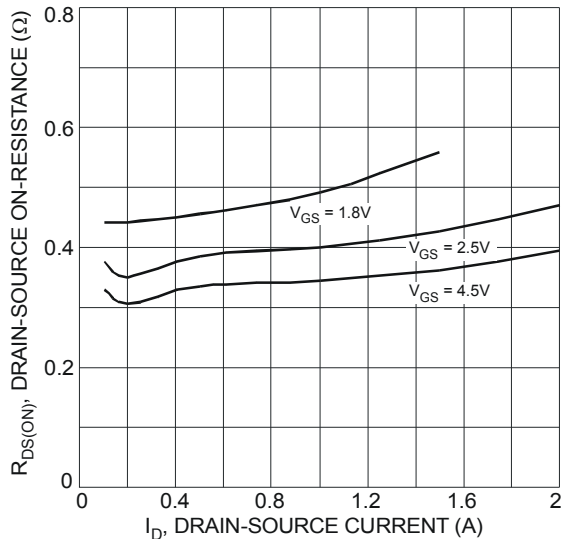


Fig. 6 Typical On-Resistance vs. Drain Current and Gate Voltage

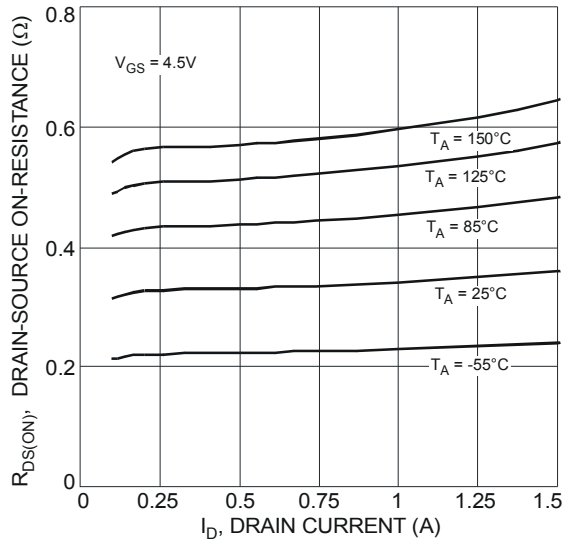


Fig. 7 Typical On-Resistance vs. Drain Current and Temperature

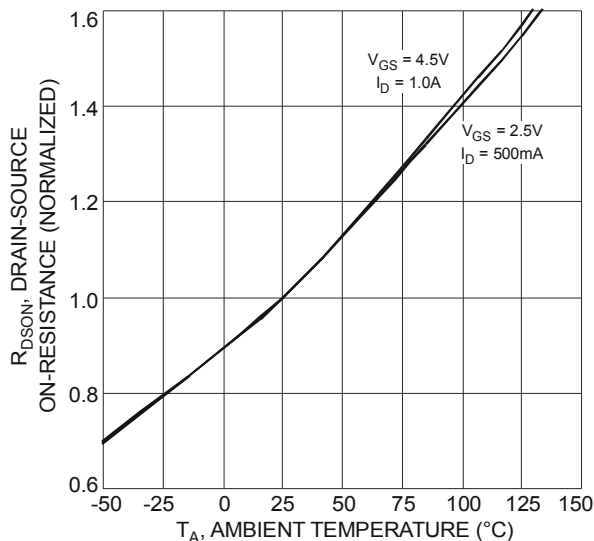


Fig. 8 On-Resistance Variation with Temperature

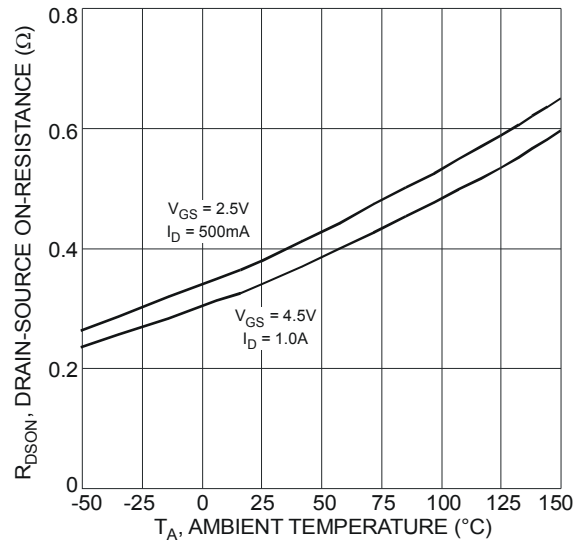


Fig. 9 On-Resistance Variation with Temperature

**DMN3730U**

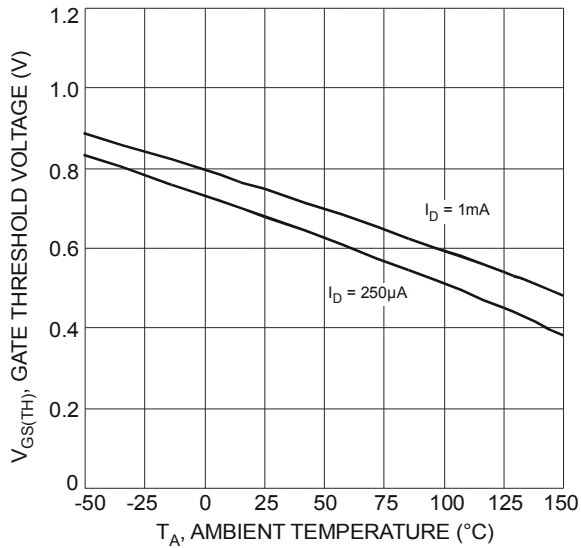


Fig. 10 Gate Threshold Variation vs. Ambient Temperature

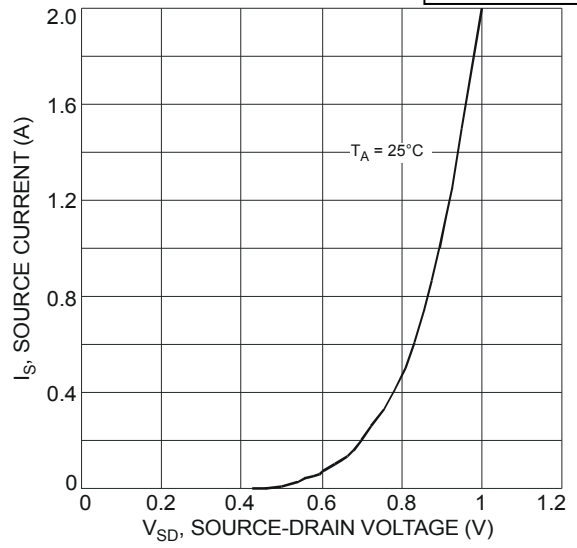


Fig. 11 Diode Forward Voltage vs. Current

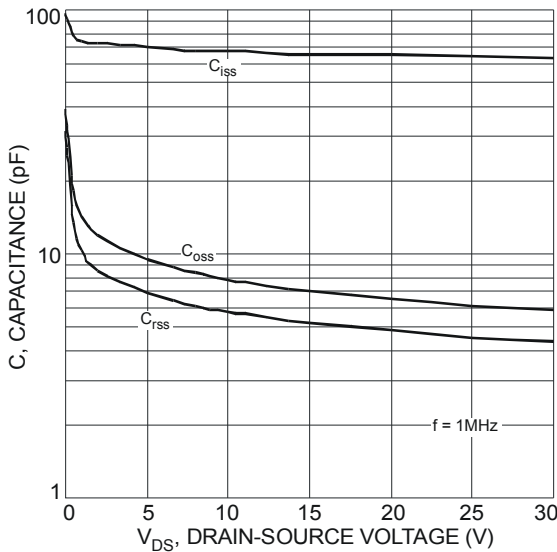


Fig. 12 Typical Total Capacitance

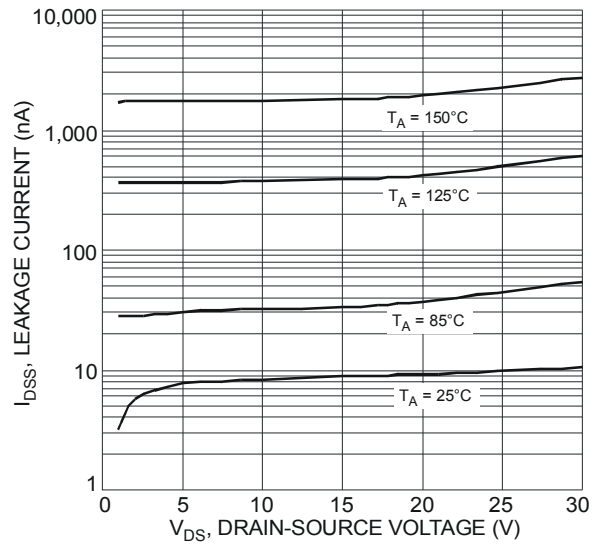


Fig. 13 Typical Leakage Current vs. Drain-Source Voltage

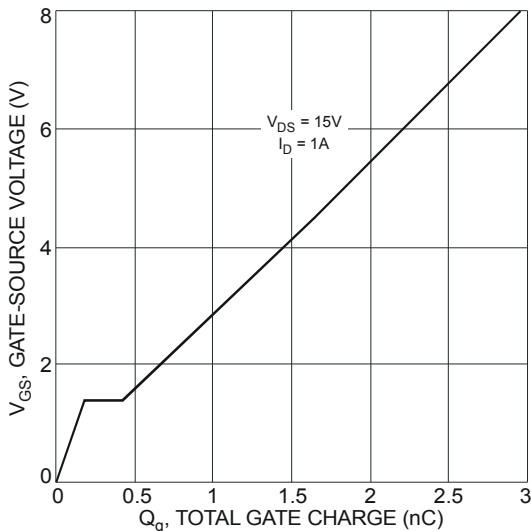
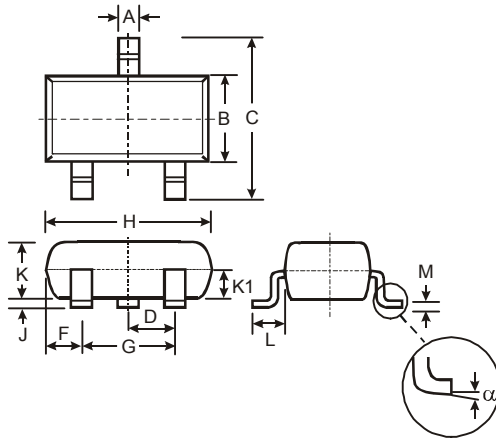


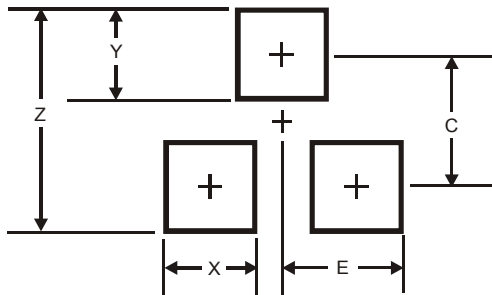
Fig. 14 Gate-Charge Characteristics

**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          |

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