



STS2DPF80

DUAL P-CHANNEL 80V - 0.21 Ω - 2.3A SO-8

STripFET™ POWER MOSFET

| TYPE | V _{DSS} | R _{DS(on)} | I _D |
|-----------|------------------|---------------------|----------------|
| STS2DPF80 | 80 V | <0.25 Ω | 2.3 A |

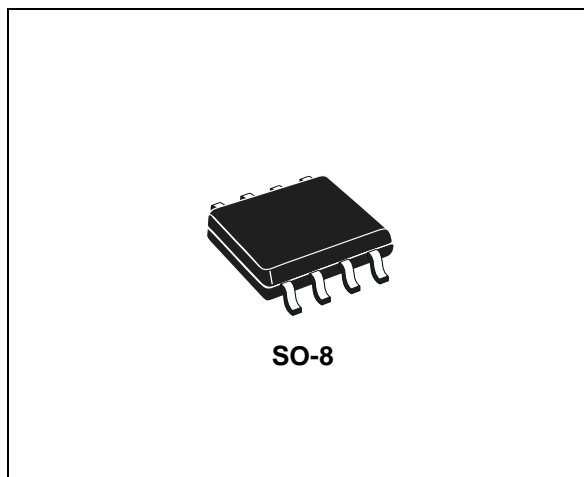
- TYPICAL R_{DS(on)} = 0.21 Ω
- STANDARD OUTLINE FOR EASY AUTOMATED SURFACE MOUNT ASSEMBLY

DESCRIPTION

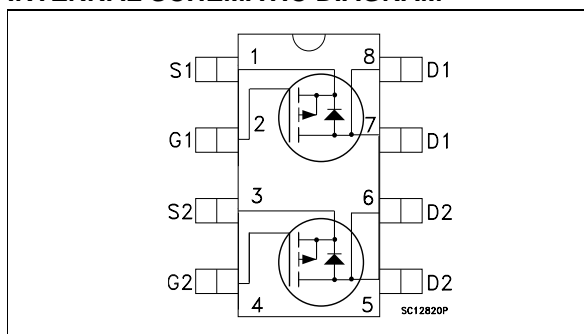
This application specific Power MOSFET is the second generation of STMicroelectronics unique "Single Feature Size™" strip-based process. The resulting transistor shows extremely high packing density for low on-resistance, rugged avalanche characteristics and less critical alignment steps therefore a remarkable manufacturing reproducibility.

APPLICATIONS

- DC/DC CONVERTERS
- BATTERY MANAGEMENT IN NOMADIC EQUIPMENT
- POWER MANAGEMENT IN CELLULAR PHONES AND DISPLAY NEW GENERATION



INTERNAL SCHEMATIC DIAGRAM



Ordering Information

| SALES TYPE | MARKING | PACKAGE | PACKAGING |
|------------|---------|---------|-------------|
| STS8DPF80 | S8DPF80 | SO-8 | TAPE & REEL |

ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|---------------------|---|------------|--------|
| V _{DS} | Drain-source Voltage (V _{GS} = 0) | 80 | V |
| V _{DGR} | Drain-gate Voltage (R _{GS} = 20 k Ω) | 80 | V |
| V _{GS} | Gate- source Voltage | ± 20 | V |
| I _D | Drain Current (continuous) at T _C = 25°C Single Operation Drain Current (continuous) at T _C = 100°C Single Operation | 2.0 1.3 | A A |
| I _{DM} (•) | Drain Current (pulsed) | 8 | A |
| P _{tot} | Total Dissipation at T _C = 25°C | 2.5 | W |
| T _{stg} | Storage Temperature | -55 to 150 | °C |
| T _j | Max. Operating Junction Temperature | 150 | °C |

(•) Pulse width limited by safe operating area.

Note: For the P-CHANNEL MOSFET actual polarity of voltages and current has to be reversed

STS2DPF80

TAB.1 THERMAL DATA

| | | | |
|---------------------|---------------------------------|------|------|
| $R_{thj-PCB}^{(*)}$ | Thermal Resistance Junction-PCB | 62.5 | °C/W |
|---------------------|---------------------------------|------|------|

(*) When Mounted on 1 inch² FR-4 board, 2 oz of Cu and t [10 sec.

ELECTRICAL CHARACTERISTICS (T_{CASE} = 25 °C UNLESS OTHERWISE SPECIFIED)

TAB.2 OFF

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---------------|--|--|------|------|-----------|--------------------|
| $V_{(BR)DSS}$ | Drain-source Breakdown Voltage | $I_D = 250 \mu A$, $V_{GS} = 0$ | 80 | | | V |
| I_{DSS} | Zero Gate Voltage Drain Current ($V_{GS} = 0$) | $V_{DS} = \text{Max Rating}$ $V_{DS} = \text{Max Rating}$ $T_C = 125^\circ C$ | | | 1 10 | μA μA |
| I_{GSS} | Gate-body Leakage Current ($V_{DS} = 0$) | $V_{GS} = \pm 20 V$ | | | ± 100 | nA |

TAB.3 ON (*)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|--------------|-----------------------------------|-------------------------------------|------|------|------|----------|
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS} = V_{GS}$ $I_D = 250 \mu A$ | 2 | | 4 | V |
| $R_{DS(on)}$ | Static Drain-source On Resistance | $V_{GS} = 10 V$ $I_D = 1 A$ | | 0.21 | 0.25 | Ω |

TAB.4 DYNAMIC

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|-------------------------------------|---|---|------|-------------------|------|----------------|
| $g_{fs}^{(*)}$ | Forward Transconductance | $V_{DS} = 10V$ $I_D = 1 A$ | | 4 | | S |
| C_{iss} C_{oss} C_{rss} | Input Capacitance Output Capacitance Reverse Transfer Capacitance | $V_{DS} = 25V$, $f = 1 \text{ MHz}$, $V_{GS} = 0$ | | 739 89.5 31 | | pF pF pF |

ELECTRICAL CHARACTERISTICS (continued)**TAB.5 SWITCHING ON**

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|-------------------------------|--|---|------|------------------|------|----------------|
| $t_{d(on)}$ t_r | Turn-on Delay Time Rise Time | $V_{DD} = 40\text{ V}$ $I_D = 1\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$ (Resistive Load, Figure 1) | | 13.5 18 | | ns ns |
| Q_g Q_{gs} Q_{gd} | Total Gate Charge Gate-Source Charge Gate-Drain Charge | $V_{DD} = 64\text{ V}$ $I_D = 2\text{ A}$ $V_{GS} = 10\text{ V}$ (See test circuit, Figure 2) | | 20 2.5 4.9 | | nC nC nC |

TAB.6 SWITCHING OFF

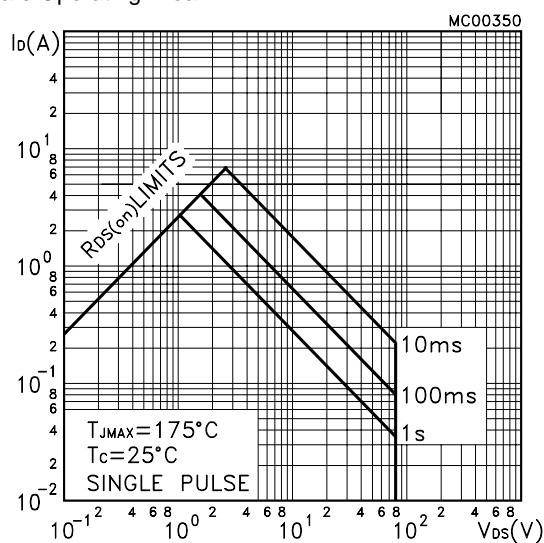
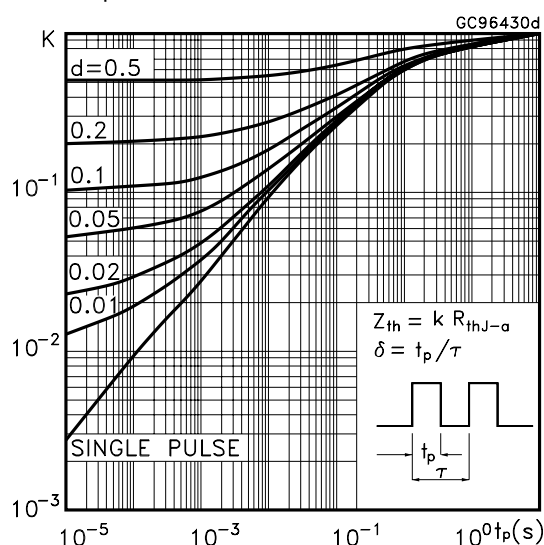
| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|-----------------------|----------------------------------|---|------|----------|------|----------|
| $t_{d(off)}$ t_f | Turn-off Delay Time Fall Time | $V_{DD} = 40\text{ V}$ $I_D = 1\text{ A}$ $R_G = 4.7\ \Omega$, $V_{GS} = 10\text{ V}$ (Resistive Load, Figure 1) | | 32 13 | | ns ns |

TAB.7 SOURCE DRAIN DIODE

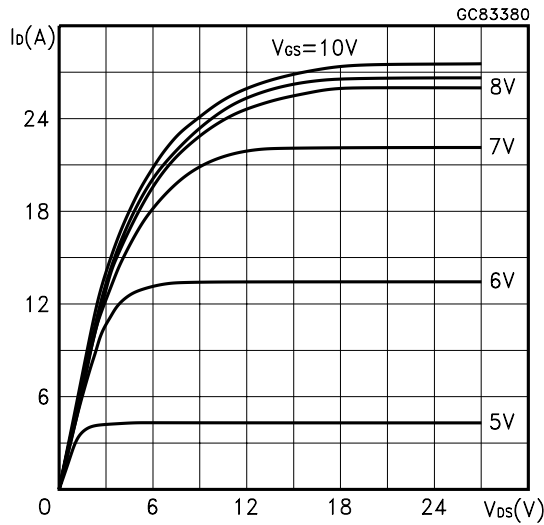
| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|-----------------------------------|--|--|------|-----------------|------------|---------------|
| I_{SD} $I_{SDM}(\bullet)$ | Source-drain Current Source-drain Current (pulsed) | | | | 2.3 9.2 | A A |
| $V_{SD}^(*)$ | Forward On Voltage | $I_{SD} = 1\text{ A}$ $V_{GS} = 0$ | | | 1.2 | V |
| t_{rr} Q_{rr} I_{RRM} | Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current | $I_{SD} = 2\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 40\text{ V}$ $T_J = 150^\circ\text{C}$ (See test circuit, Figure 3) | | 47 87 3.7 | | ns nC A |

(*) Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %.

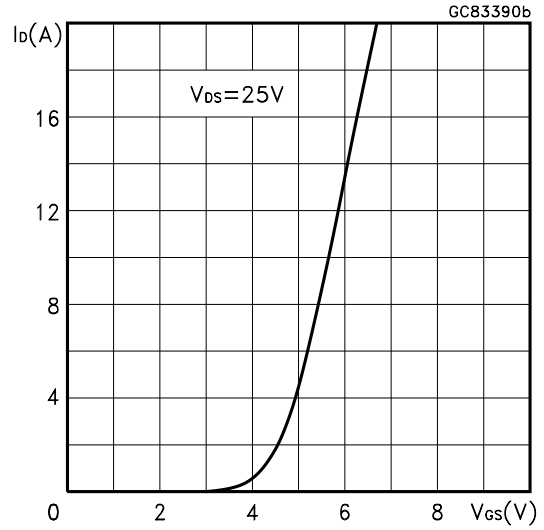
(\bullet) Pulse width limited by safe operating area.

Safe Operating Area**Thermal Impedance**

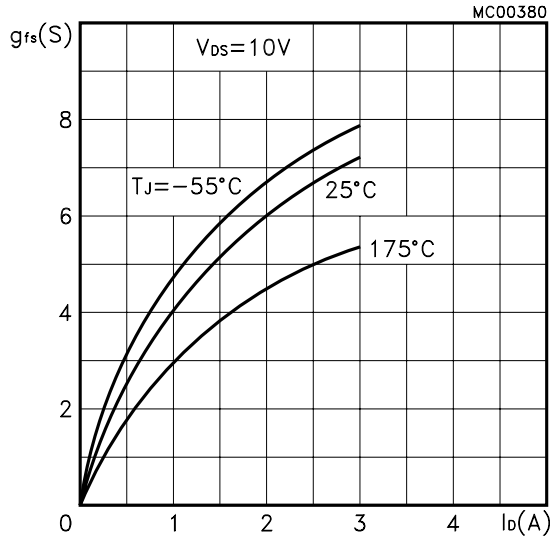
Output Characteristics



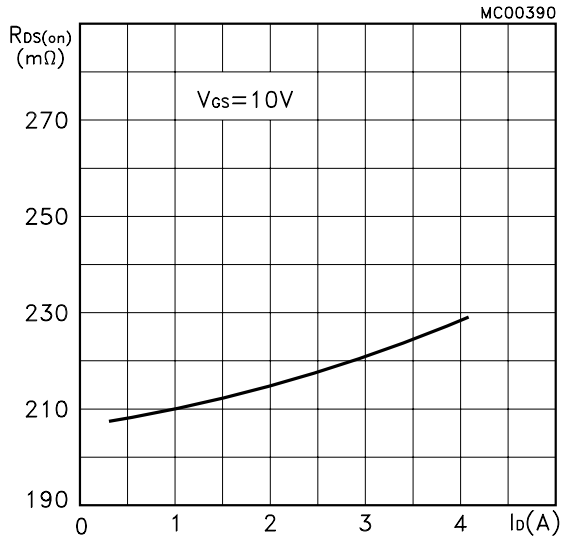
Transfer Characteristics



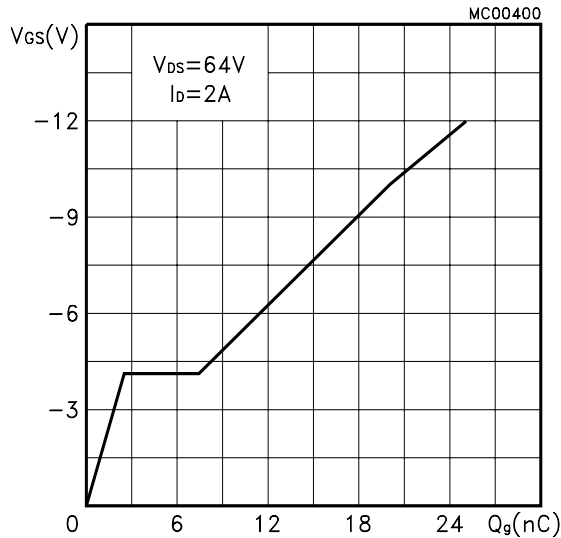
Transconductance



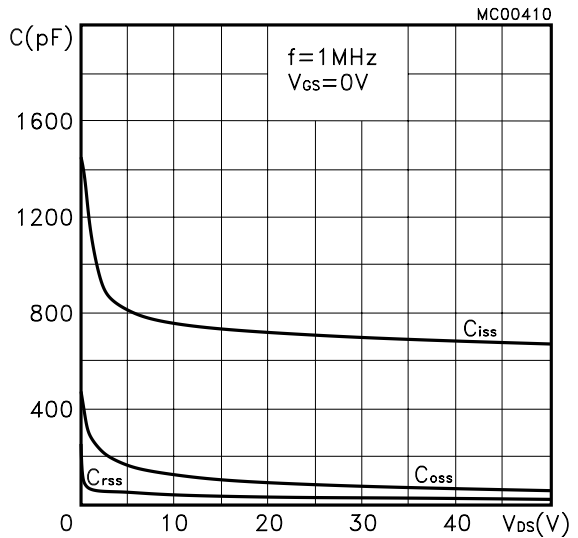
Static Drain-source On Resistance



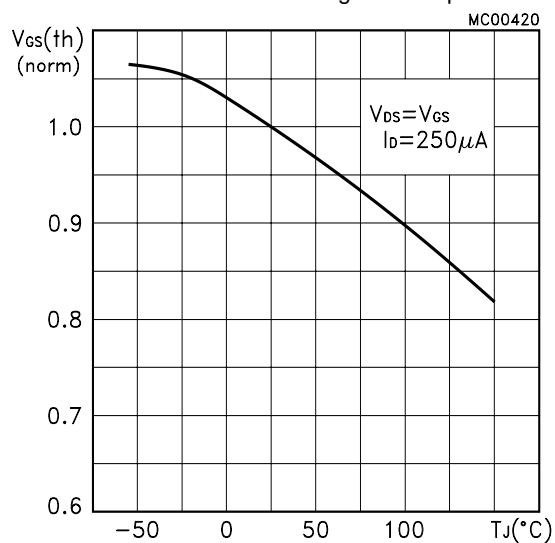
Gate Charge vs Gate-source Voltage



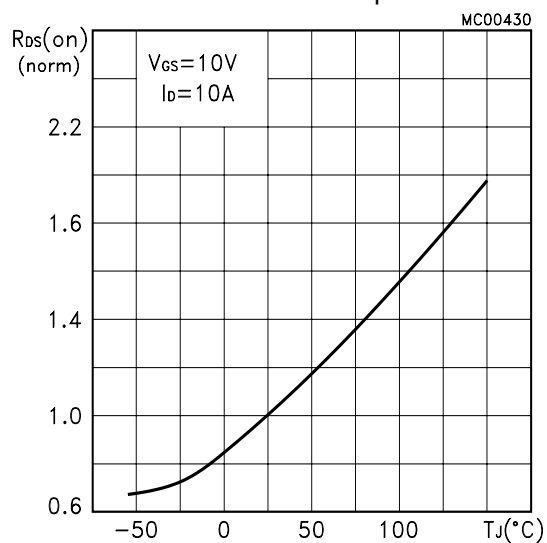
Capacitance Variations



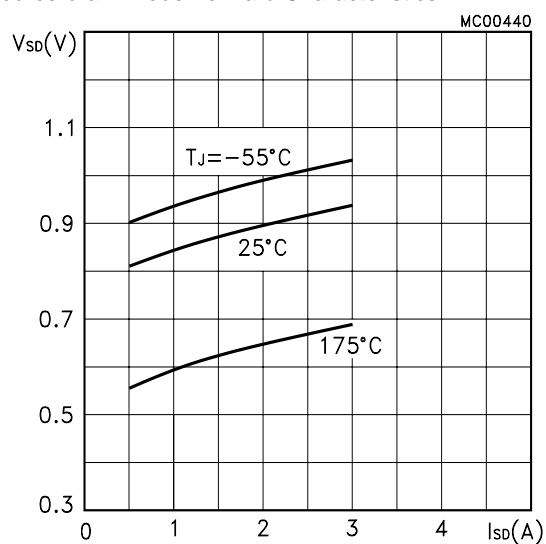
Normalized Gate Threshold Voltage vs Temperature



Normalized on Resistance vs Temperature



Source-drain Diode Forward Characteristics



Normalized Breakdown Voltage Temperature.

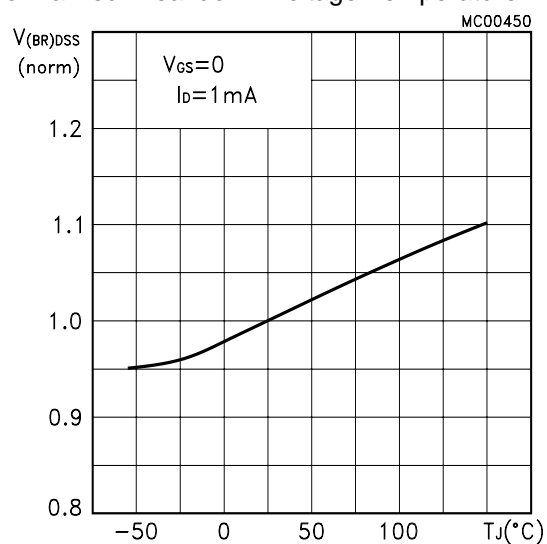


Fig. 1: Switching Times Test Circuits For Resistive Load

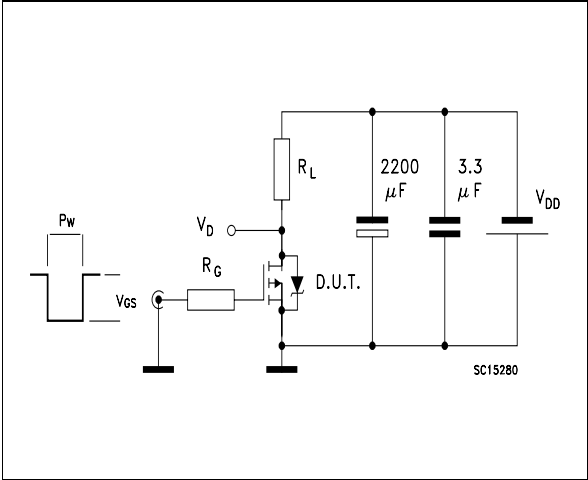


Fig. 2: Gate Charge test Circuit

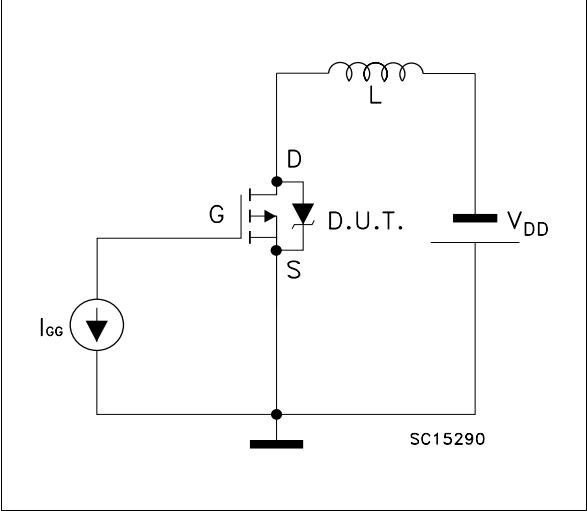
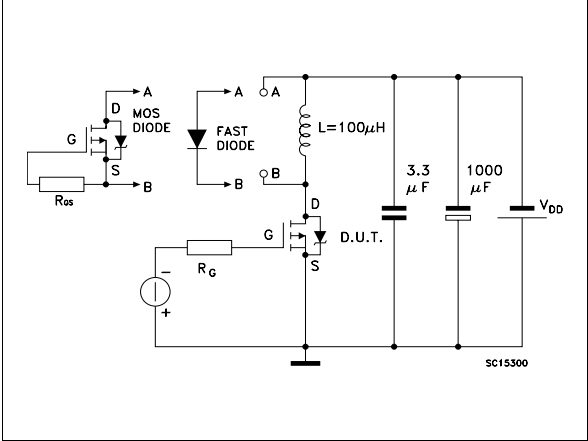
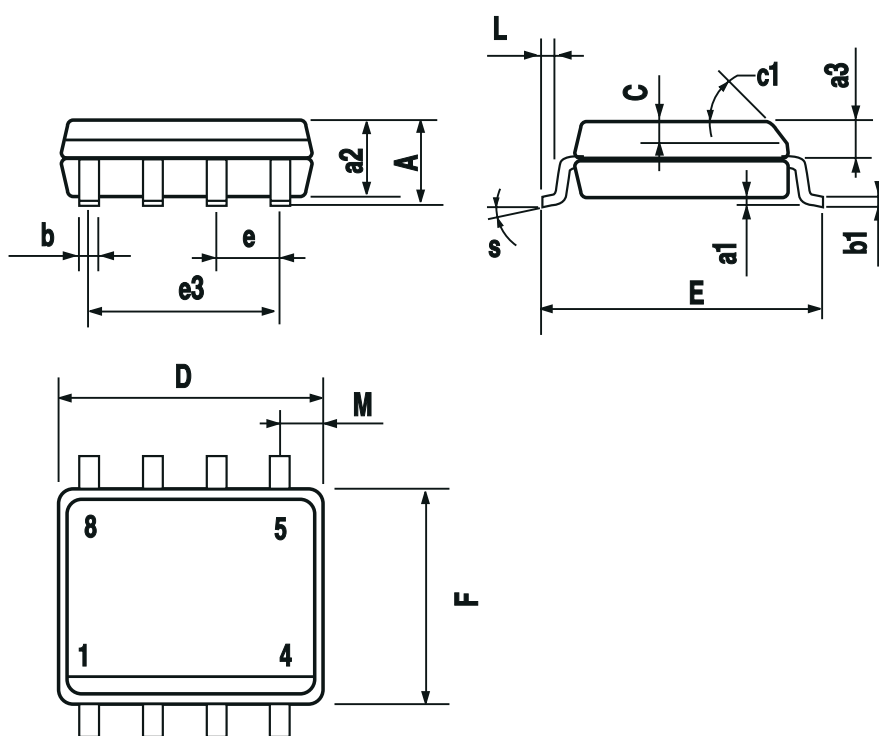


Fig. 3: Test Circuit For Diode Recovery Behaviour



SO-8 MECHANICAL DATA

| DIM. | mm | | | inch | | |
|------|-----------|------|------|-------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | | | 1.75 | | | 0.068 |
| a1 | 0.1 | | 0.25 | 0.003 | | 0.009 |
| a2 | | | 1.65 | | | 0.064 |
| a3 | 0.65 | | 0.85 | 0.025 | | 0.033 |
| b | 0.35 | | 0.48 | 0.013 | | 0.018 |
| b1 | 0.19 | | 0.25 | 0.007 | | 0.010 |
| C | 0.25 | | 0.5 | 0.010 | | 0.019 |
| c1 | 45 (typ.) | | | | | |
| D | 4.8 | | 5.0 | 0.188 | | 0.196 |
| E | 5.8 | | 6.2 | 0.228 | | 0.244 |
| e | | 1.27 | | | 0.050 | |
| e3 | | 3.81 | | | 0.150 | |
| F | 3.8 | | 4.0 | 0.14 | | 0.157 |
| L | 0.4 | | 1.27 | 0.015 | | 0.050 |
| M | | | 0.6 | | | 0.023 |
| S | 8 (max.) | | | | | |



0016023

Revision History

| Date | Revision | Description of Changes |
|------------------------|-----------------|-------------------------------|
| Wednesday 16 June 2004 | 0.1 | FIRST ISSUE |

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