



STS10PF30L

P-CHANNEL 30V - 0.012 Ω - 10A SO-8 STripFET™ II POWER MOSFET

Table 1: General Features

| TYPE | V _{DSS} | R _{DS(on)} | I _D |
|------------|------------------|---------------------|----------------|
| STS10PF30L | 30V | <0.014 Ω | 10 A |

- TYPICAL R_{DS(on)} = 0.012 Ω
- STANDARD OUTLINE FOR EASY AUTOMATED SURFACE MOUNT ASSEMBLY
- LOW THRESHOLD DRIVE

DESCRIPTION

This Power MOSFET is the latest development of STMicroelectronics unique "Single Feature Size™" strip-based process. The resulting transistor shows extremely high packing density for low on-resistance.

APPLICATIONS

- BATTERY MANAGEMENT IN NOMADIC EQUIPMENT
- LOAD SWITCH

Figure 1: Package

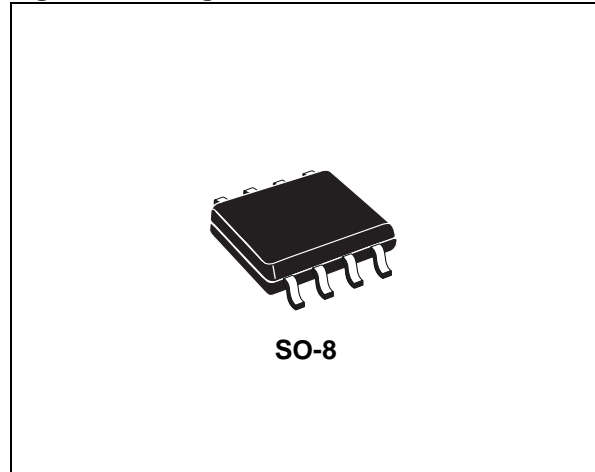


Figure 2: Internal Schematic Diagram

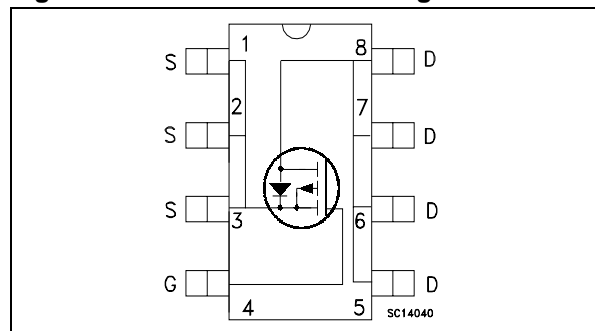


Table 2: Order Codes

| SALES TYPE | MARKING | PACKAGE | PACKAGING |
|------------|----------|---------|-------------|
| STS10PF30L | S10PF30L | SO-8 | TAPE & REEL |

Table 3: ABSOLUTE MAXIMUM RATING

| Symbol | Parameter | Value | Unit |
|---------------------|---|----------|------|
| V _{DS} | Drain-source Voltage (V _{GS} = 0) | 30 | V |
| V _{DGR} | Drain-gate Voltage (R _{GS} = 20 k Ω) | 30 | V |
| V _{GS} | Gate- source Voltage | ± 16 | V |
| I _D | Drain Current (continuous) at T _C = 25°C | 10 | A |
| I _D | Drain Current (continuous) at T _C = 100°C | 6 | A |
| I _{DM} (•) | Drain Current (pulsed) | 40 | A |
| P _{tot} | Total Dissipation at T _C = 25°C | 2.5 | W |

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

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Table 4: THERMAL DATA

| | | | | |
|------------------|--|-----|------------|------|
| Rthj-amb | (*) Thermal Resistance Junction-ambient | Max | 47 | °C/W |
| Rthj-lead | Thermal Resistance Junction-leads | Max | 16 | °C/W |
| T _l | Maximum Lead Temperature For Soldering Purpose | Typ | 150 | °C |
| T _{stg} | storage temperature | | -55 to 150 | °C |

(*) 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)

Table 5: OFF

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|----------------------|---|---|------|------|---------|----------|
| V _{(BR)DSS} | Drain-source Breakdown Voltage | I _D = 250 μA, V _{GS} = 0 | 30 | | | V |
| I _{DSS} | Zero Gate Voltage Drain Current (V _{GS} = 0) | V _{DS} = Max Rating V _{DS} = Max Rating T _C = 125°C | | | 1 10 | μA μA |
| I _{GSS} | Gate-body Leakage Current (V _{DS} = 0) | V _{GS} = ± 16 V | | | ±100 | nA |

Table 6: ON (*)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---------------------|-----------------------------------|---|------|----------------|----------------|--------|
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} = V _{GS} I _D = 250 μA | 1 | | | V |
| R _{DS(on)} | Static Drain-source On Resistance | V _{GS} = 10 V I _D = 5 A V _{GS} = 4.5 V I _D = 5 A | | 0.012 0.015 | 0.014 0.018 | Ω Ω |

Table 7: DYNAMIC

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|--|---|---|------|--------------------|------|----------------|
| g _{fs} | Forward Transconductance | V _{DS} = 10 V I _D = 5 A | | 31 | | S |
| C _{iss} C _{oss} C _{rss} | Input Capacitance Output Capacitance Reverse Transfer Capacitance | V _{DS} = 25V, f = 1 MHz, V _{GS} = 0 | | 2300 750 115 | | pF pF pF |

ELECTRICAL CHARACTERISTICS (continued)

Table 8: SWITCHING ON

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|-------------------------------|--|---|------|------------------|------|----------------|
| $t_{d(on)}$ t_r | Turn-on Delay Time Rise Time | $V_{DD} = 15\text{ V}$ $I_D = 5\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 4.5\text{ V}$ (Resistive Load, Figure 15) | | 72 87 | | ns ns |
| Q_g Q_{gs} Q_{gd} | Total Gate Charge Gate-Source Charge Gate-Drain Charge | $V_{DD} = 15\text{ V}$ $I_D = 10\text{ A}$ $V_{GS} = 4.5\text{ V}$ (see test circuit, Figure 16) | | 29 6.8 7.6 | 39 | nC nC nC |

Table 9: SWITCHING OFF

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|-----------------------|----------------------------------|---|------|----------|------|----------|
| $t_{d(off)}$ t_f | Turn-off Delay Time Fall Time | $V_{DD} = 15\text{ V}$ $I_D = 5\text{ A}$ $R_G = 4.7\ \Omega$, $V_{GS} = 4.5\text{ V}$ (Resistive Load, Figure 15) | | 89 27 | | ns ns |

Table 10: SOURCE DRAIN DIODE

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|-----------------------------------|--|--|------|-------------------|----------|---------------|
| I_{SD} I_{SDM} | Source-drain Current Source-drain Current (pulsed) | | | | 10 40 | A A |
| $V_{SD}^{(*)}$ | Forward On Voltage | $I_{SD} = 10\text{ A}$ $V_{GS} = 0$ | | | 1.2 | V |
| t_{rr} Q_{rr} I_{RRM} | Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current | $I_{SD} = 10\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 15\text{ V}$ $T_j = 150^\circ\text{C}$ (see test circuit, Figure 17) | | 48.5 68 2.8 | | ns nC A |

(*) Pulse width $\leq 300\ \mu\text{s}$, duty cycle 1.5 %.

(*) Pulse width limited by T_{JMAX}

Figure 3: Safe Operating Area

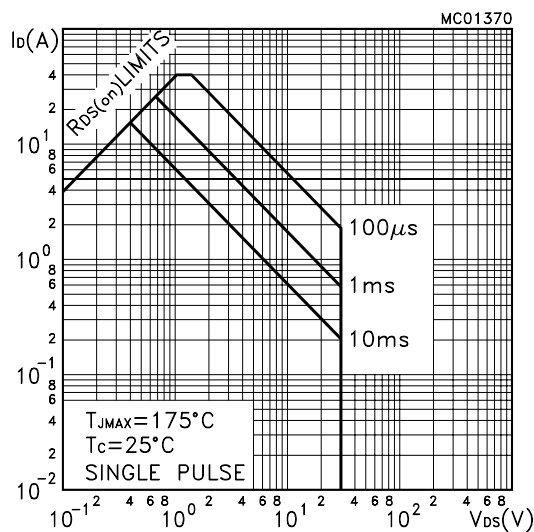


Figure 4: Thermal Impedance

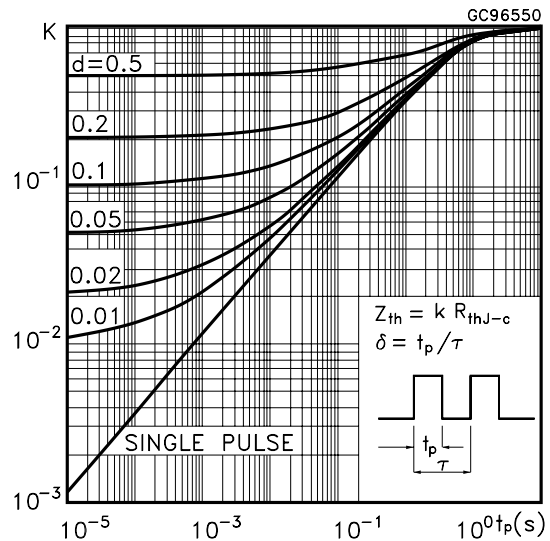


Figure 5: Output Characteristics

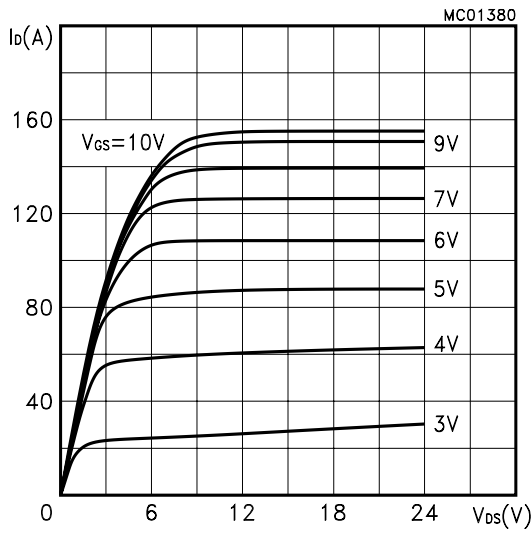


Figure 6: Transfer Characteristics

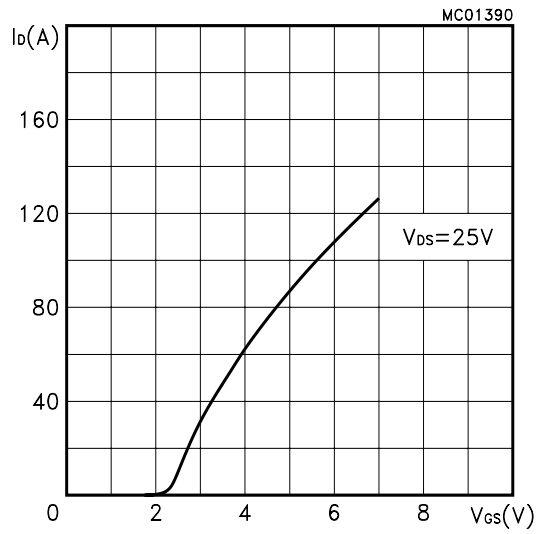


Figure 7: Transconductance

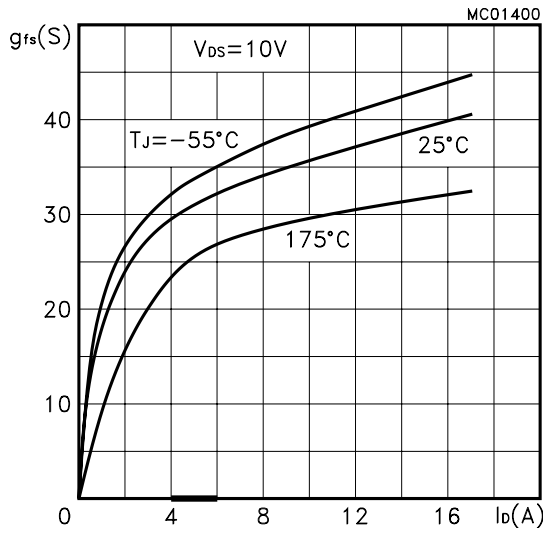


Figure 8: Static Drain-source On Resistance

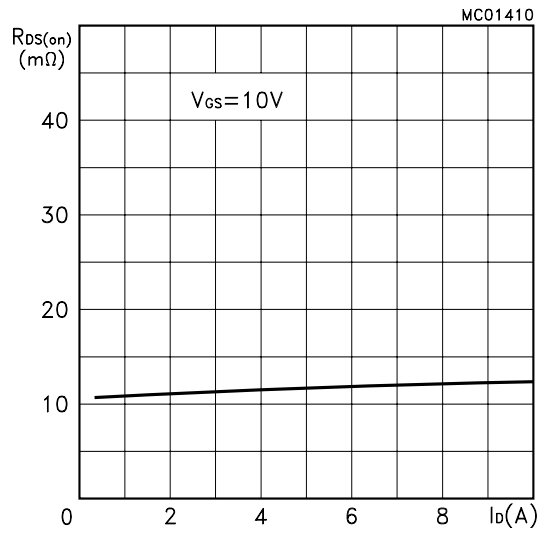


Figure 9: Gate Charge vs Gate-source Voltage

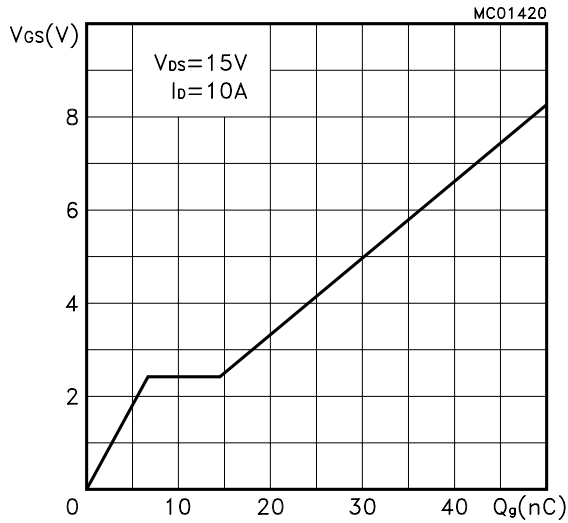


Figure 10: Capacitance Variations

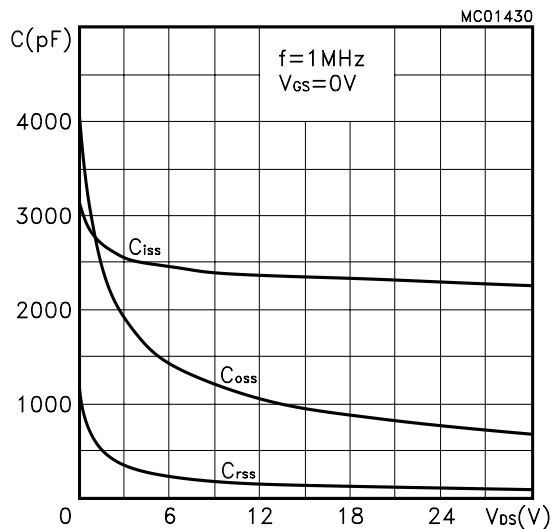


Figure 11: Normalized Gate Threshold Voltage vs Temperature

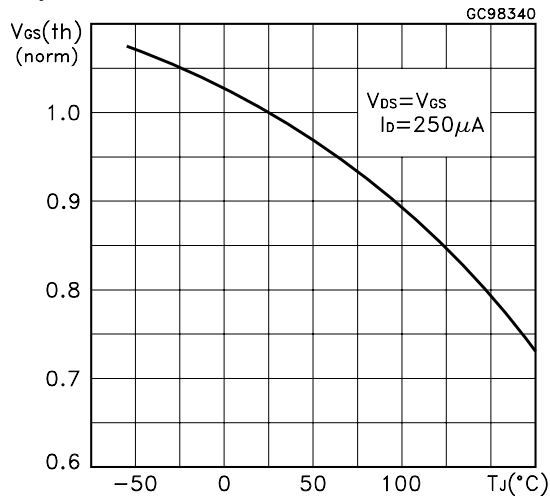


Figure 12: Normalized on Resistance vs Temperature

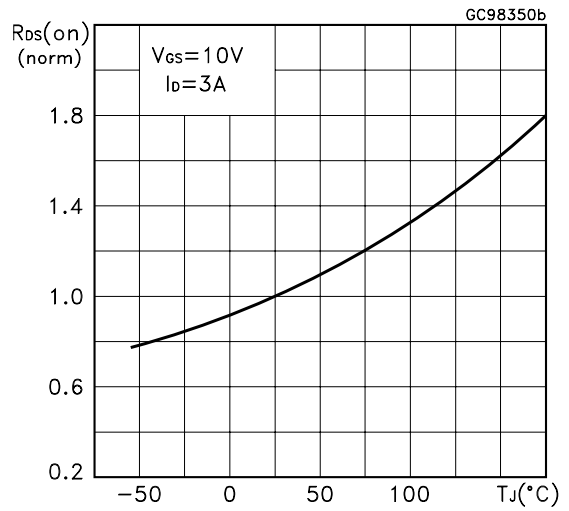


Figure 13: Source-drain Diode Forward Characteristics

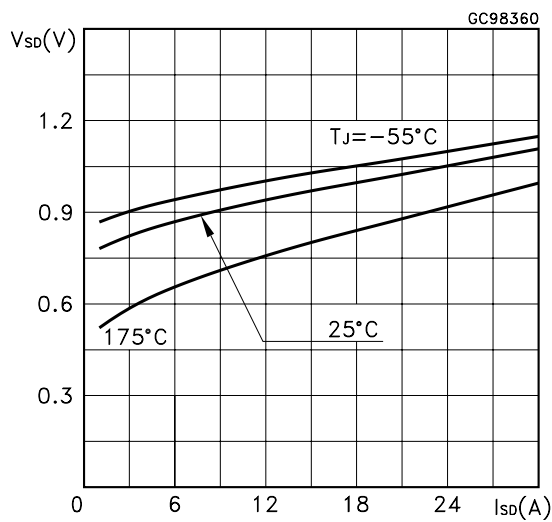


Figure 14: Normalized Breakdown Voltage vs Temperature.

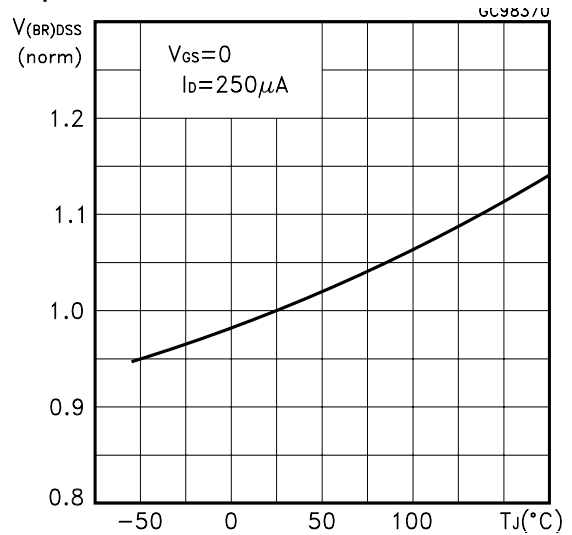


Fig. 15: Switching Times Test Circuits For Resistive Load

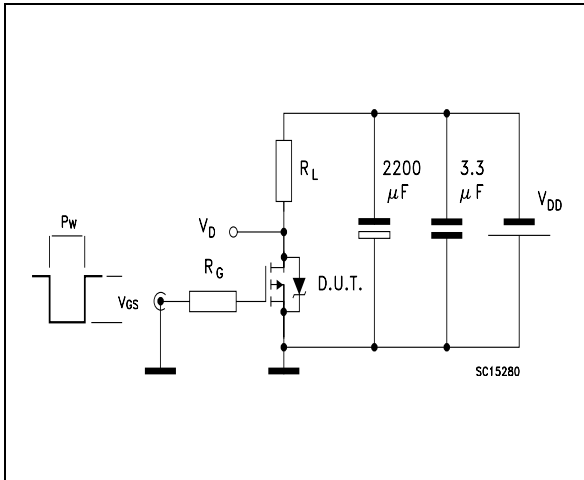


Fig. 16: Gate Charge test Circuit

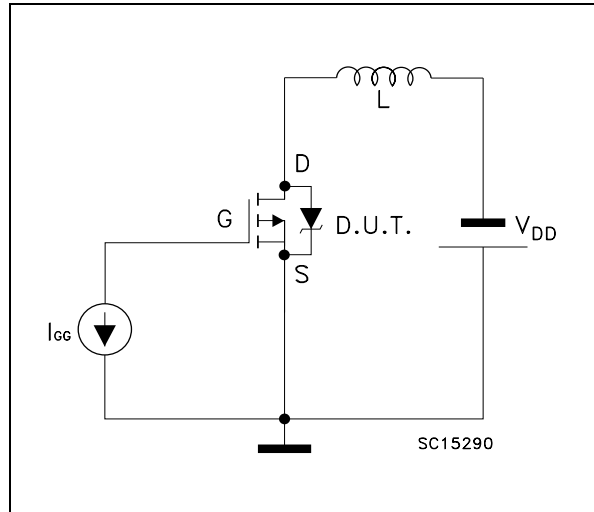
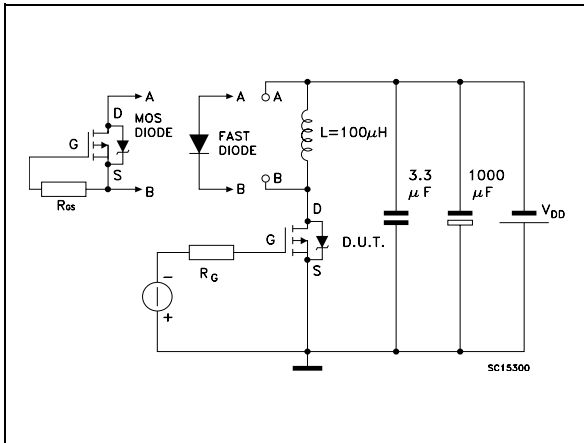
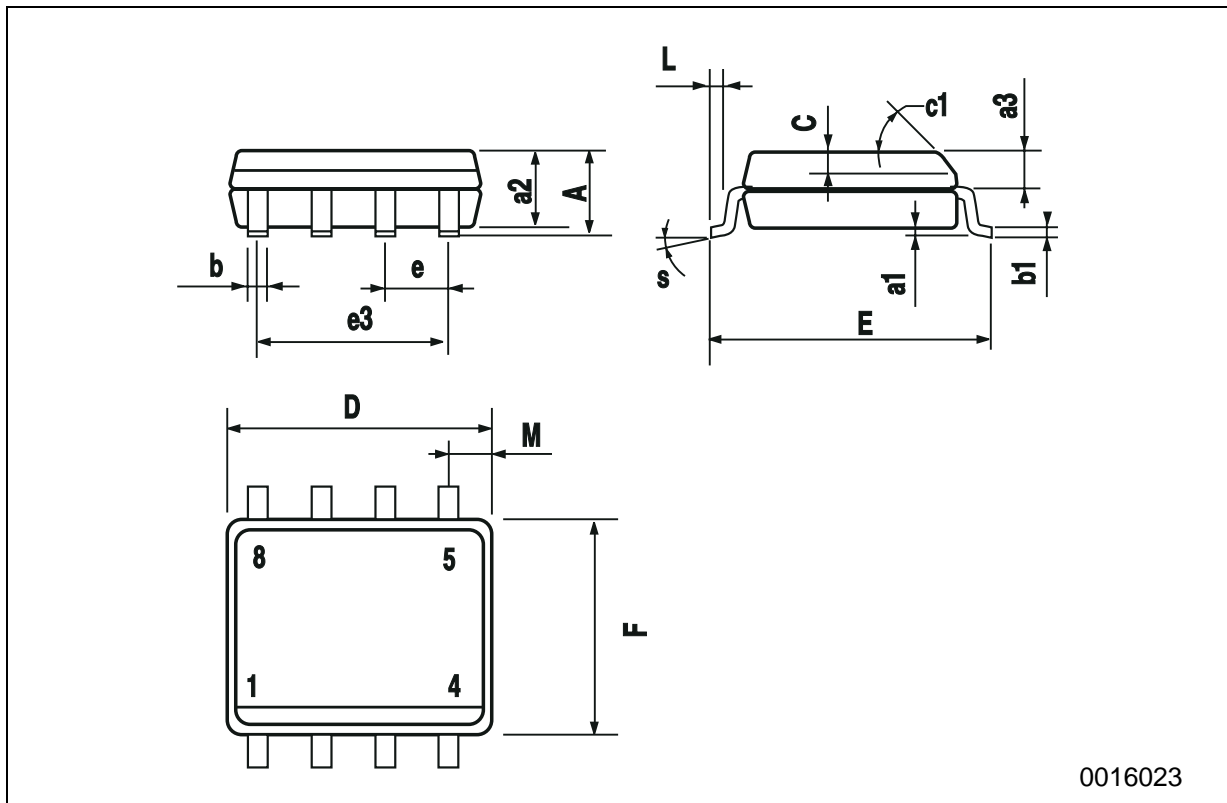


Fig. 17: Test Circuit For Diode Recovery Behaviour



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.) | | | | | |



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Table 11:Revision History

| Date | Revision | Description of Changes |
|----------|----------|------------------------|
| May 2005 | 2.0 | completed whit curves |

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