



Description

The HXY4P03SI uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

$V_{DS} = -30V$ $I_D = -5A$

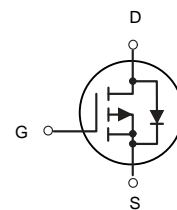
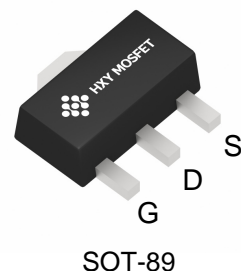
$R_{DS(ON)} < 55\text{ m}\Omega$ @ $V_{GS} = -10V$

Application

Battery protection

Load switch

Uninterruptible power supply



P-Channel MOSFET

Package Marking and Ordering Information

| Product ID | Pack | Marking | Qty(PCS) |
|------------|--------|---------|----------|
| HXY4P03SI | SOT-89 | 4P03 | 1000 |

Absolute Maximum Ratings ($T_C = 25^\circ\text{C}$ unless otherwise noted)

| Symbol | Parameter | Rating | Units |
|--------------------------------|--|--------------|--------------------|
| | | Steady State | |
| V_{DS} | Drain-Source Voltage | -30 | V |
| V_{GS} | Gate-Source Voltage | ± 12 | V |
| $I_D @ T_C = 25^\circ\text{C}$ | Continuous Drain Current, $V_{GS} @ -10V^1$ | -5 | A |
| I_{DM} | Pulsed Drain Current ² | -30 | A |
| $P_D @ T_C = 25^\circ\text{C}$ | Total Power Dissipation ⁴ | 1.2 | W |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ\text{C}$ |
| T_J | Operating Junction Temperature Range | -55 to 150 | $^\circ\text{C}$ |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient ¹ | 104 | $^\circ\text{C/W}$ |



Electrical Characteristics (TA=25°C unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|------------------------------------|---------------------|---|------|-----|------|------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} =0V I _D =-250μA | -30 | | - | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =-24V, V _{GS} =0V | - | - | -1 | μA |
| Gate-Body Leakage Current | I _{GSS} | V _{GS} =±12V, V _{DS} =0V | - | - | ±100 | nA |
| On Characteristics (Note 3) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =-250μA | -0.7 | -1 | -1.3 | V |
| Drain-Source On-State Resistance | R _{DS(ON)} | V _{GS} =-10V, I _D =-4.2A | - | 50 | 55 | mΩ |
| | | V _{GS} =-4.5V, I _D =-4A | - | 64 | 72 | mΩ |
| | | V _{GS} =-2.5V, I _D =-1A | | 95 | 120 | mΩ |
| Forward Transconductance | g _{FS} | V _{DS} =-5V, I _D =-4.2A | - | 10 | - | S |
| Dynamic Characteristics (Note4) | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =-15V, V _{GS} =0V, F=1.0MHz | - | 950 | - | PF |
| Output Capacitance | C _{oss} | | - | 115 | - | PF |
| Reverse Transfer Capacitance | C _{rss} | | - | 75 | - | PF |
| Switching Characteristics (Note 4) | | | | | | |
| Turn-on Delay Time | t _{d(on)} | V _{DD} =-15V, I _D =-3.2A V _{GS} =-10V, R _{GEN} =6Ω | - | 7 | - | nS |
| Turn-on Rise Time | t _r | | - | 3 | - | nS |
| Turn-Off Delay Time | t _{d(off)} | | - | 30 | - | nS |
| Turn-Off Fall Time | t _f | | - | 12 | - | nS |
| Total Gate Charge | Q _g | V _{DS} =-15V, I _D =-4A, V _{GS} =-4.5V | - | 9.5 | - | nC |
| Gate-Source Charge | Q _{gs} | | - | 2 | - | nC |
| Gate-Drain Charge | Q _{gd} | | - | 3 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage (Note 3) | V _{SD} | V _{GS} =0V, I _S =-1A | - | - | -1.2 | V |

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production



Typical Electrical And Thermal Characteristics

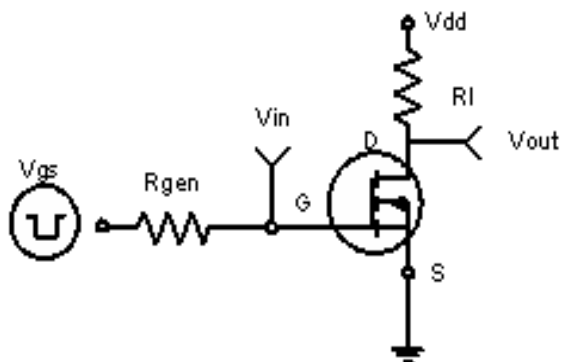


Figure 1: Switching Test Circuit

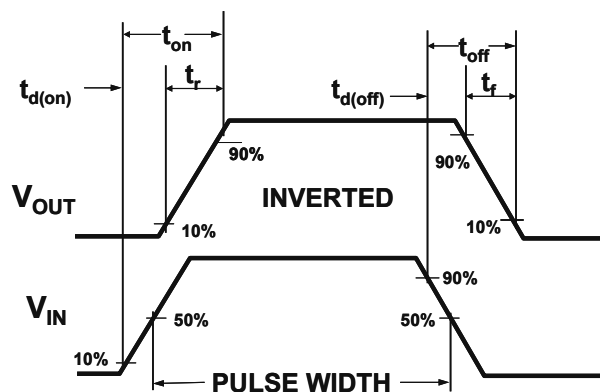


Figure 2: Switching Waveforms

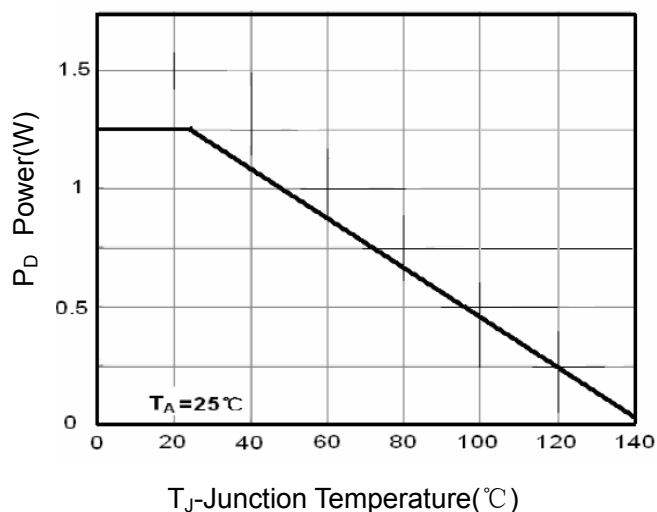


Figure 3 Power Dissipation

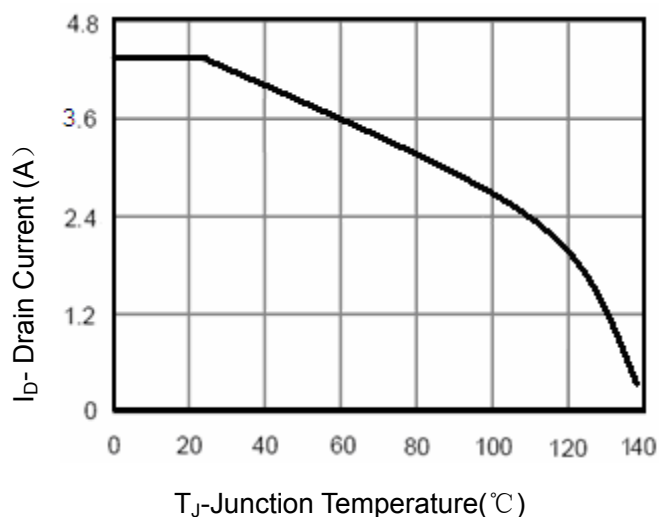


Figure 4 Drain Current

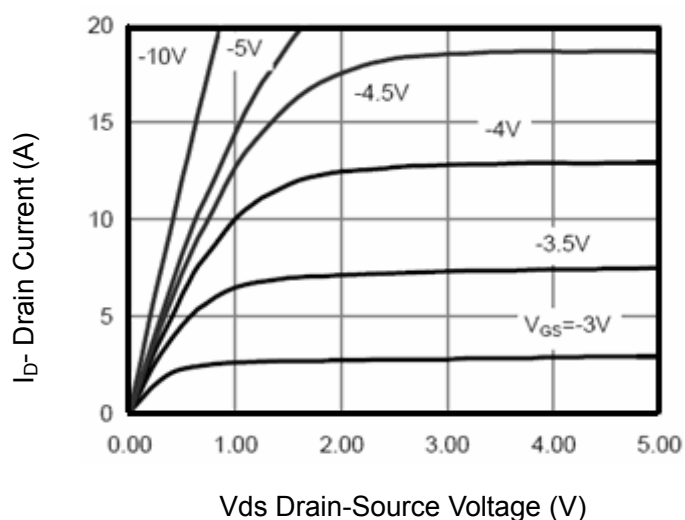


Figure 5 Output CHARACTERISTICS

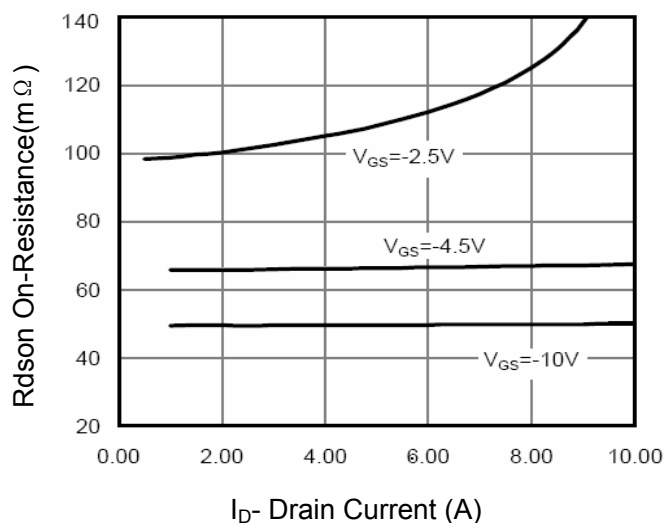


Figure 6 Drain-Source On-Resistance

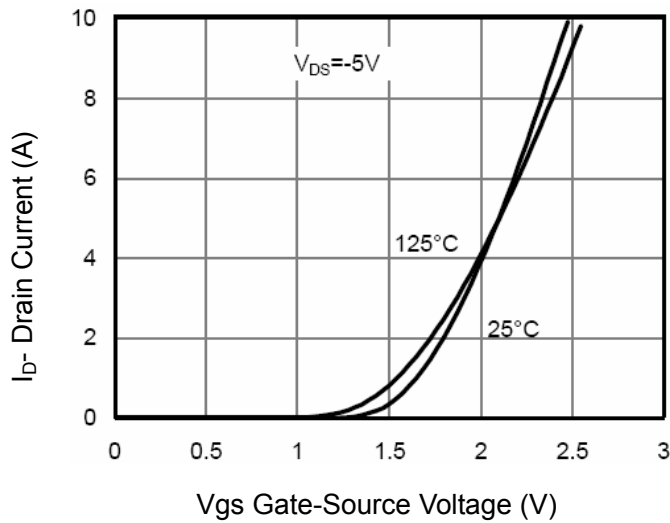


Figure 7 Transfer Characteristics

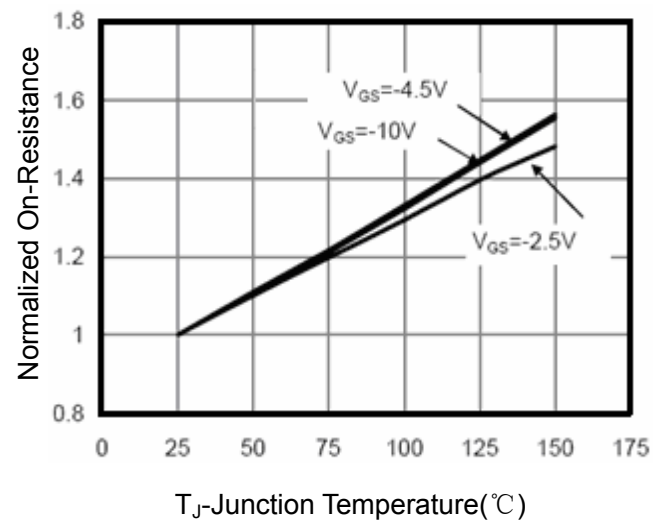


Figure 8 Drain-Source On-Resistance

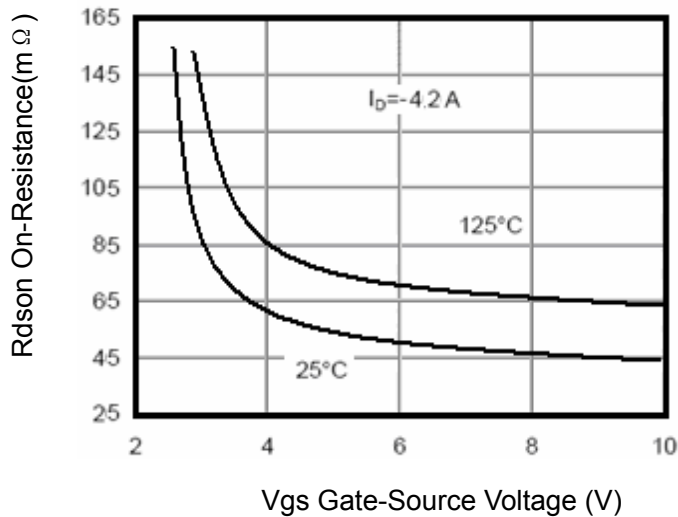


Figure 9 Rdson vs Vgs

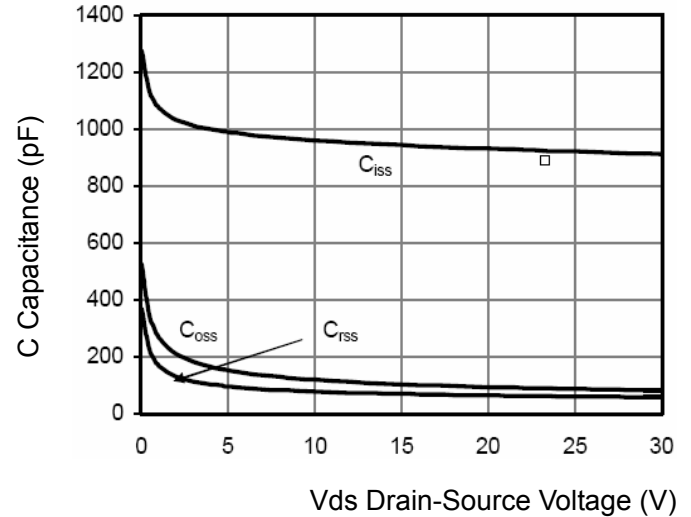


Figure 10 Capacitance vs Vds

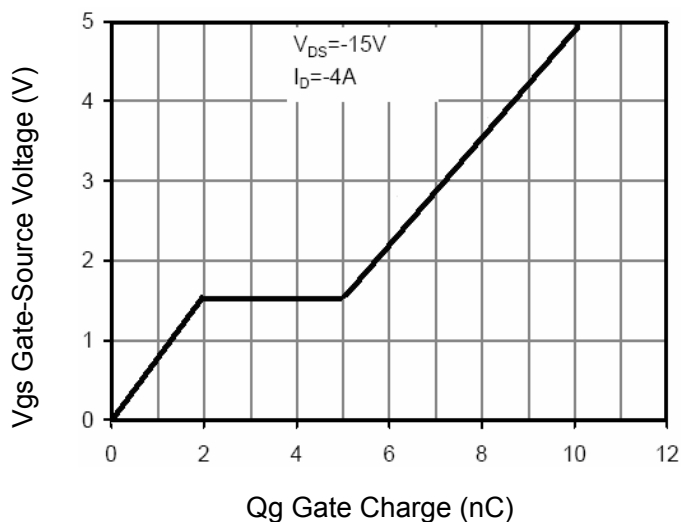


Figure 11 Gate Charge

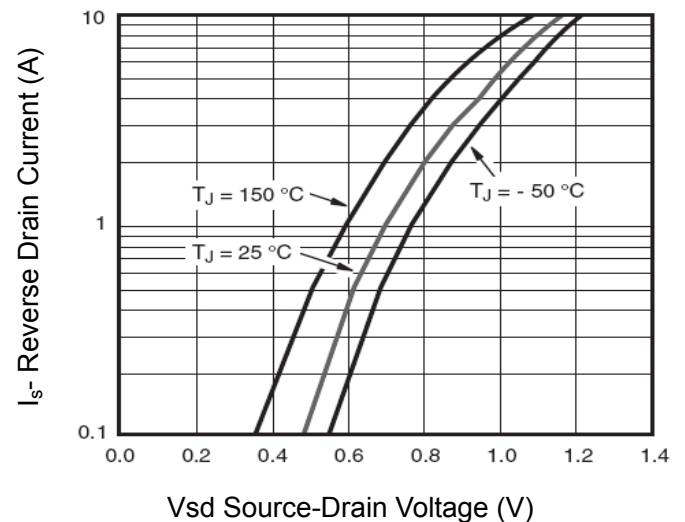


Figure 12 Source- Drain Diode Forward

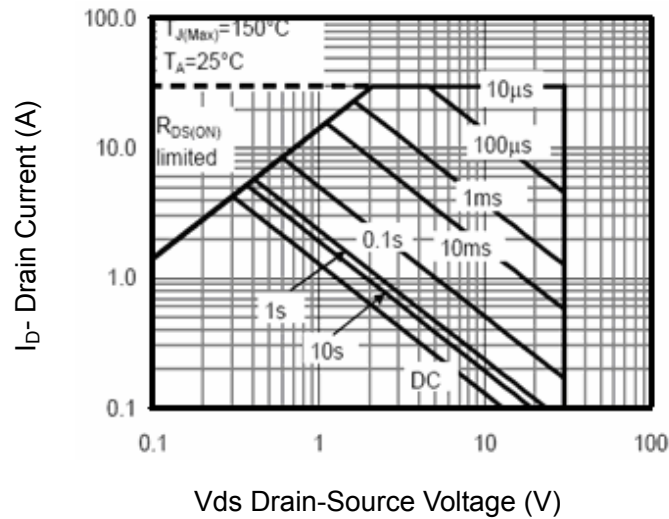


Figure 13 Safe Operation Area

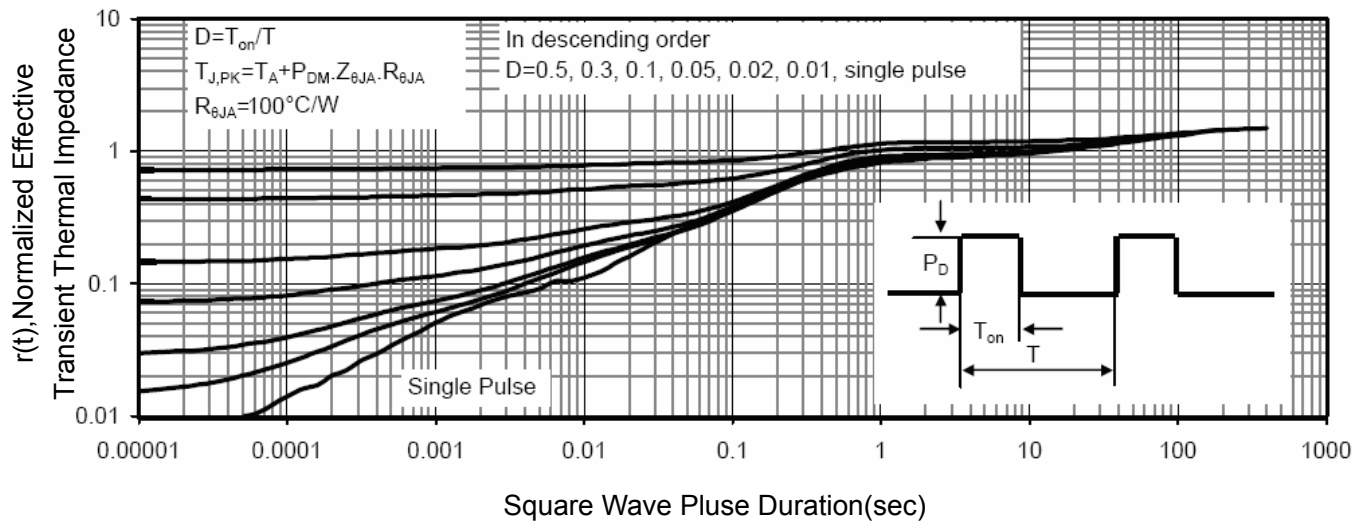
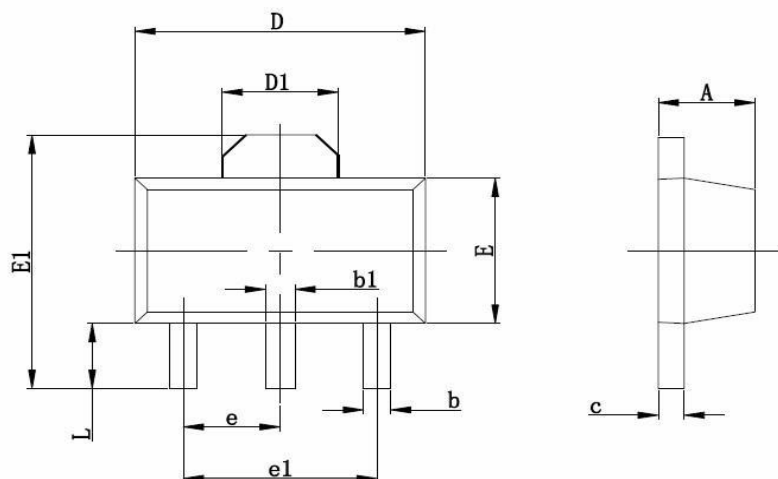


Figure 14 Normalized Maximum Transient Thermal Impedance



SOT-89 Package Outline Dimensions



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 1.400 | 1.600 | 0.055 | 0.063 |
| b | 0.350 | 0.520 | 0.013 | 0.197 |
| b1 | 0.400 | 0.580 | 0.016 | 0.023 |
| c | 0.350 | 0.440 | 0.014 | 0.017 |
| D | 4.400 | 4.600 | 0.173 | 0.181 |
| D1 | 1.550 REF | | 0.061 REF | |
| E | 2.350 | 2.550 | 0.091 | 0.102 |
| E1 | 3.940 | 4.250 | 0.155 | 0.167 |
| e | 1.500 TYP | | 0.060TYP | |
| e1 | 3.000 TYP | | 0.118TYP | |
| L | 0.900 | 1.100 | 0.035 | 0.047 |



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