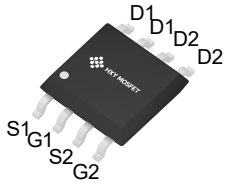
## Description

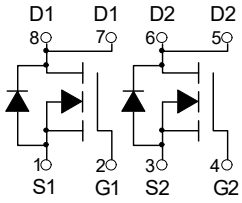
The SI4904DY-T1-E3 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.




SOP-8
(SOIC-8)

## General Features

$V_{DS}$ = 40V $I_D$ = 12A
$R_{DS(ON)}$ < 16mΩ @ $V_{GS}$=10 V
$R_{DS(ON)}$ < 24mΩ @ $V_{GS}$=4.5V




Dual N-Channel MOSFET

## Application

Battery protection

Load switch

Uninterruptible power supply

## Package Marking and Ordering Information

| Product ID | Pack | Brand | Qty(PCS) |
|---|---|---|---|
| SI4904DY-T1-E3 | SOP-8(SOIC-8) | HXY MOSFET | 3000 |

## Absolute Maximum Ratings@$T_j$=25°C(unless otherwise specified)

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 40 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$@$T_A$=25℃ | Drain Current, $V_{GS}$ @ 4.5V[3] | 12 | A |
| $I_D$@$T_A$=70℃ | Drain Current, $V_{GS}$ @ 4.5V[3] | 7 | A |
| $I_{DM}$ | Pulsed Drain Current[1] | 40 | A |
| $P_D$@$T_A$=25℃ | Total Power Dissipation | 2.9 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | ℃ |
| Rthj-a | Maximum Thermal Resistance, Junction-ambient[3] | 65 | ℃/W |

## Electrical Characteristics ($T_A$=25℃unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V $I_D$=250μA | 40 | - | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=40V,$V_{GS}$=0V | - | - | 1 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V,$V_{DS}$=0V | - | - | ±100 | nA |
| **On Characteristics** (Note 3) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$,$I_D$=250μA | 1 | 1.5 | 2.0 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=8A | - | 12.0 | 16 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=4A | - | 18.9 | 24 | mΩ |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$=5V,$I_D$=8A | 33 | - | - | S |
| **Dynamic Characteristics** (Note4) | | | | | | |
| Input Capacitance | $C_{lss}$ | $V_{DS}$=20V,$V_{GS}$=0V, F=1.0MHz | - | 964 | - | PF |
| Output Capacitance | $C_{oss}$ | | - | 109 | - | PF |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 96 | - | PF |
| **Switching Characteristics** (Note 4) | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$=20V, $R_L$=2.5Ω $V_{GS}$=10V,$R_{GEN}$=3Ω | - | 5.5 | - | nS |
| Turn-on Rise Time | $t_r$ | | - | 14 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 24 | - | nS |
| Turn-Off Fall Time | $t_f$ | | - | 12 | - | nS |
| Total Gate Charge | $Q_g$ | $V_{DS}$=20V,$I_D$=8A, $V_{GS}$=10V | - | 22.9 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 3.5 | - | nC |
| Gate-Drain Charge | $Q_{gd}$ | | - | 5.3 | - | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| Diode Forward Voltage (Note 3) | $V_{SD}$ | $V_{GS}$=0V,$I_S$=9A | - | 0.8 | 1.2 | V |

## Typical Electrical and Thermal Characteristics (Curves)

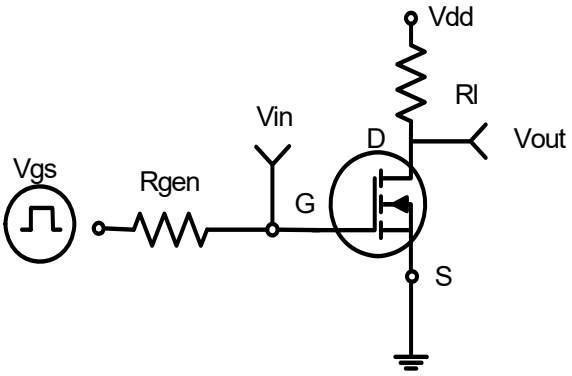



**Figure 1:Switching Test Circuit**

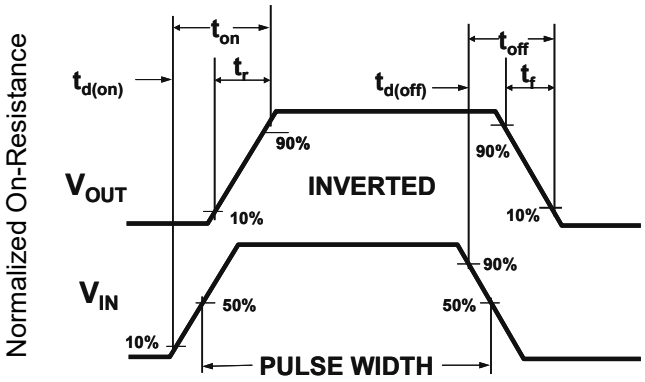



**Figure 2:Switching Waveforms**

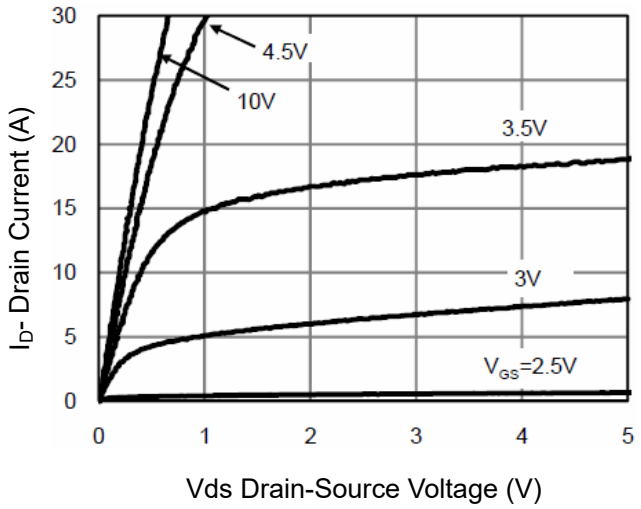



**Figure 3 Output Characteristics**

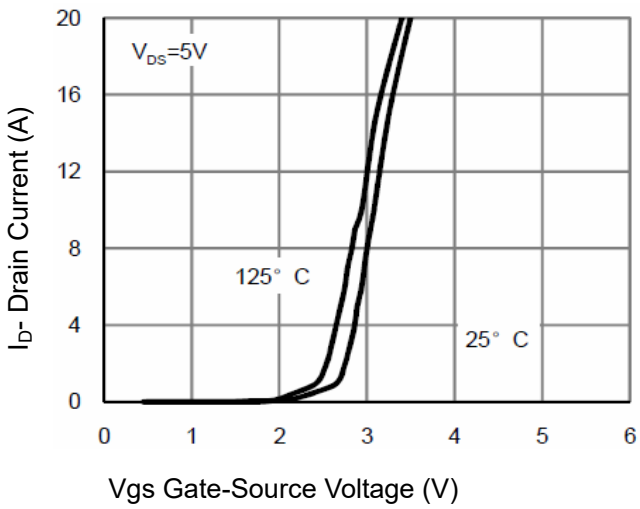



**Figure 4 Transfer Characteristics**

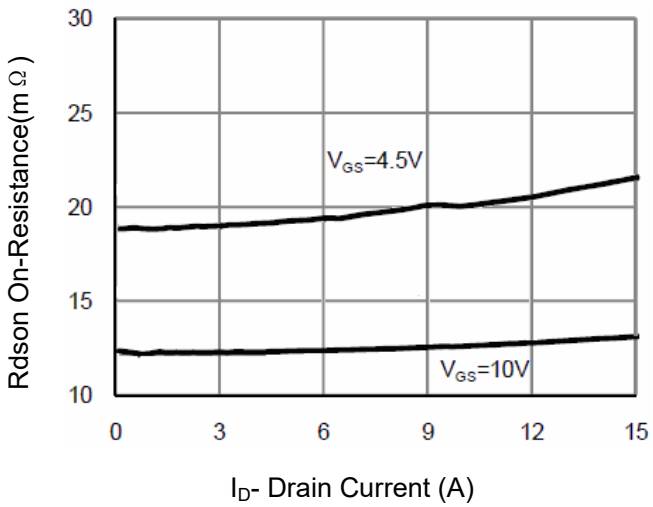



**Figure 5 Drain-Source On-Resistance**

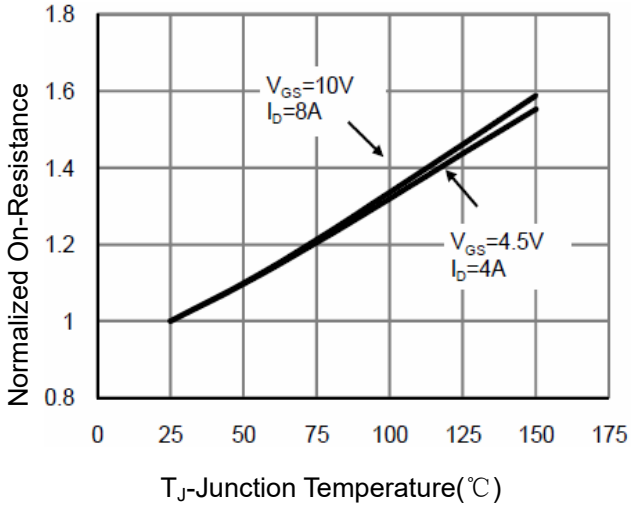



**Figure 6 Drain-Source On-Resistance**

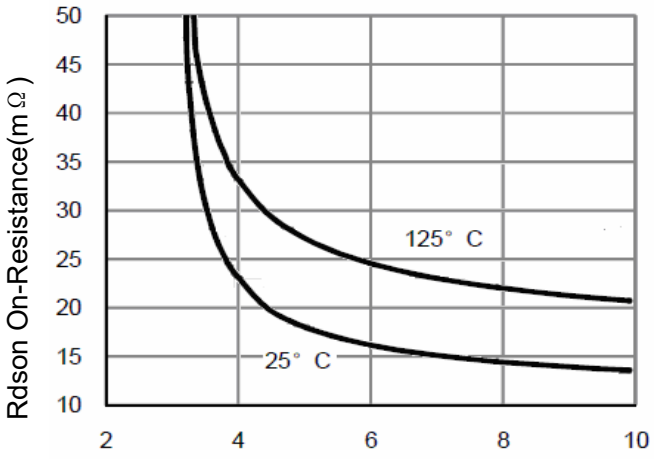



**Figure7 Rdson vs Vgs**

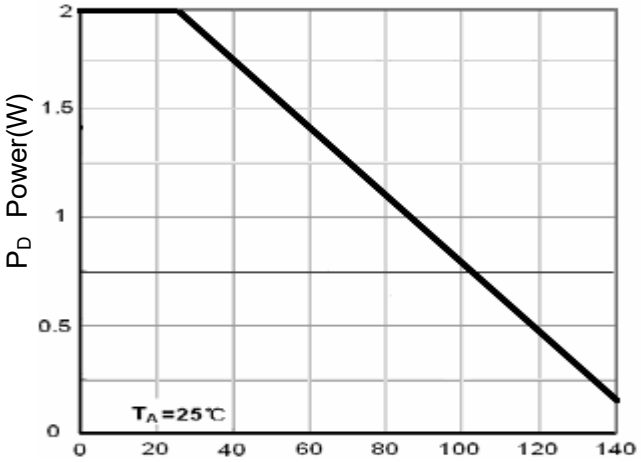



**Figure 8 Power Dissipation**

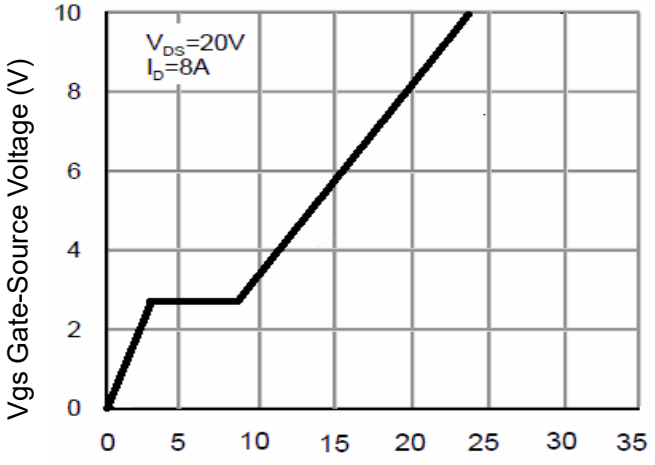



**Figure 9 Gate Charge**

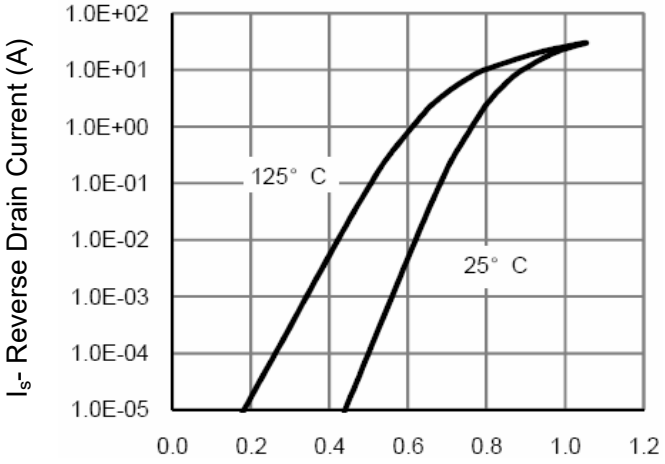



**Figure 10 Source- Drain Diode Forward**

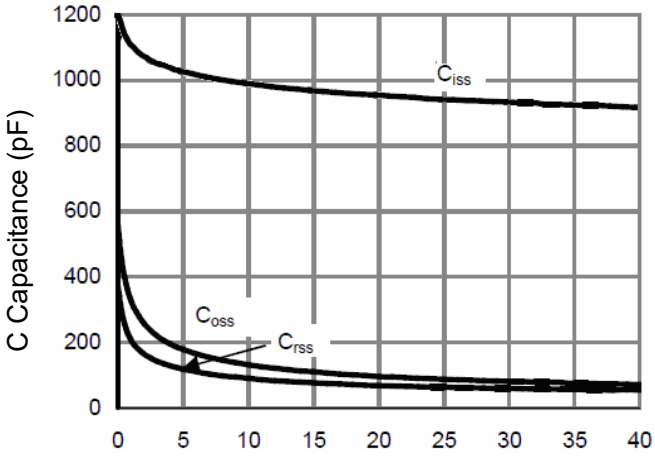



**Figure 11 Capacitance vs Vds**

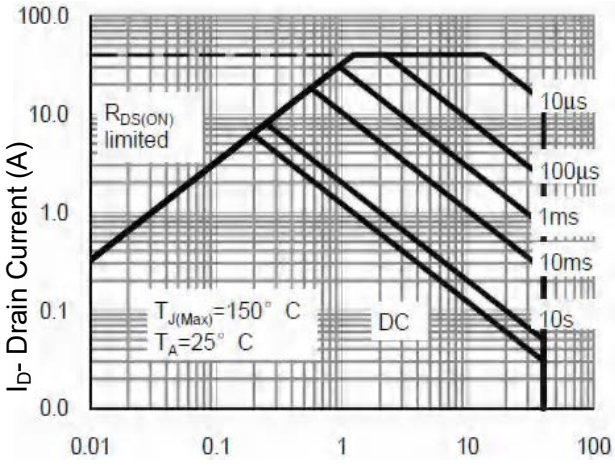
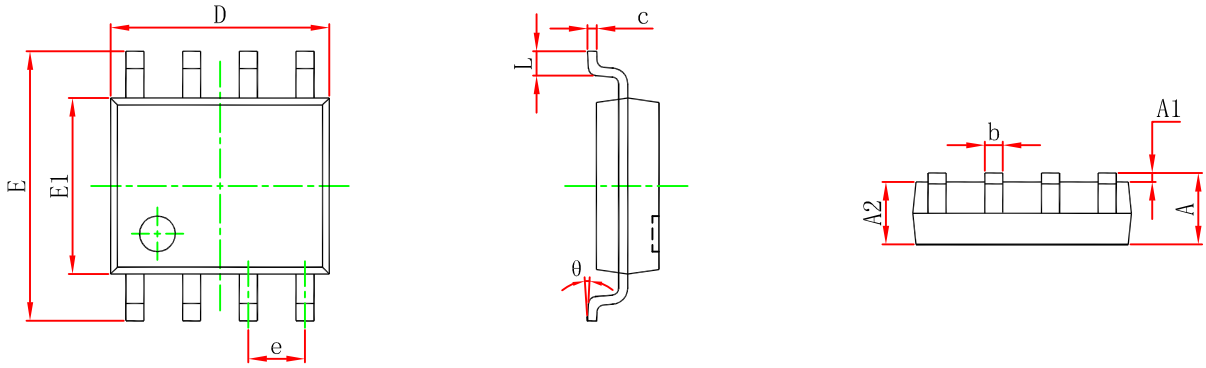
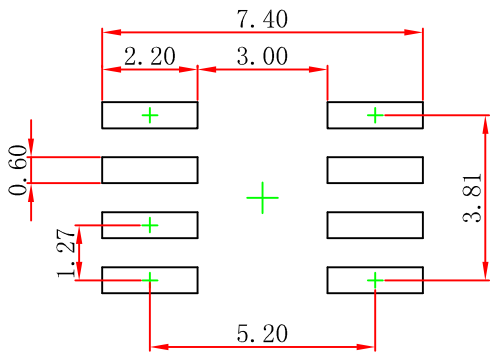



**Figure 12 Safe Operation Area**

## SOP-8(SOIC-8) Package Outline Dimensions




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | **Min** | **Max** | **Min** | **Max** |
| A | 1.350 | 1.750 | 0.053 | 0.069 |
| A1 | 0.100 | 0.250 | 0.004 | 0.010 |
| A2 | 1.350 | 1.550 | 0.053 | 0.061 |
| b | 0.330 | 0.510 | 0.013 | 0.020 |
| c | 0.170 | 0.250 | 0.007 | 0.010 |
| D | 4.800 | 5.000 | 0.189 | 0.197 |
| e | 1.270 (BSC) | | 0.050 (BSC) | |
| E | 5.800 | 6.200 | 0.228 | 0.244 |
| E1 | 3.800 | 4.000 | 0.150 | 0.157 |
| L | 0.400 | 1.270 | 0.016 | 0.050 |
| θ | 0° | 8° | 0° | 8° |




Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.

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