



## Description

The HSI4925DDYT1GE3 uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in a wide variety of applications.

## General Features

$V_{DS} = -30V, I_D = -8.5A$

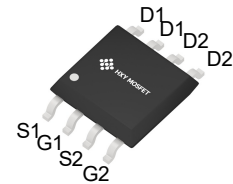
$R_{DS(ON)} < 18m @ V_{GS} = -10V$

$R_{DS(ON)} < 28m @ V_{GS} = -4.5V$

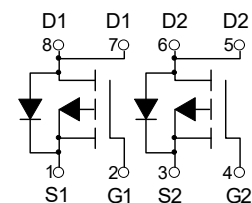
## Application

PWM application

Load switch



SOP-8  
(SO-8)



Dual P-Channel MOSFET

## Package Marking and Ordering Information

| Product ID      | Pack        | Brand      | Qty(PCS) |
|-----------------|-------------|------------|----------|
| HSI4925DDYT1GE3 | SOP-8(SO-8) | HXY MOSFET | 3000     |

## Absolute Maximum Ratings ( $T_A = 25^\circ C$ unless otherwise noted)

| Symbol          | Parameter                                        | Limit      | Unit         |
|-----------------|--------------------------------------------------|------------|--------------|
| $V_{DS}$        | Drain-Source Voltage                             | -30        | V            |
| $V_{GS}$        | Gate-Source Voltage                              | $\pm 20$   | V            |
| $I_D$           | Drain Current-Continuous                         | -8.5       | A            |
| $I_{DM}$        | Drain Current-Pulsed (Note 1)                    | -26        | A            |
| $P_D$           | Maximum Power Dissipation                        | 1.5        | W            |
| $T_J, T_{STG}$  | Operating Junction and Storage Temperature Range | -55 To 150 | $^\circ C$   |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient (Note 2) | 85         | $^\circ C/W$ |



### Electrical Characteristics (T<sub>J</sub>=25°C, unless otherwise noted)

| Symbol                              | Parameter                                      | Conditions                                                                              | Min. | Typ.   | Max. | Unit  |
|-------------------------------------|------------------------------------------------|-----------------------------------------------------------------------------------------|------|--------|------|-------|
| BV <sub>DSS</sub>                   | Drain-Source Breakdown Voltage                 | V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA                                             | -30  | ---    | ---  | V     |
| ΔBV <sub>DSS</sub> /ΔT <sub>J</sub> | BV <sub>DSS</sub> Temperature Coefficient      | Reference to 25°C, I <sub>D</sub> =-1mA                                                 | ---  | -0.022 | ---  | V/°C  |
| R <sub>DS(ON)</sub>                 | Static Drain-Source On-Resistance <sup>2</sup> | V <sub>GS</sub> =-10V, I <sub>D</sub> =-6A                                              | ---  | 14     | 18   | mΩ    |
|                                     |                                                | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-4A                                             | ---  | 22     | 28   |       |
| V <sub>GS(th)</sub>                 | Gate Threshold Voltage                         | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =-250uA                               | -1.0 | ---    | -2.5 | V     |
| ΔV <sub>GS(th)</sub>                | V <sub>GS(th)</sub> Temperature Coefficient    |                                                                                         | ---  | 4.6    | ---  | mV/°C |
| I <sub>DSS</sub>                    | Drain-Source Leakage Current                   | V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C                        | ---  | ---    | -1   | uA    |
|                                     |                                                | V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C                        | ---  | ---    | -5   |       |
| I <sub>GSS</sub>                    | Gate-Source Leakage Current                    | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                              | ---  | ---    | ±100 | nA    |
| g <sub>fs</sub>                     | Forward Transconductance                       | V <sub>DS</sub> =-5V, I <sub>D</sub> =-6A                                               | ---  | 17     | ---  | S     |
| R <sub>g</sub>                      | Gate Resistance                                | V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz                                        | ---  | 13     | ---  | Ω     |
| Q <sub>g</sub>                      | Total Gate Charge (-4.5V)                      | V <sub>DS</sub> =-15V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-6A                      | ---  | 12.6   | ---  | nC    |
| Q <sub>gs</sub>                     | Gate-Source Charge                             |                                                                                         | ---  | 4.8    | ---  |       |
| Q <sub>gd</sub>                     | Gate-Drain Charge                              |                                                                                         | ---  | 4.8    | ---  |       |
| T <sub>d(on)</sub>                  | Turn-On Delay Time                             | V <sub>DD</sub> =-15V, V <sub>GS</sub> =-10V, R <sub>G</sub> =3.3Ω, I <sub>D</sub> =-6A | ---  | 4.6    | ---  | ns    |
| T <sub>r</sub>                      | Rise Time                                      |                                                                                         | ---  | 14.8   | ---  |       |
| T <sub>d(off)</sub>                 | Turn-Off Delay Time                            |                                                                                         | ---  | 41     | ---  |       |
| T <sub>f</sub>                      | Fall Time                                      |                                                                                         | ---  | 19.6   | ---  |       |
| C <sub>iss</sub>                    | Input Capacitance                              | V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, f=1MHz                                      | ---  | 1345   | ---  | pF    |
| C <sub>oss</sub>                    | Output Capacitance                             |                                                                                         | ---  | 194    | ---  |       |
| C <sub>rss</sub>                    | Reverse Transfer Capacitance                   |                                                                                         | ---  | 158    | ---  |       |

### Diode Characteristics

| Symbol          | Parameter                                | Conditions                                                     | Min. | Typ. | Max. | Unit |
|-----------------|------------------------------------------|----------------------------------------------------------------|------|------|------|------|
| I <sub>S</sub>  | Continuous Source Current <sup>1,5</sup> | V <sub>G</sub> =V <sub>D</sub> =0V, Force Current              | ---  | ---  | -6.5 | A    |
| I <sub>SM</sub> | Pulsed Source Current <sup>2,5</sup>     |                                                                | ---  | ---  | -26  | A    |
| V <sub>SD</sub> | Diode Forward Voltage <sup>2</sup>       | V <sub>GS</sub> =0V, I <sub>S</sub> =-1A, T <sub>J</sub> =25°C | ---  | ---  | -1.2 | V    |
| t <sub>rr</sub> | Reverse Recovery Time                    | I <sub>F</sub> =-6A, dI/dt=100A/μs, T <sub>J</sub> =25°C       | ---  | 16.3 | ---  | nS   |
| Q <sub>rr</sub> | Reverse Recovery Charge                  |                                                                | ---  | 5.9  | ---  | nC   |

Note :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 20Z copper.
- 2.The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- 3.The EAS data shows Max. rating. The test condition is V<sub>DD</sub>=-25V, V<sub>GS</sub>=-10V, L=0.1mH, I<sub>AS</sub>=-38A
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub>, in real applications, should be limited by total power dissipation.



## Typical Characteristics

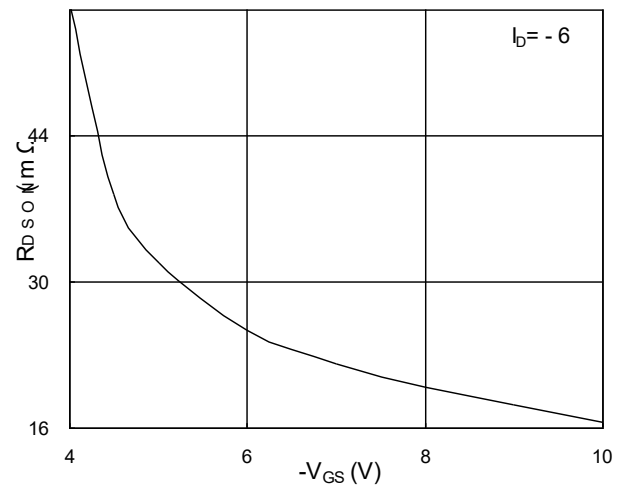
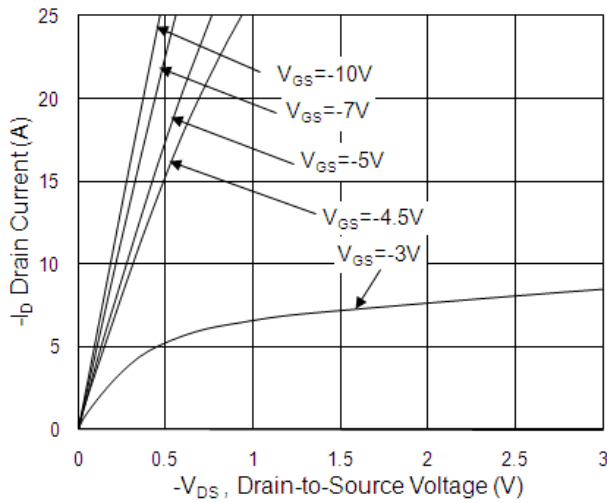


Fig.1 Typical Output Characteristics

Fig.2 On-Resistance v.s Gate-Source

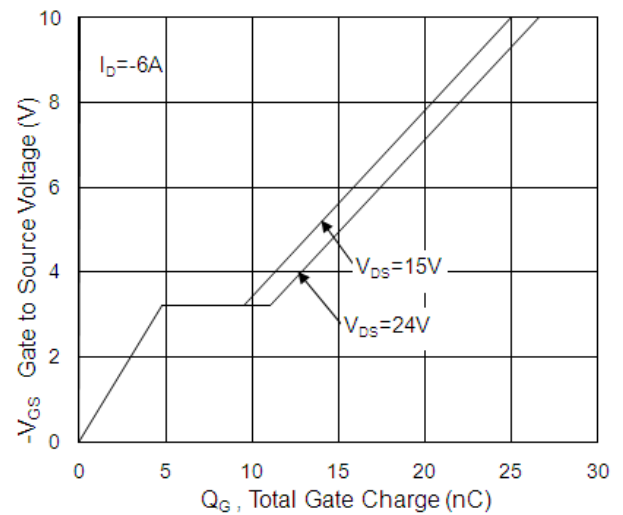
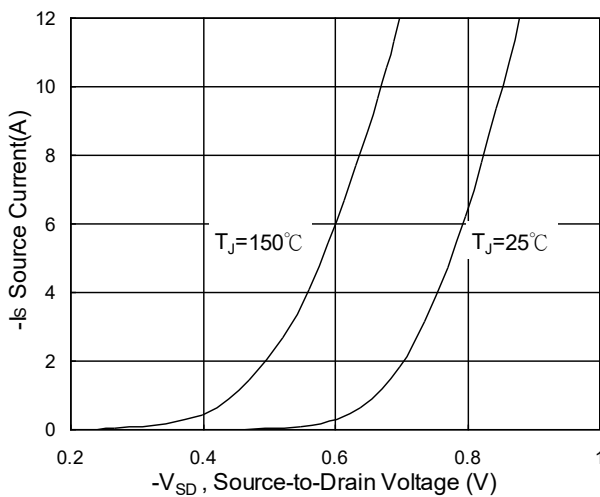


Fig.3 Forward Characteristics of Reverse

Fig.4 Gate-Charge Characteristics

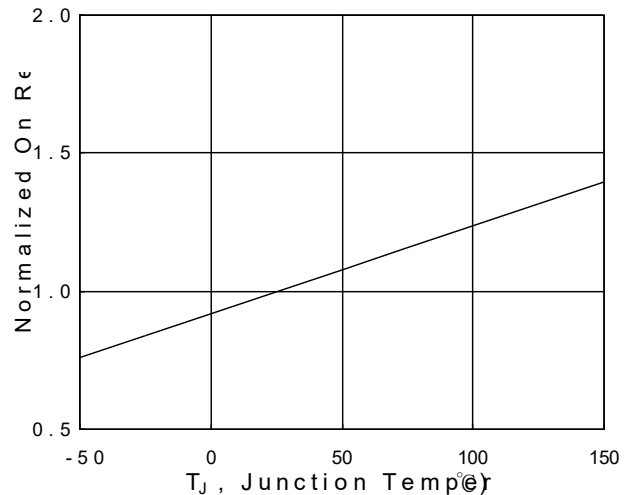
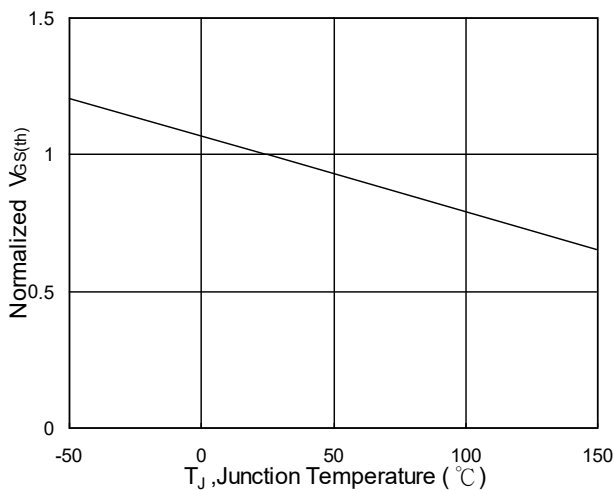


Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$

Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$

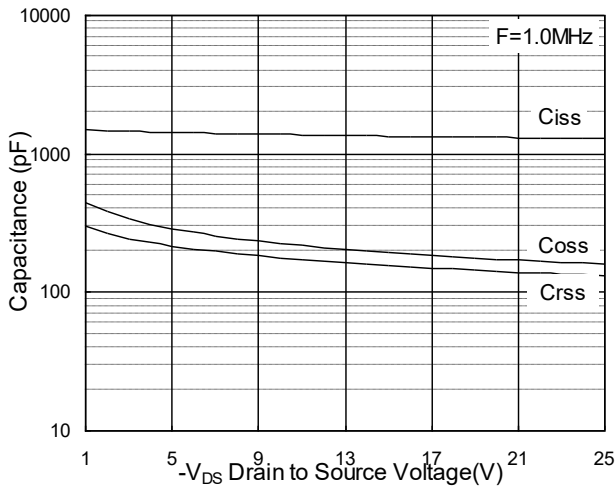


Fig.7 Capacitance

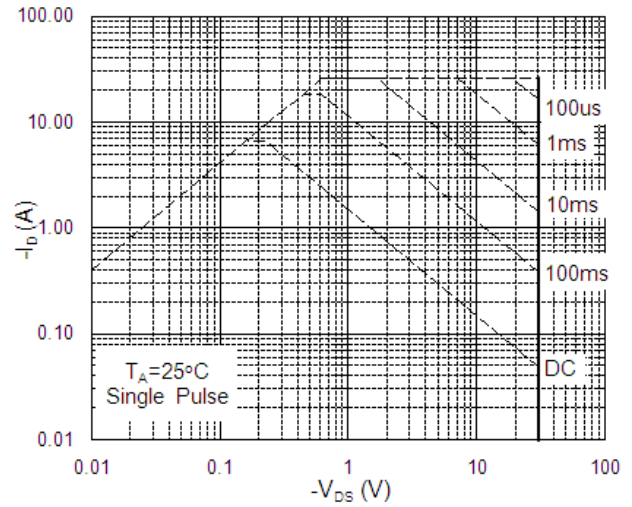


Fig.8 Safe Operating Area

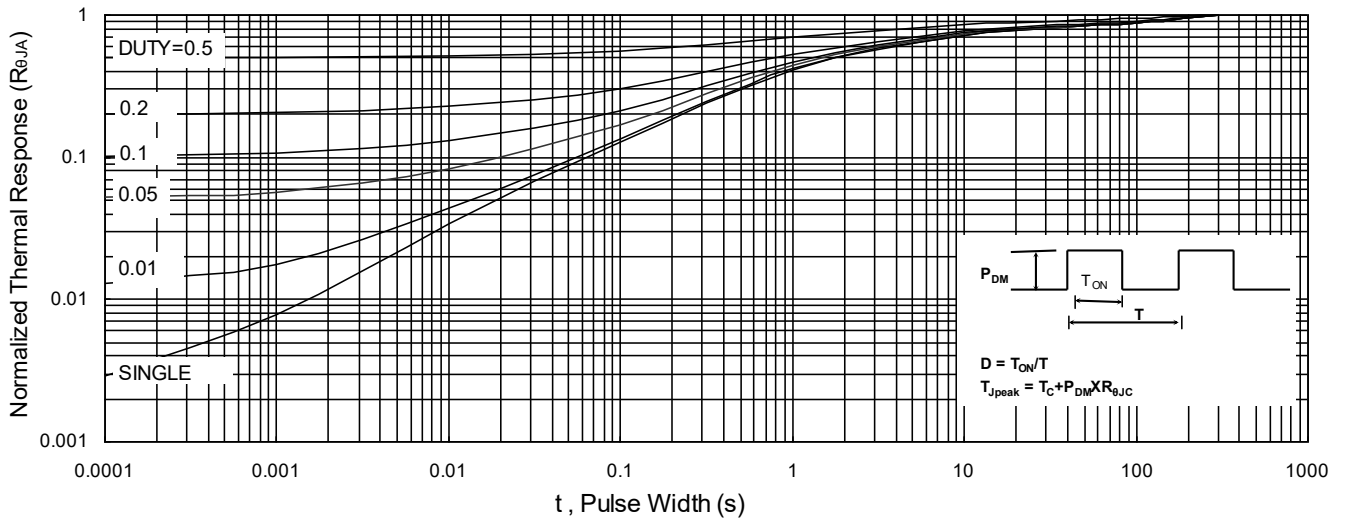


Fig.9 Normalized Maximum Transient Thermal Impedance

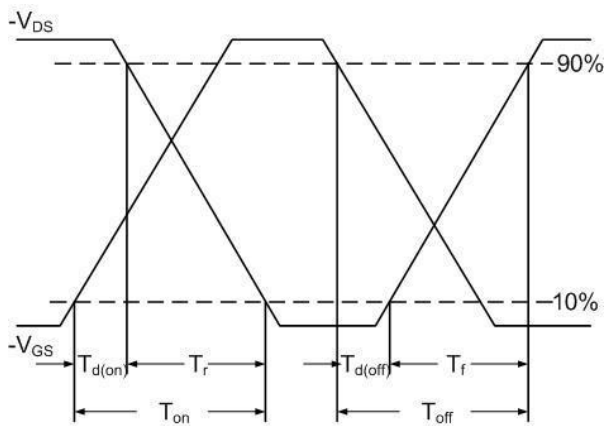


Fig.10 Switching Time Waveform

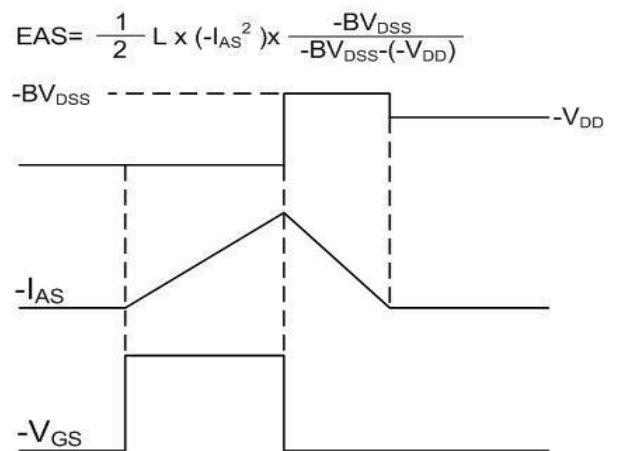
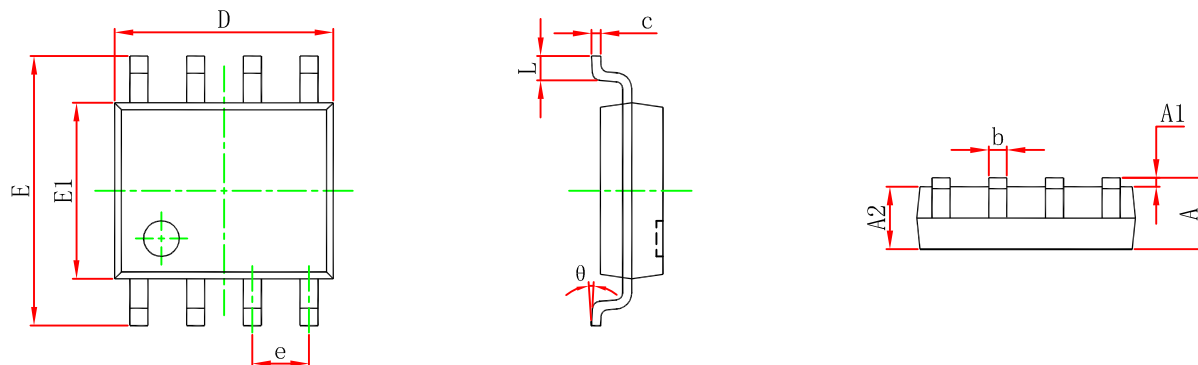


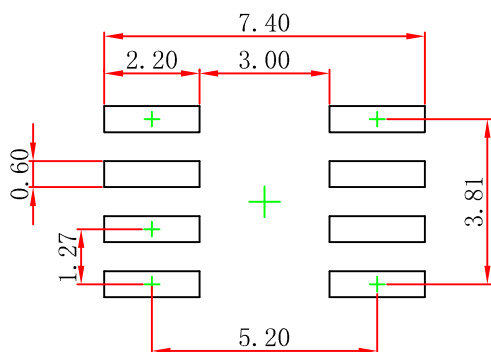
Fig.11 Unclamped Inductive Switching Waveform



## SOP-8(SO-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:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.



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