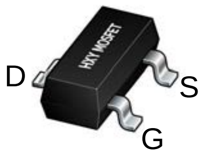
## Description

The HSI2333CDST1GE3 uses advanced trench technology to provide excellent $R_{DS(ON)}$, This device is suitable for use as a load switch or in PWM applications.



**SOT-23**

## General Features

$V_{DS}$ = -20V,$I_D$ = -6.5A

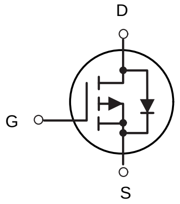
$R_{DS(ON)}$ < 28mΩ @ $V_{GS}$=-4.5V

## Application

Battery protection

Load switch

Uninterruptible power supply



P-Channel MOSFET

## Package Marking and Ordering Information

| Product ID | Pack | Marking | Qty(PCS) |
|---|---|---|---|
| HSI2333CDST1GE3 | SOT-23 | 20P07 | 3000 |

## Absolute Maximum Ratings (TA=25℃unless otherwise noted)

| Symbol | Parameter | Limit | Unit |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | -20 | V |
| $V_{GS}$ | Gate-Source Voltage | ±12 | V |
| $I_D$ | Drain Current-Continuous | -6.5 | A |
| $I_{DM}$ | Drain Current-Pulsed (Note 1) | -15 | A |
| $P_D$ | Maximum Power Dissipation | 2 | W |
| $T_J$,$T_{STG}$ | Operating Junction and Storage Temperature Range | -55 To 150 | ℃ |
| $R_{\theta JA}$ | Thermal Resistance,Junction-to-Ambient (Note 2) | 74 | ℃/W |

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

| | | | | | | |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V $I_D$=-250μA | - | -20 | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=-20V,$V_{GS}$=0V | - | - | -1 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$=±8V,$V_{DS}$=0V | - | - | ±100 | nA |
| **On Characteristics** (Note 3) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$,$I_D$=-250μA | -0.45 | -0.7 | -1.0 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}$=-4.5V, $I_D$=-4.1A | - | 20 | 28 | mΩ |
| | | $V_{GS}$=-2.5V, $I_D$=-3A | - | 27 | 36 | |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$=-5V,$I_D$=-3.5A | - | 8.5 | - | S |
| **Dynamic Characteristics** (Note4) | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=-4V,$V_{GS}$=0V,<br>F=1.0MHz | - | 980 | - | PF |
| Output Capacitance | $C_{oss}$ | | - | 450 | - | PF |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 250 | - | PF |
| **Switching Characteristics** (Note 4) | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$=-4V,$I_D$=-3.3A ,<br>$R_L$=-1.2Ω,$V_{GEN}$=-4.5V,$R_g$=1Ω | - | 12 | - | nS |
| Turn-on Rise Time | $t_r$ | | - | 35 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 30 | - | nS |
| Turn-Off Fall Time | $t_f$ | | - | 10 | - | nS |
| Total Gate Charge | $Q_g$ | $V_{DS}$=-4V,$I_D$=-4.1A,$V_{GS}$=-4.5V | - | 7.8 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 1.2 | - | nC |
| Gate-Drain Charge | $Q_{gd}$ | | - | 1.6 | - | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| Diode Forward Voltage (Note 3) | $V_{SD}$ | $V_{GS}$=0V,$I_S$=-1.6A | - | - | -1.2 | V |
| Diode Forward Current (Note 2) | $I_S$ | | - | - | 1.6 | A |

## Notes:

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

## Typical Characteristics

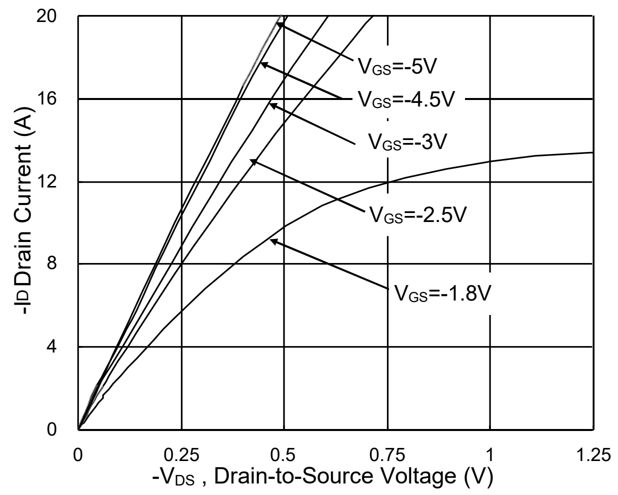


**Fig.1 Typical Output Characteristics**

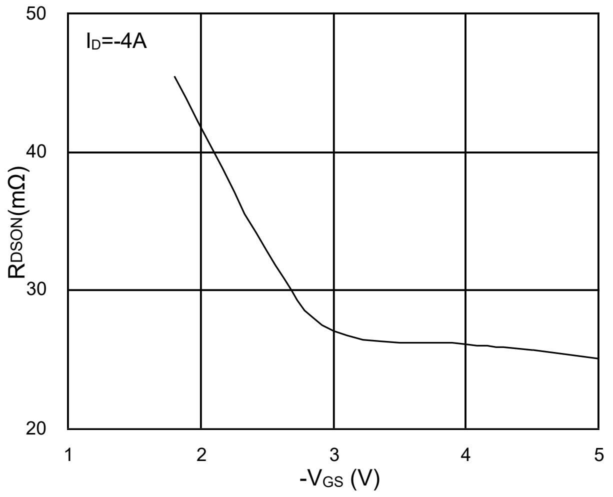


**Fig.2 On-Resistance vs. Gate-Source**

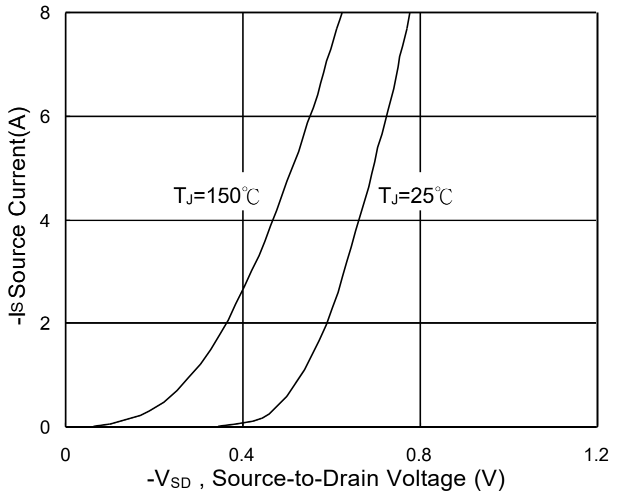


**Fig.3 Forward Characteristics Of Reverse**

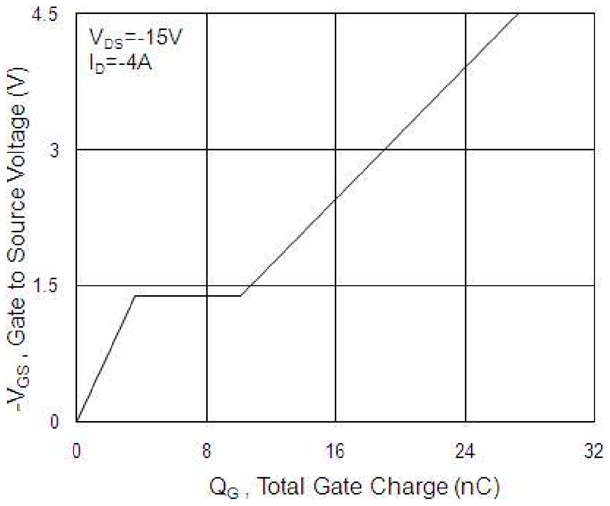


**Fig.4 Gate-Charge Characteristics**

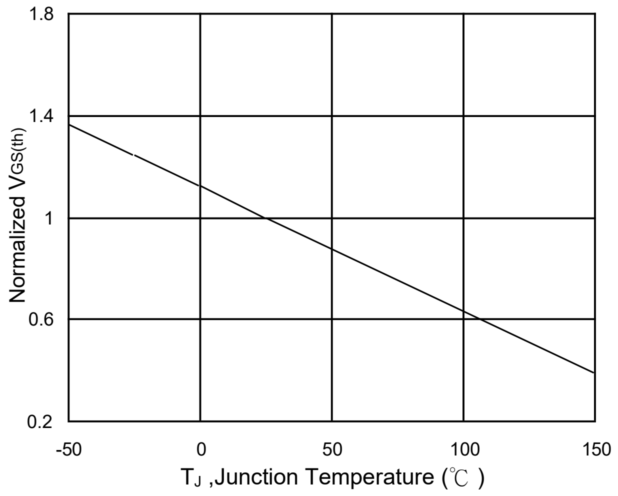


**Fig.5 Normalized $V_{GS(th)}$ vs. $T_J$**

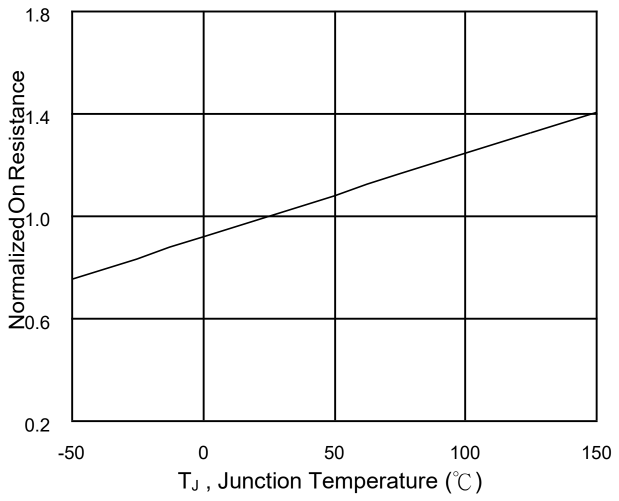


**Fig.6 Normalized $R_{DSON}$ vs. $T_J$**

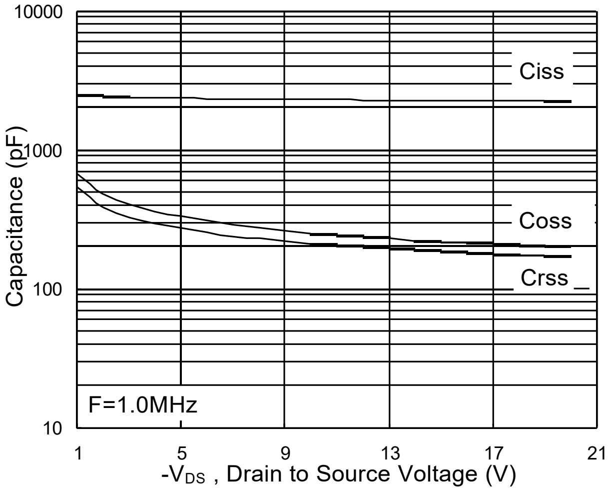


**Fig.7 Capacitance**

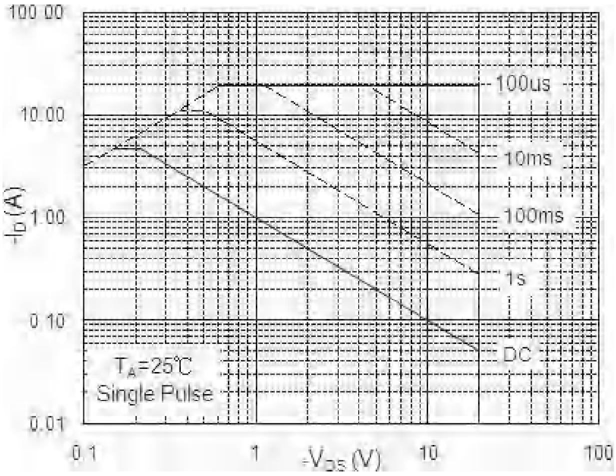


**Fig.8 Safe Operating Area**

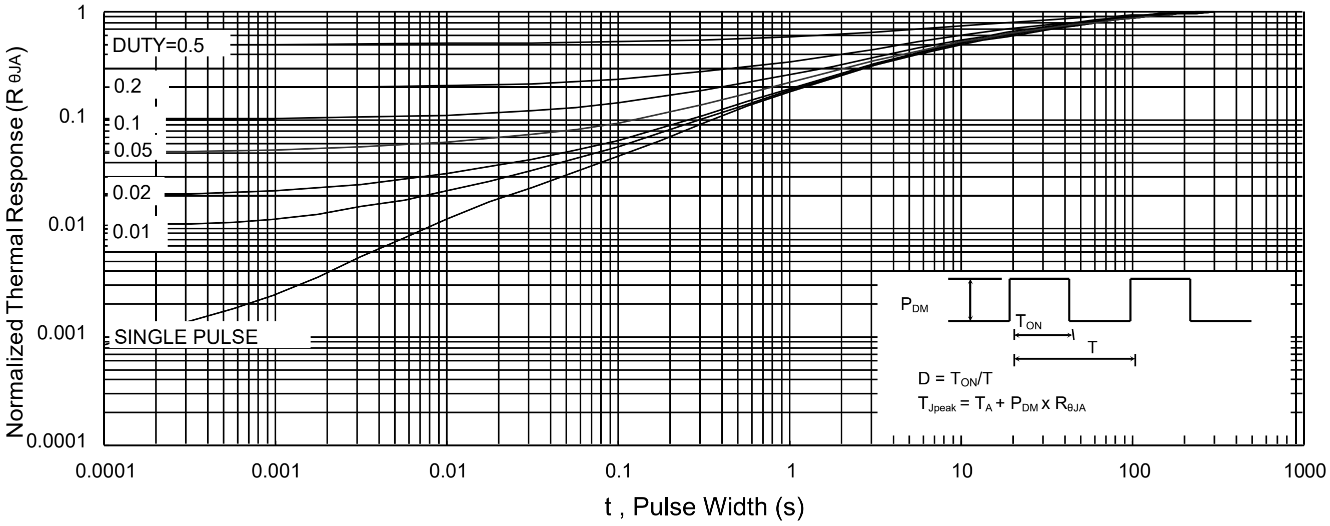


**Fig.9 Normalized Maximum Transient Thermal Impedance**

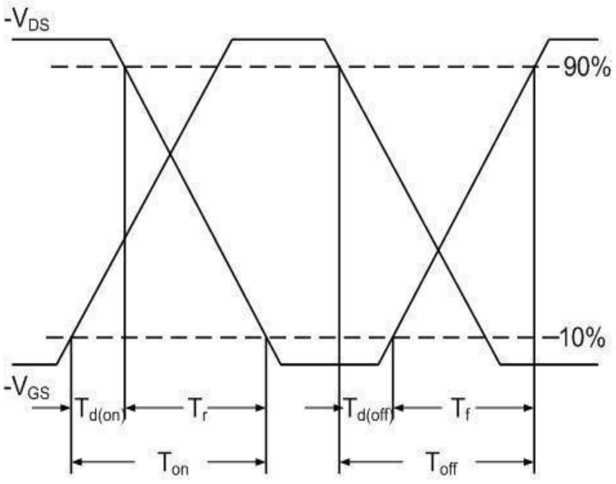


**Fig.10 Switching Time Waveform**

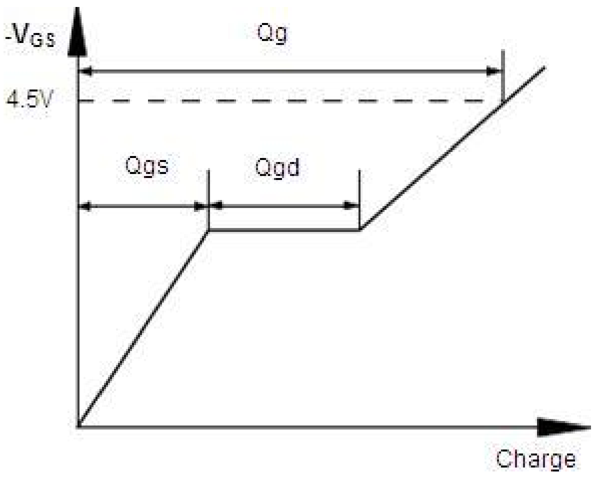
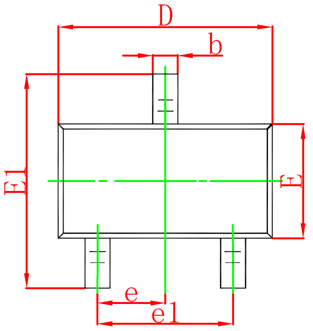
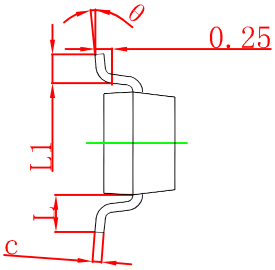
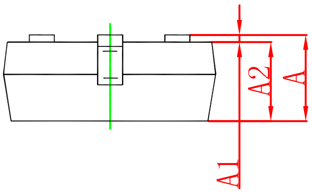


**Fig.11 Gate Charge Waveform**

## SOT-23 Package Outline Dimensions

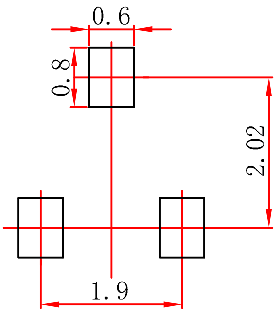






| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 0.900 | 1.150 | 0.035 | 0.045 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.050 | 0.035 | 0.041 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.200 | 1.400 | 0.047 | 0.055 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.950 TYP | | 0.037 TYP | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550 REF | | 0.022 REF | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | 0° | 8° | 0° | 8° |

## SOT-23 Suggested Pad Layout



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

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