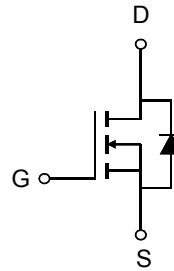
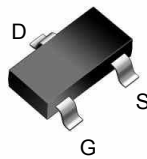


General Description

The HC2312 combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is suitable for use as a load switch or in PWM applications.

Features

| | |
|----------------------------------|----------------------|
| V_{DS} | 20V |
| I_D (at $V_{GS}=4.5V$) | 6.8A |
| $R_{DS(ON)}$ (at $V_{GS}=4.5V$) | 13.5m Ω (Typ) |

SOT23

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

| Parameter | Symbol | Maximum | Units | |
|--|------------------|------------|------------|---|
| Drain-Source Voltage | V_{DS} | 20 | V | |
| Gate-Source Voltage | V_{GS} | ± 12 | V | |
| Drain Current-Continuous | TC=25 $^\circ C$ | I_D | 6.8 | A |
| | TC=70 $^\circ C$ | I_D | 5.4 | A |
| Drain Current – Pulsed | I_{DM} | 27 | A | |
| Maximum Power Dissipation | P_D | 1.56 | W | |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55 To 150 | $^\circ C$ | |

Thermal Characteristics

| Parameter | Symbol | Typ | Max | Unit |
|--|-----------------|-----|-----|----------------|
| Thermal Resistance junction-case | $R_{\theta Jc}$ | | 1.1 | $^\circ C / W$ |
| Thermal Resistance junction-to-Ambient | $R_{\theta JA}$ | | 62 | $^\circ C / W$ |

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

| Symbol | Parameter | Condition | Min | Typ | Max | Unit |
|-----------------------------|----------------------------------|--|------|------|------|------|
| STATIC PARAMETERS | | | | | | |
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250μA | 20 | | | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =20V, V _{GS} =0V | | | 1 | μA |
| I _{GSS} | Gate-Body Leakage Current | V _{GS} =±12V, V _{DS} =0V | | | ±100 | nA |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =250μA | 0.45 | 0.65 | 1.0 | V |
| R _{DS(ON)} | Drain-Source On-State Resistance | V _{GS} =4.5V, I _D =3.0A | | 13.5 | 18 | mΩ |
| | | V _{GS} =2.5V, I _D =2.0A | | 17 | 22 | mΩ |
| | | V _{GS} =1.8V, I _D =2.7A | | 22 | 39 | mΩ |
| gfs | Forward Transconductance | V _{DS} =5V, I _D =4.5A | | 10 | | S |
| DYNAMIC PARAMETERS | | | | | | |
| C _{iSS} | Input Capacitance | V _{DS} =10V, V _{GS} =0V, F=1.0MHz | | 860 | | pF |
| C _{oSS} | Output Capacitance | | | 130 | | pF |
| C _{rSS} | Reverse Transfer Capacitance | | | 110 | | pF |
| SWITCHING PARAMETERS | | | | | | |
| t _{d(on)} | Turn-on Delay Time | V _{GS} =4.5V V _{DS} =10V R _G =25Ω I _D =6.8A | | 7 | | nS |
| t _r | Turn-on Rise Time | | | 46 | | nS |
| t _{d(off)} | Turn-Off Delay Time | | | 30 | | nS |
| t _f | Turn-Off Fall Time | | | 52 | | nS |
| Q _g | Total Gate Charge | V _{DS} =10V, I _D =6A, V _{GS} =4.5V | | 11 | | nC |
| Q _{gs} | Gate-Source Charge | | | 1.73 | | nC |
| Q _{gd} | Gate-Drain Charge | | | 3.1 | | nC |
| V _{SD} | Diode Forward Voltage | V _{GS} =0V, I _{SD} =1A | | 0.70 | 1.3 | V |

Note:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≅ 300us , duty cycle ≅ 2%.
3. Essentially independent of operating temperature.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

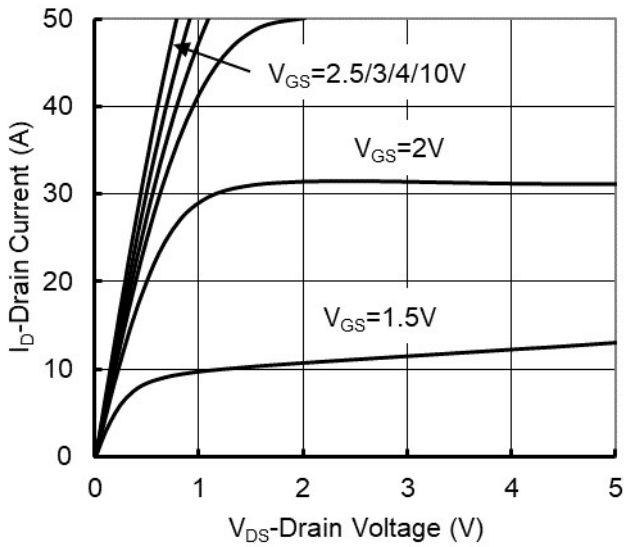


Figure1. Output Characteristics

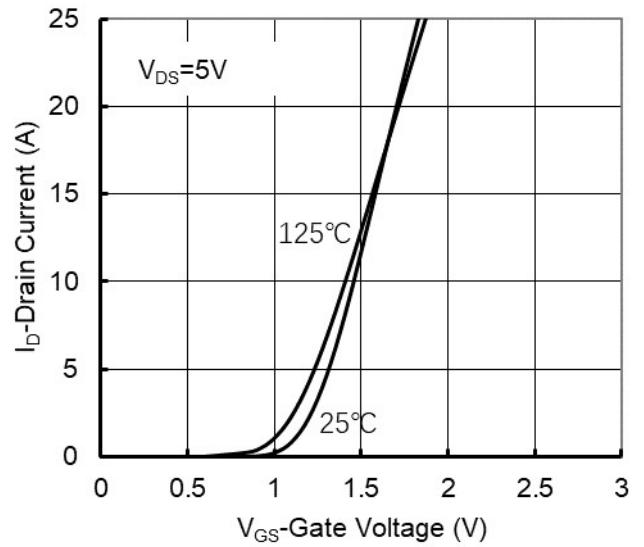


Figure2. Transfer Characteristics

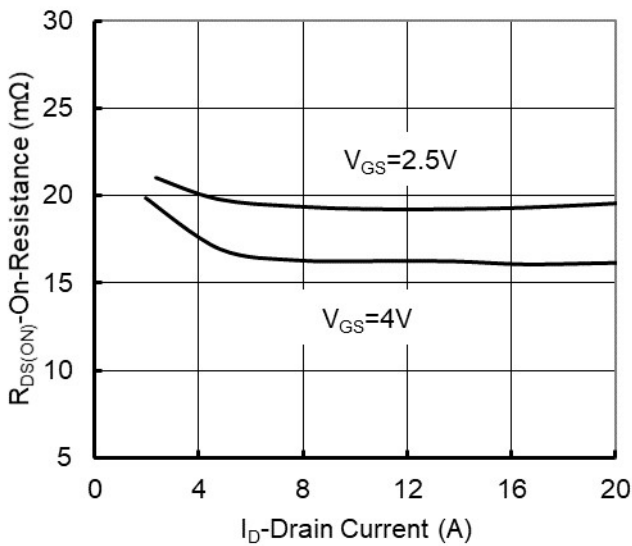


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

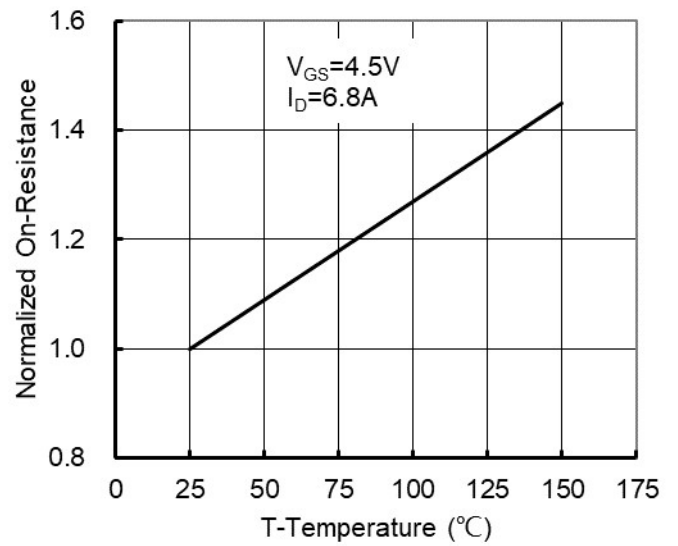


Figure 4: On-Resistance vs. Junction Temperature

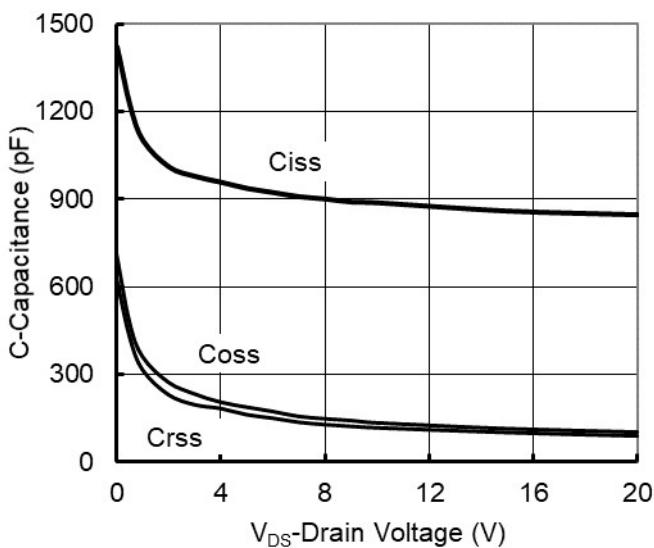


Figure5. Capacitance Characteristics

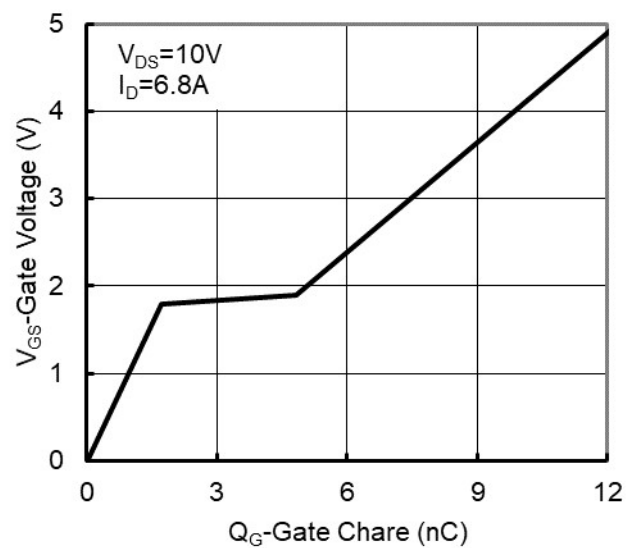


Figure6. Gate Charge

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

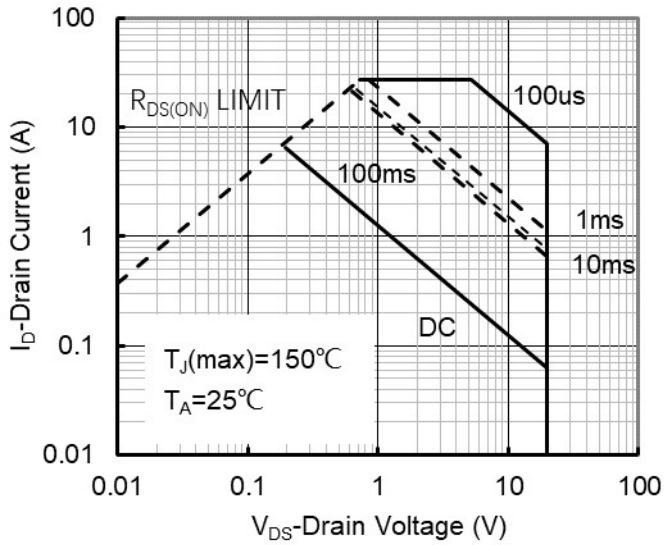


Figure7. Safe Operation Area

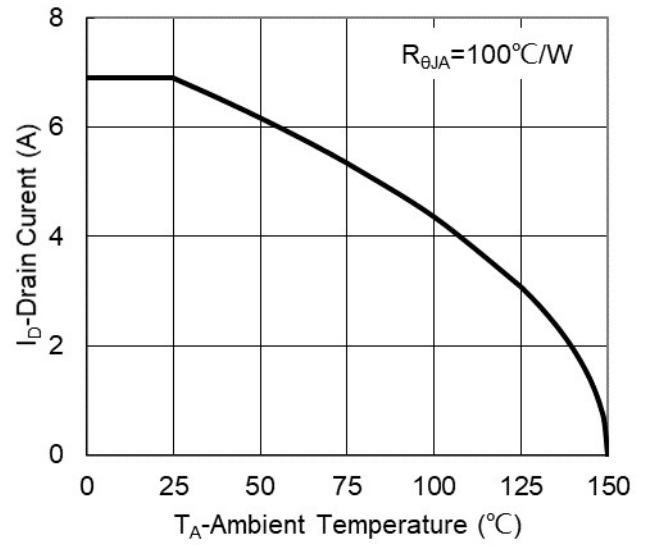


Figure8. Maximum Continuous Drain Current vs Ambient Temperature

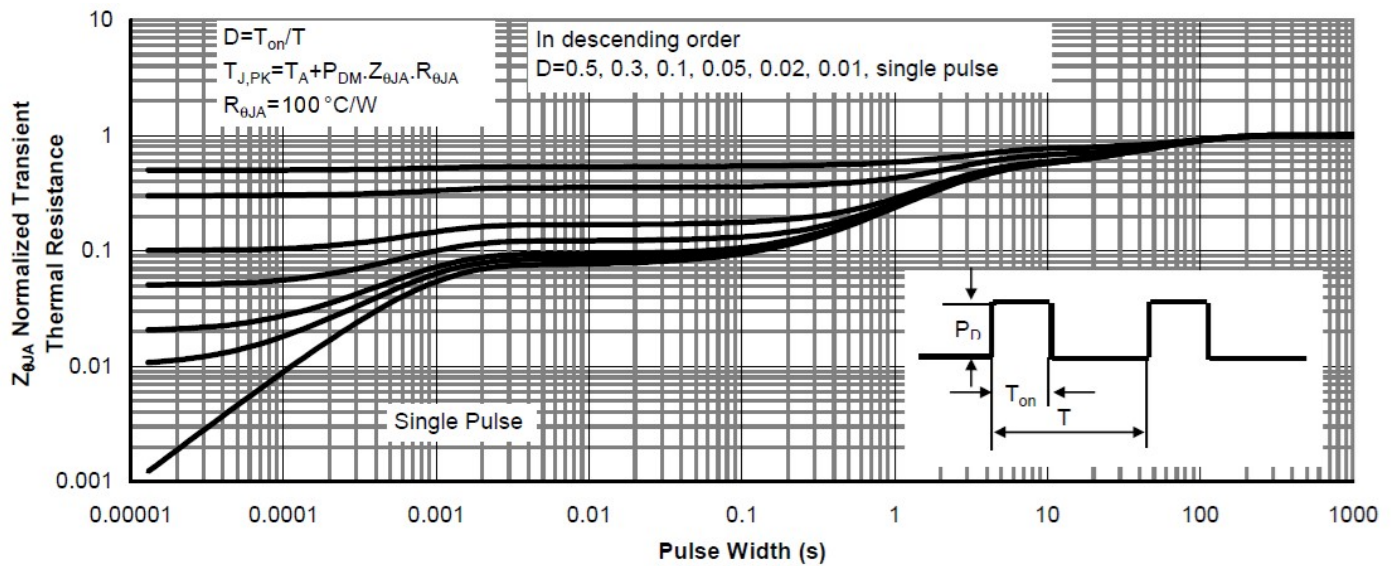
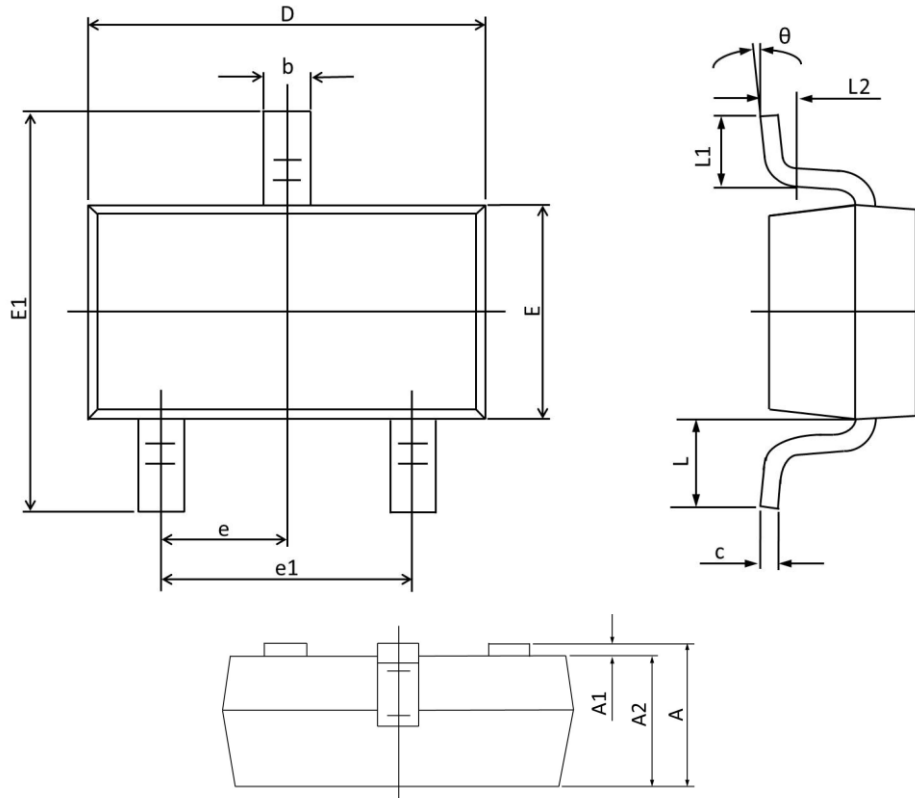


Figure9. Normalized Maximum Transient Thermal Impedance

SOT23 PACKAGE INFORMATION



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|----------|---------------------------|-------|----------------------|-------|
| | Max | Min | Max | Min |
| A | 1.150 | 0.900 | 0.045 | 0.035 |
| A1 | 0.100 | 0.000 | 0.004 | 0.000 |
| A2 | 1.050 | 0.900 | 0.041 | 0.035 |
| b | 0.500 | 0.300 | 0.020 | 0.012 |
| c | 0.150 | 0.080 | 0.006 | 0.003 |
| D | 3.000 | 2.800 | 0.118 | 0.110 |
| E | 1.400 | 1.200 | 0.055 | 0.047 |
| E1 | 2.550 | 2.250 | 0.100 | 0.089 |
| e | 0.95 TYP. | | 0.037 TYP. | |
| e1 | 2.000 | 1.800 | 0.079 | 0.071 |
| L | 0.55 REF. | | 0.022 REF. | |
| L1 | 0.500 | 0.300 | 0.020 | 0.012 |
| L2 | 0.25 TYP. | | 0.01 TYP. | |
| θ | 8° | 0° | 8° | 0° |