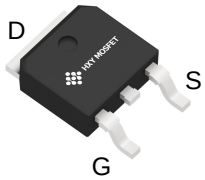
# HTK20S06K3LT6L1NQ

N-Channel Enhancement Mode MOSFET

## Description

The HTK20S06K3LT6L1NQ 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.

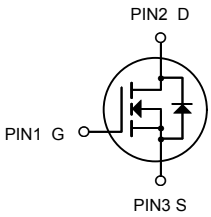



**TO-252-2L**

## General Features

$V_{DS}$ = 60V $I_D$ =20 A

$R_{DS(ON)}$ < 32mΩ @ $V_{GS}$=10V




N-Channel MOSFET

## Application

Battery protection

Load switch

Uninterruptible power supply

## Ordering Information

| Product ID | Pack | Brand | Qty(PCS) |
|---|---|---|---|
| HTK20S06K3LT6L1NQ | TO-252-2L | HXY MOSFET | 2500 |

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

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 60 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$@$T_C$=25℃ | Continuous Drain Current, $V_{GS}$ @ 10V[1] | 20 | A |
| $I_D$@$T_C$=100℃ | Continuous Drain Current, $V_{GS}$ @ 10V[1] | 10 | A |
| $I_{DM}$ | Pulsed Drain Current[2] | 80 | A |
| EAS | Single Pulse Avalanche Energy[3] | 38 | mJ |
| $P_D$@$T_C$=25℃ | Total Power Dissipation[4] | 34.7 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | ℃ |

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

| Parameter | | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | | |
| Drain-Source Breakdown Voltage | | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250μA | 60 | - | - | V |
| Gate-Body Leakage Current | | $I_{GSS}$ | $V_{DS}$ = 0V, $V_{GS}$ = ±20V | - | - | ±100 | nA |
| Zero Gate Voltage Drain Current | $T_J$=25℃ | $I_{DSS}$ | $V_{DS}$ = 60V, $V_{GS}$ = 0V | - | - | 1 | μA |
| | $T_J$=100℃ | | | - | - | 100 | |
| Gate-Threshold Voltage | | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 1.2 | 1.7 | 2.5 | V |
| Drain-Source on-Resistance[4] | | $R_{DS(on)}$ | $V_{GS}$ = 10V, $I_D$ = 10A | - | 25 | 32 | mΩ |
| | | | $V_{GS}$ = 4.5V, $I_D$ = 5A | - | 31.5 | 40 | |
| Forward Transconductance[4] | | $g_{fs}$ | $V_{DS}$ = 5V, $I_D$ = 10A | - | 15.5 | - | S |
| **Dynamic Characteristics**[5] | | | | | | | |
| Input Capacitance | | $C_{iss}$ | $V_{DS}$ = 30V, $V_{GS}$ =0V, f =1MHz | - | 1355 | - | pF |
| Output Capacitance | | $C_{oss}$ | | - | 60 | - | |
| Reverse Transfer Capacitance | | $C_{rss}$ | | - | 49 | - | |
| Gate Resistance | | $R_G$ | f =1MHz | - | 1.2 | - | Ω |
| **Switching Characteristics**[5] | | | | | | | |
| Total Gate Charge | | $Q_g$ | $V_{GS}$ = 10V, $V_{DD}$ = 30V, $I_D$= 10A | - | 22 | - | nC |
| Gate-Source Charge | | $Q_{gs}$ | | - | 4.2 | - | |
| Gate-Drain Charge | | $Q_{gd}$ | | - | 6.9 | - | |
| Turn-on Delay Time | | $t_{d(on)}$ | $V_{GS}$ =10V, $V_{DD}$ = 30V, $R_G$ = 3Ω, $I_D$= 10A | - | 6.4 | - | ns |
| Rise Time | | $t_r$ | | - | 15.3 | - | |
| Turn-off Delay Time | | $t_{d(off)}$ | | - | 25 | - | |
| Fall Time | | $t_f$ | | - | 7.6 | - | |
| Body Diode Reverse Recovery Time | | $t_{rr}$ | $I_F$=10A, $dI_F/dt$=100A/μs | - | 26 | - | ns |
| Body Diode Reverse Recovery Charge | | $Q_{rr}$ | | - | 45 | - | nC |
| **Drain-Source Body Diode Characteristics** | | | | | | | |
| Diode Forward Voltage[4] | | $V_{SD}$ | $I_S$ = 10A, $V_{GS}$ = 0V | - | - | 1.2 | V |
| Continuous Source Current | $T_C$=25℃ | $I_S$ | - | - | - | 20 | A |

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C
2. The EAS data shows Max. rating . The test condition is $V_{DD}$=25V, $V_{GS}$=10V, L=0.4mH, $I_{AS}$=14A
3. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.

## Typical Characteristics

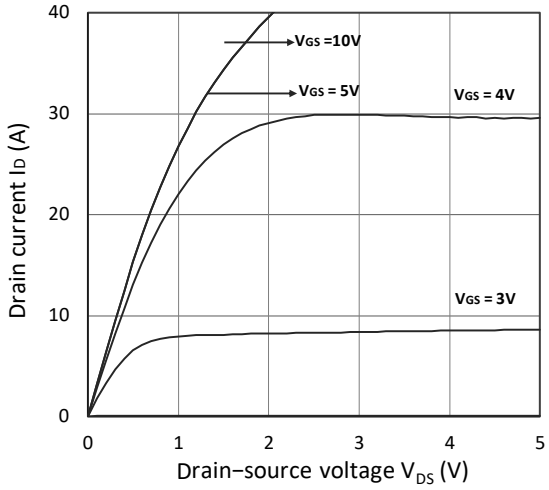



Figure 1. Output Characteristics

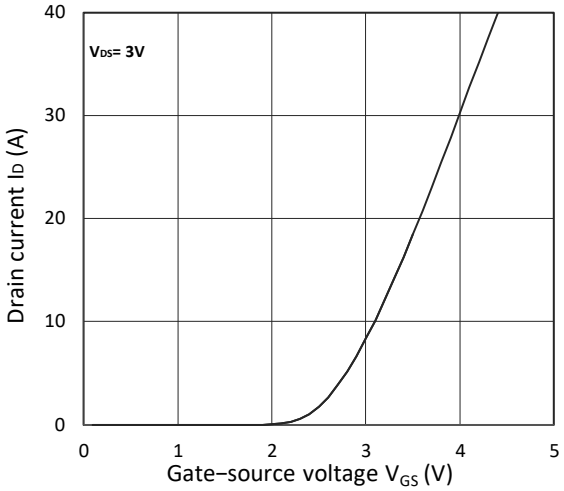



Figure 2. Transfer Characteristics

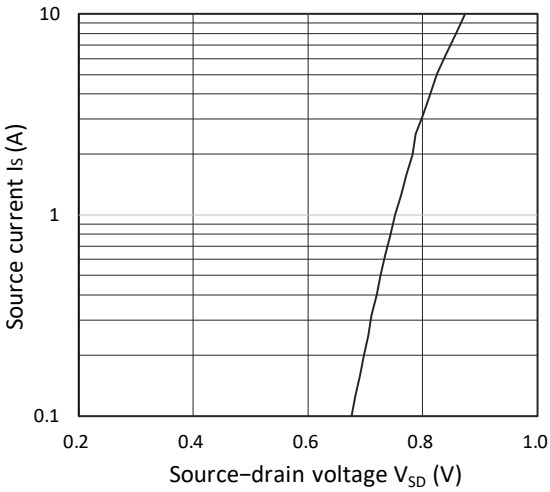



Figure 3. Forward Characteristics of Reverse

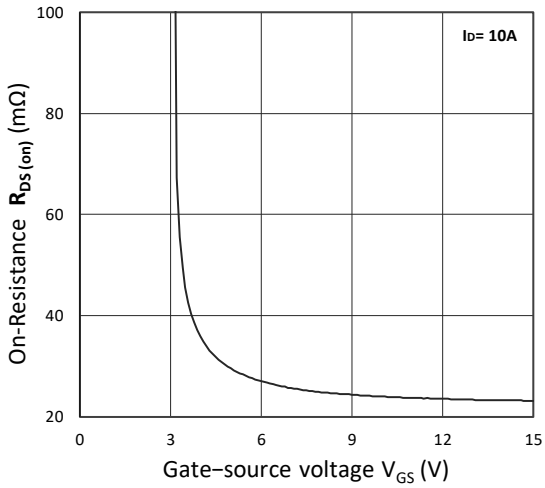



Figure 4. $R_{DS(ON)}$ vs. $V_{GS}$

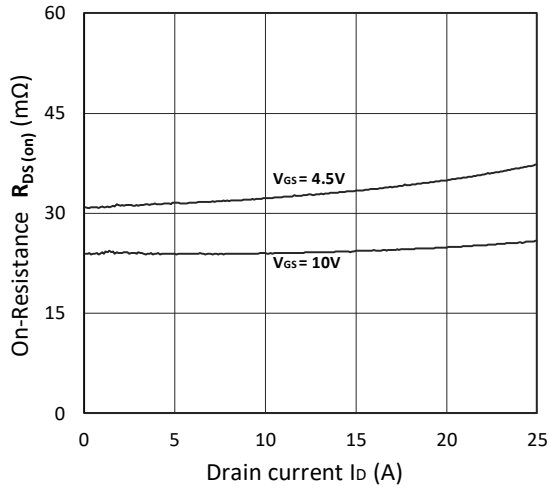



Figure 5. $R_{DS(ON)}$ vs. $I_D$

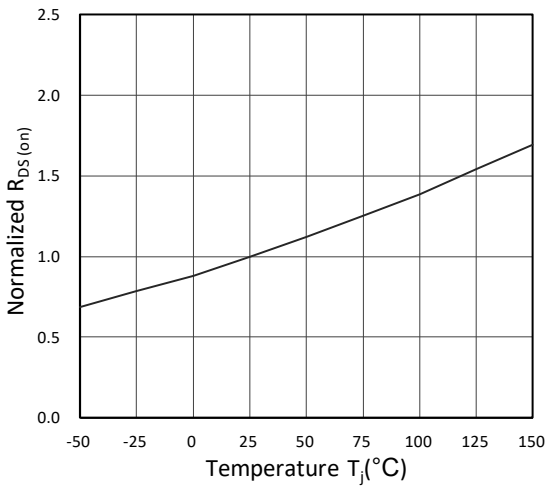



Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

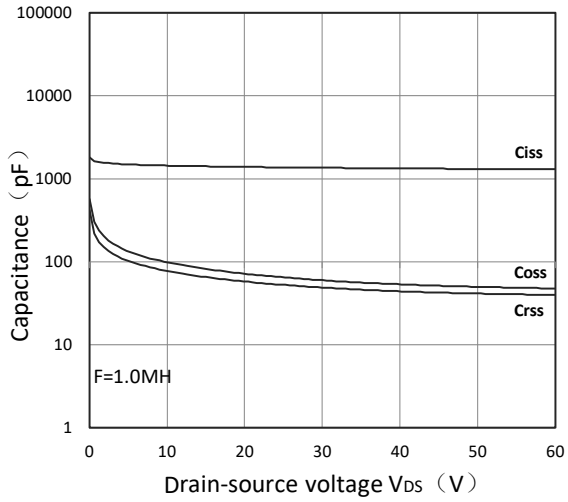



Figure 7. Capacitance Characteristics

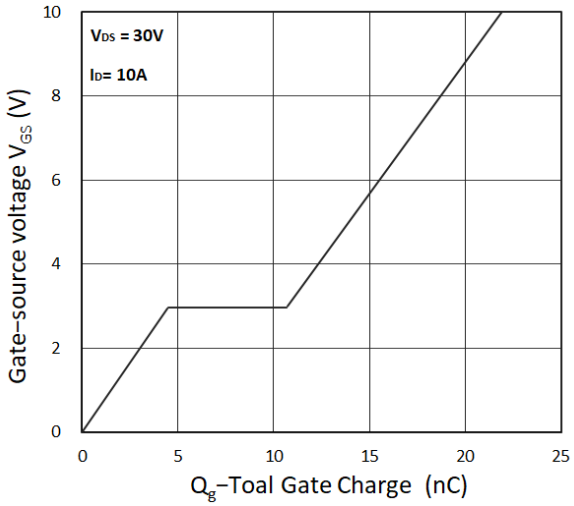



Figure 8. Gate Charge Characteristics

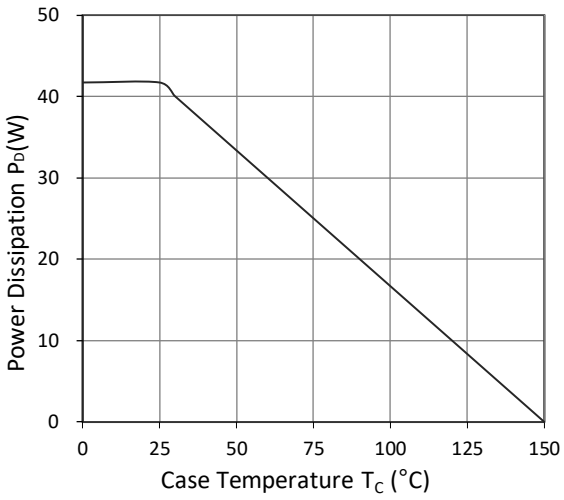



Figure 9. Power Dissipation

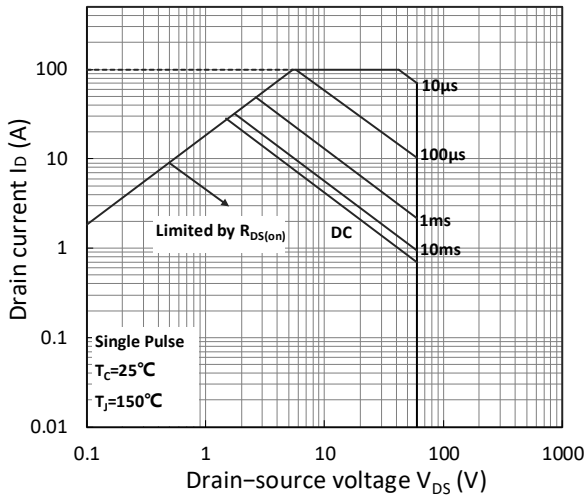



Figure10. Safe Operating Area

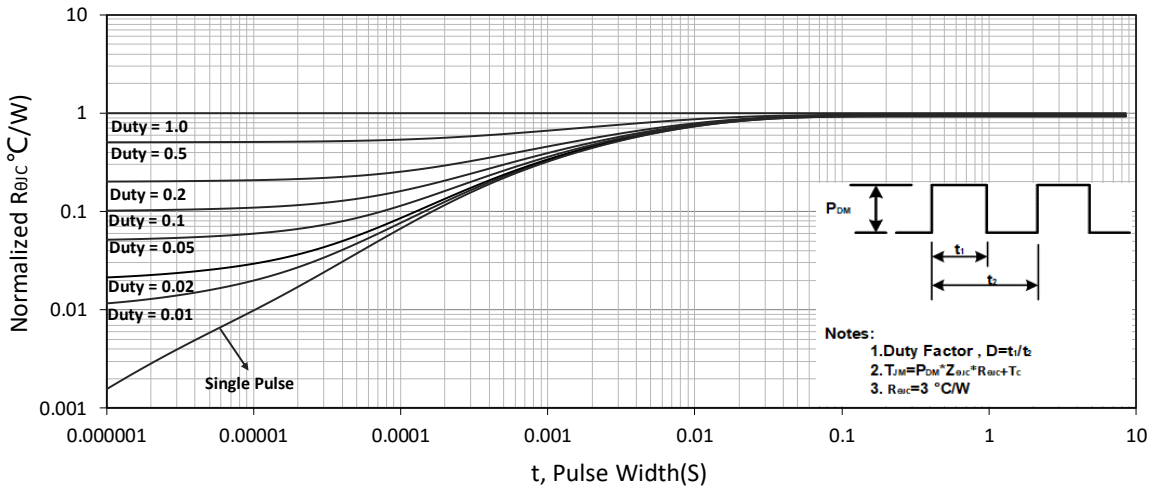
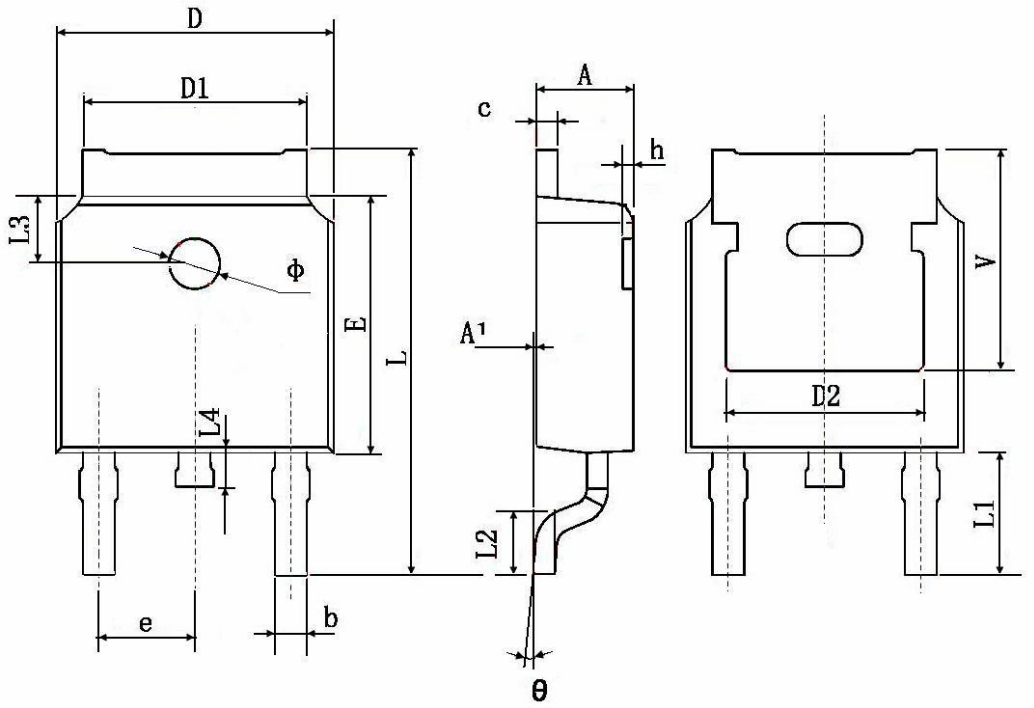



Figure 11. Normalized Maximum Transient Thermal Impedance

## TO252-2L Package Information




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 2.200 | 2.400 | 0.087 | 0.094 |
| A1 | 0.000 | 0.127 | 0.000 | 0.005 |
| b | 0.660 | 0.860 | 0.026 | 0.034 |
| c | 0.460 | 0.580 | 0.018 | 0.023 |
| D | 6.500 | 6.700 | 0.256 | 0.264 |
| D1 | 5.100 | 5.460 | 0.201 | 0.215 |
| D2 | 0.483 TYP. | | 0.190 TYP. | |
| E | 6.000 | 6.200 | 0.236 | 0.244 |
| e | 2.186 | 2.386 | 0.086 | 0.094 |
| L | 9.800 | 10.400 | 0.386 | 0.409 |
| L1 | 2.900 TYP. | | 0.114 TYP. | |
| L2 | 1.400 | 1.700 | 0.055 | 0.067 |
| L3 | 1.600 TYP. | | 0.063 TYP. | |
| L4 | 0.600 | 1.000 | 0.024 | 0.039 |
| Φ | 1.100 | 1.300 | 0.043 | 0.051 |
| θ | 0° | 8° | 0° | 8° |
| h | 0.000 | 0.300 | 0.000 | 0.012 |
| V | 5.350 TYP. | | 0.211 TYP. | |

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