## DESCRIPTION

The HX3407 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and high density cell Design for ultra low on-resistance. This device is suitable for use as a load switch or in PWM applications.

## GENERAL FEATURES

- ✧ $V_{DS}$ =-30V，ID =-4A
  $R_{DS(ON)}$(Typ.)=65mΩ @$V_{GS}$=-4.5V
  $R_{DS(ON)}$(Typ.)=47mΩ @$V_{GS}$=-10V
- ✧ High power and current handing capability
- ✧ Lead free product is acquired
- ✧ Surface mount package

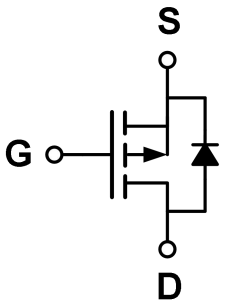
## APPLICATION

- ✧ PWM applications
- ✧ Load switch

## PACKAGE

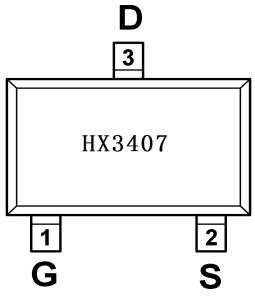
- ✧ SOT23-3L

## SCHEMATIC DIAGRAM




## PIN ASSIGNMENT

SOT23-3L
(TOP VIEW)




## ORDERING INFORMATION

| Part Number | Storage Temperature | Package | Marking | Devices Per Reel |
|---|---|---|---|---|
| HX3407 | -55°C to +150°C | SOT23-3L | 3407 | 3000 |

## ABSOLUTE MAXIMUM RATINGS

**($T_A$=25℃ unless otherwise noted)**

| parameter | | symbol | limit | unit |
|---|---|---|---|---|
| Drain-source voltage | | $V_{DS}$ | -30 | V |
| Gate-source voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current | $T_C$=25°C | $I_D$ | -4 | A |
| | $T_C$=70°C | | -3.0 | |
| Pulsed Drain Current [C] | | $I_{DP}$ | -16 | A |
| power dissipation [B] | $T_C$=25°C | $P_D$ | 1.4 | W |
| | $T_C$=70°C | | 0.9 | |
| Junction and Storage Temperature Range | | $T_J$,$T_{SGT}$ | -55—150 | ℃ |

## THERMAL CHARACTERISTICS

| Parameter | | Symbol | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Maximum Junction-to-Ambient [A] | t≤ 10s | $R_{\theta JA}$ | 70 | 90 | ℃/W |
| Maximum Junction-to-Ambient [A D] | Steady-State | | 100 | 125 | |
| Maximum Junction-to-Lead | Steady-State | $R_{\theta JL}$ | 62 | 80 | |

**Notes**

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in$^2$ FR-4 board with 2oz. Copper, in a still air environment with $T_A$ =25°C. The value in any given application depends on the user's specific board design.

B. The power dissipation $P_D$ is based on $T_{J(MAX)}$=150°C, using ≤ 10s junction-to-ambient thermal resistance.

C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C. Ratings are based on low frequency and duty cycles to keep initial $T_J$=25°C.

D. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ and lead to ambient.

## 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 | -30 | - | - | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$=-30V, $V_{GS}$=0V | - | - | -1 | μA |
| Gate-body leakage | $I_{GSS}$ | $V_{DS}$=0V, $V_{GS}$=±20V | - | - | ±100 | nA |
| **ON Characteristics** | | | | | | |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=-250μA | -1.0 | -1.5 | -2.2 | V |
| Drain-source on-state resistance | $R_{DS(ON)}$ | $V_{GS}$=-10V, $I_D$=-4A | - | 47 | 60 | mΩ |
| | | $V_{GS}$=-4.5V, $I_D$=-3A | - | 65 | 85 | |
| Forward transconductance | $G_{FS}$ | $V_{DS}$=-5V, $I_D$=-1A | - | 10 | - | S |
| **Dynamic Characteristics** | | | | | | |
| Input capacitance | $C_{ISS}$ | $V_{DS}$=-10V ,$V_{GS}$=0V f=1.0MHz | - | 583 | - | pF |
| Output capacitance | $C_{OSS}$ | | - | 100 | - | |
| Reverse transfer capacitance | $C_{RSS}$ | | - | 80 | - | |
| **Switching Characteristics** | | | | | | |
| Turn-on delay time | $t_{D(ON)}$ | $V_{DD}$=-15V $I_D$=-4A $V_{GEN}$=-10V $R_L$=3.6Ω $R_{GEN}$=3Ω | - | 2.8 | - | ns |
| Rise time | $t_r$ | | - | 8.4 | - | |
| Turn-off delay time | $t_{D(OFF)}$ | | - | 39 | - | |
| Fall time | $t_f$ | | - | 6 | - | |
| Total gate charge | Qg | $V_{DS}$=-15V,$I_D$=-4A $V_{GS}$=-10V | - | 6.4 | - | nC |
| Gate-source charge | Qgs | | - | 2.3 | - | |
| Gate-drain charge | Qgd | | - | 1.9 | - | |
| **DRAIN-SOURCE DIODE CHARACTERISTICS** | | | | | | |
| Diode forward voltage | $V_{SD}$ | $V_{GS}$=0V,Is=-4A | - | -0.81 | -1.2 | V |

# TYPICAL OPERATING CHARACTERISTICS

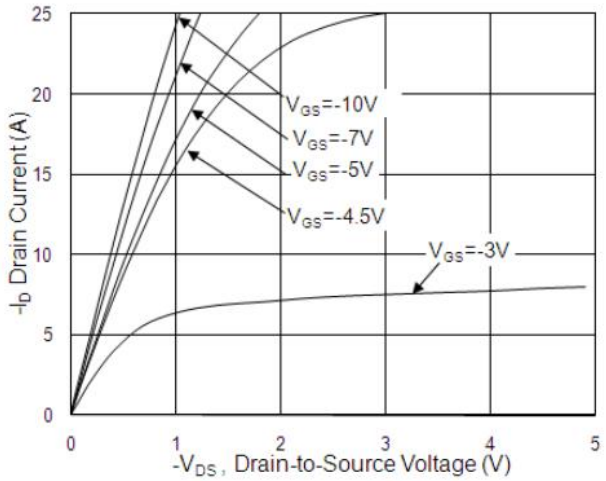



**Fig.1 Typical Output Characteristics**

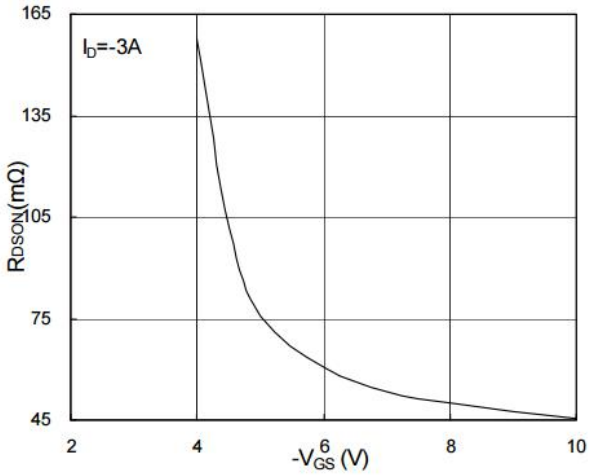



**Fig.2 On-Resistance v.s Gate-Source**

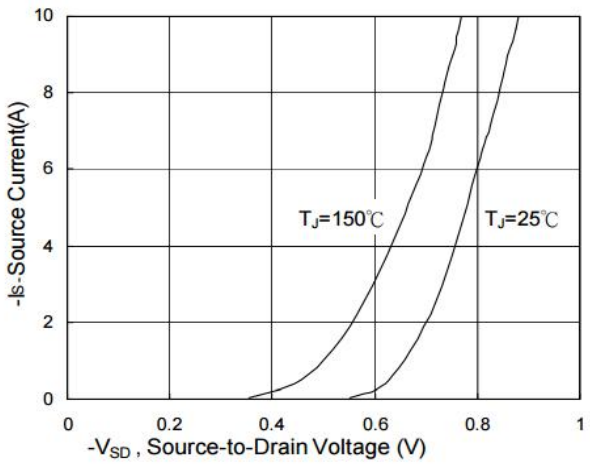



**Fig.3 Forward Characteristics of Reverse**

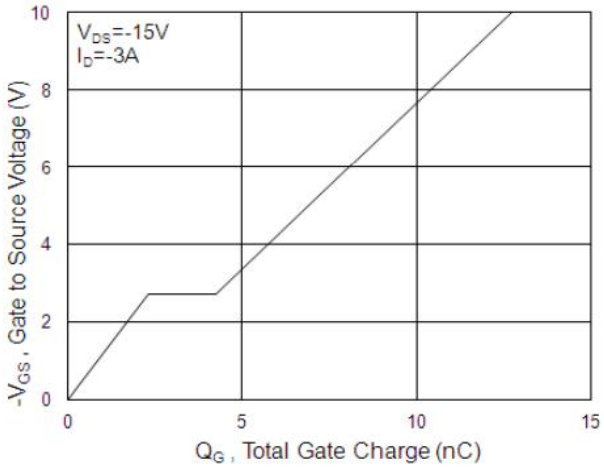



**Fig.4 Gate-Charge Characteristics**

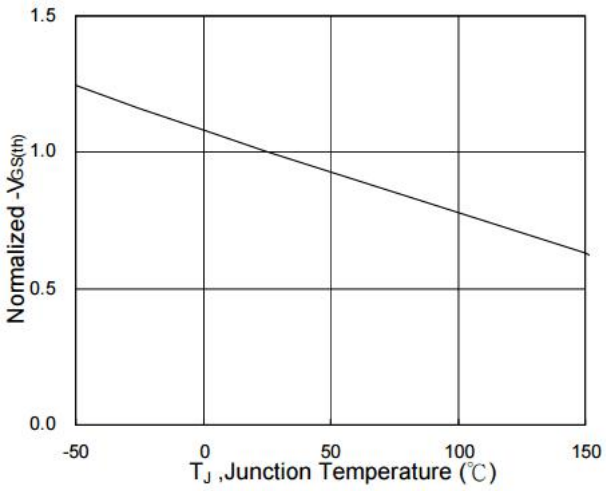



**Fig.5 Normalized $V_{GS(th)}$ vs. $T_J$**

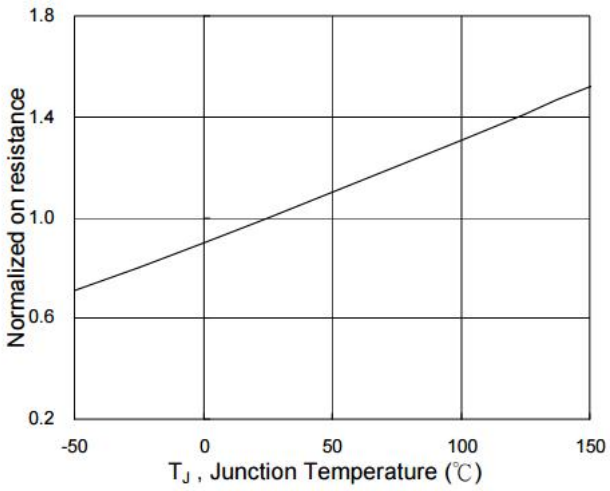



**Fig.6 Normalized $R_{DSON}$ vs $T_J$**

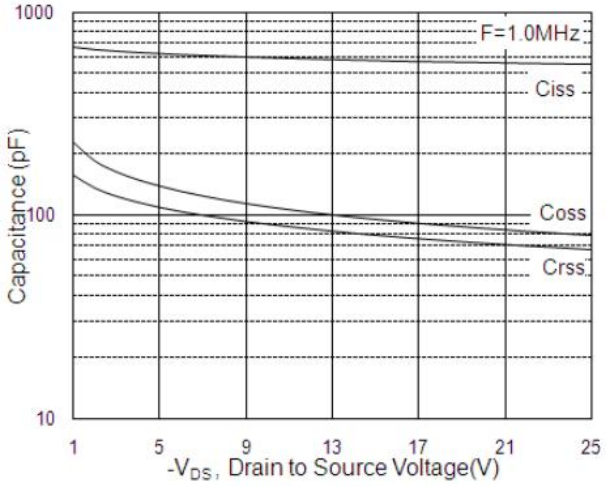



**Fig.7 Capacitance**

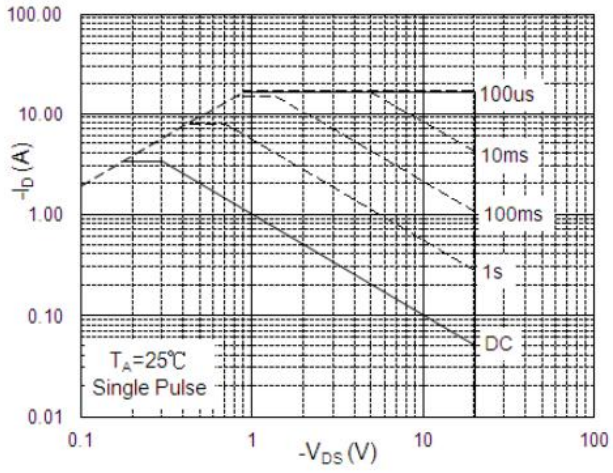



**Fig.8 Safe Operating Area**

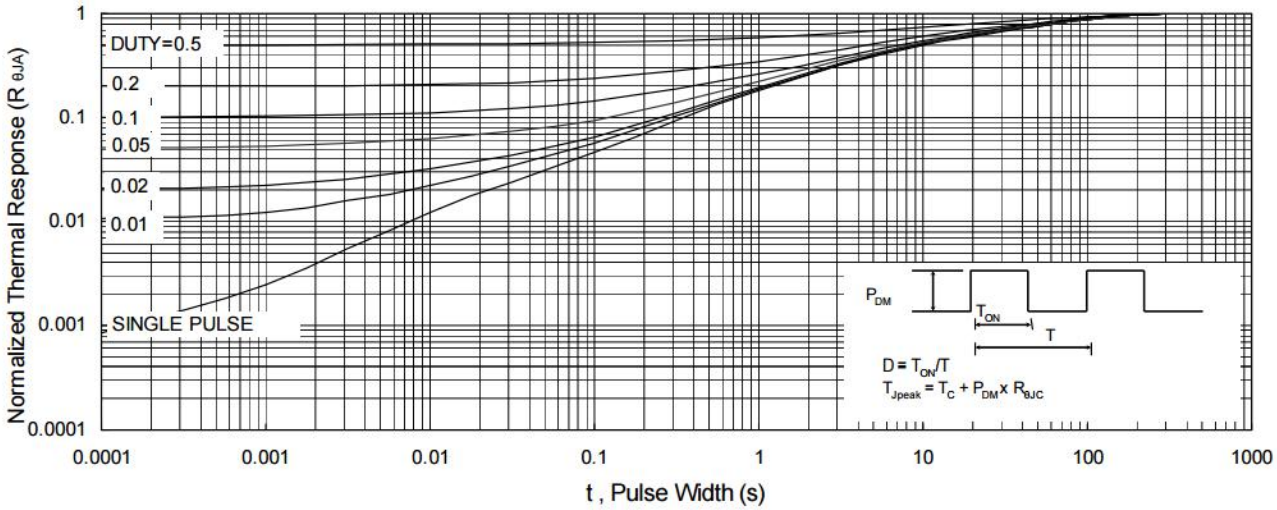
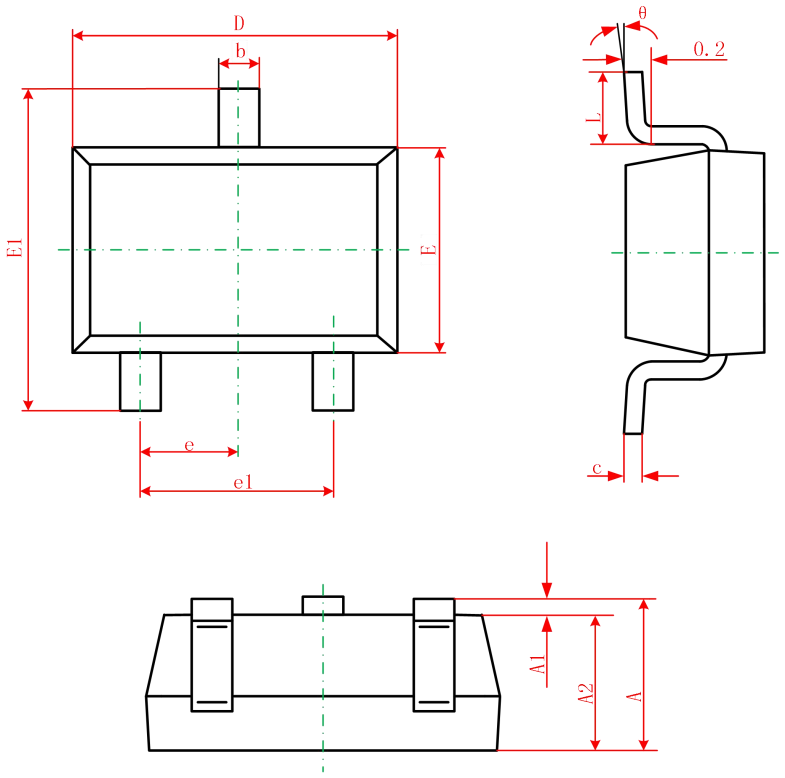



**Fig.9 Normalized Maximum Transient Thermal Impedance**

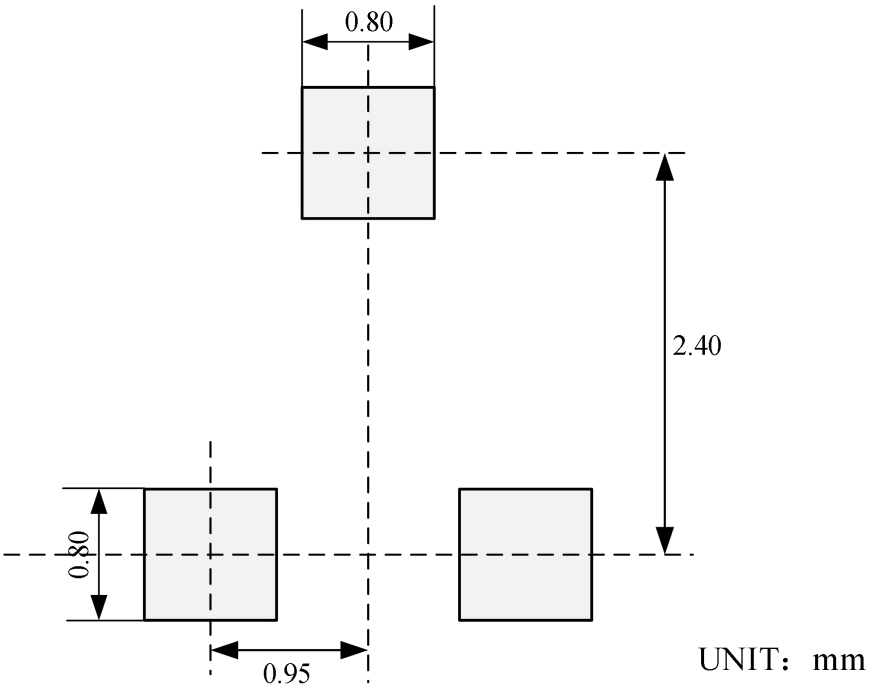
## PACKAGE INFORMATION

- **SOT23-3L**




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 2.820 | 3.020 | 0.111 | 0.119 |
| E | 1.500 | 1.700 | 0.059 | 0.067 |
| E1 | 2.650 | 2.950 | 0.104 | 0.116 |
| e | 0.950(BSC) | | 0.037(BSC) | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.300 | 0.600 | 0.012 | 0.024 |
| θ | 0° | 8° | 0° | 8° |

## RECOMMENDED MINIMUM PADS FOR SOT23-3L


0.80
2.40
0.80
0.95
UNIT：mm

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