

General Description

Utilizing Analogic Tech's state-of-the-art TrenchDMOS® process, the AHK6030LX sets a new standard in current handling capability and efficiency for surface mount power MOSFETs.

Gate charge and $R_{DS(ON)}$ have been optimized and package inductance minimized to provide high efficiency for DC-DC.

Applications

- DC-DC converters for CPU's
- High Current Load Switch

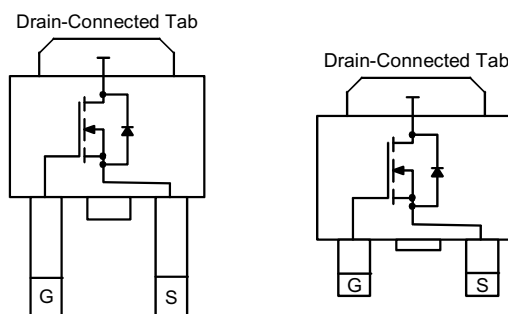
Features

PWMSwitch™

- $V_{DS(MAX)} = 30V$
- $I_{D(MAX)}^{(a)} = 52 A @ 25^{\circ}C$
- $I_{APP(MAX)} = 20A$ in typical computer application
- Low Gate Charge
- Low $R_{DS(ON)}$:
 $10.5 m\Omega$ (max), $9.5 m\Omega$ (typ) @ $V_{GS} = 10V$
 $18 m\Omega$ (max), $14 m\Omega$ (typ) @ $V_{GS} = 4.5V$

PAK-L Package

PAK Package



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

| Symbol | Description | Value | Units |
|----------------|--|---------------------|-------------|
| V_{DS} | Drain-Source Voltage | 30 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | |
| I_D | Continuous Drain Current @ $T_J = 150^{\circ}C$ ^(a) | ± 52 | A |
| I_{DM} | Pulsed Drain Current ^(a) | ± 56 | |
| I_S | Continuous Source Current (Source-Drain Diode) ^(a) | 23 | |
| P_D | Maximum Power Dissipation ^(a) | $T_A = 25^{\circ}C$ | W |
| | | $T_A = 70^{\circ}C$ | |
| T_J, T_{STG} | Operating Junction and Storage Temperature Range | -55 to 150 | $^{\circ}C$ |

| Thermal Resistance | | | |
|--------------------|--|-----|---------------|
| $R_{\theta JA}$ | Maximum Junction-to-Ambient ^(a) | 96 | $^{\circ}C/W$ |
| $R_{\theta JC}$ | Maximum Junction-to-Case ^(a) | 3.6 | $^{\circ}C/W$ |

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Preliminary Information

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

| Symbol | Description | Conditions | Min | Typ | Max | Units |
|------------------------------------|--------------------------------|---|-----|-----|------|-------|
| DC Characteristics | | | | | | |
| BV _{DS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250μA | 30 | | | V |
| R _{DS(ON)} | Drain-Source ON-Resistance | V _{GS} =10V, I _D =10A | | 9.5 | 10.5 | mΩ |
| | | V _{GS} =4.5V, I _D =5A | | 14 | 18 | |
| I _{D(ON)} | On-State Drain Current | V _{GS} =10V, V _{DS} =5V (Pulsed) | 56 | | | A |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250μA | 1.0 | | | V |
| I _{GSS} | Gate-Body Leakage Current | V _{GS} =±20V, V _{DS} =0V | | | ±100 | nA |
| I _{DSS} | Drain Source Leakage Current | V _{GS} =0V, V _{DS} =30V | | | 1 | μA |
| | | V _{GS} =0V, V _{DS} =30V, T _A =70°C | | | 25 | |
| g _{fs} | Forward Transconductance | V _{DS} =15V, I _D =10A | | 19 | | S |
| Dynamic Characteristics | | | | | | |
| Q _G | Total Gate Charge | V _{DS} =15V, I _D =15A, V _{GS} =10V | | 45 | 65 | nC |
| Q _{GS} | Gate-Source Charge | | | 9 | | nC |
| Q _{GD} | Gate-Drain Charge | | | 7.5 | | nC |
| t _{D(ON)} | Turn-ON Delay | V _{DD} =15V, V _{GS} =10V, I _D =15A, R _G =6Ω | | 17 | 30 | ns |
| t _R | Turn-ON Rise Time | | | 11 | 20 | ns |
| t _{D(OFF)} | Turn-OFF Delay | | | 60 | 100 | ns |
| t _F | Turn-OFF Fall Time | | | 45 | 80 | ns |
| Source-Drain Diode Characteristics | | | | | | |
| V _{SD} | Source-Drain Forward Voltage | V _{GS} =0, I _S =28A | | 1 | 1.5 | V |
| I _S | Continuous Diode Current | | | | 23 | A |

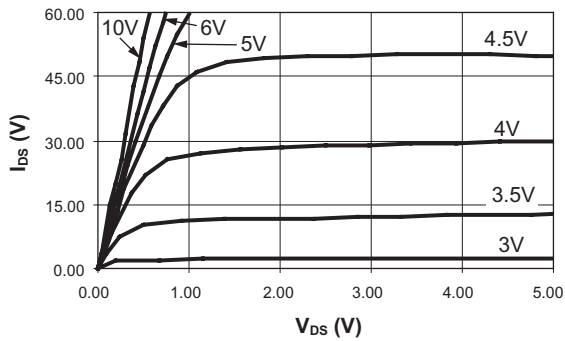
Notes:

(a) Based on thermal dissipation from junction to case. R_{θJC} + R_{θCA} = R_{θJA} where the case thermal reference is defined as the solder mounting surface of the drain pins. R_{θJC} is guaranteed by design, however R_{θCA} is determined by the PCB design. Package current is limited to 28A DC.

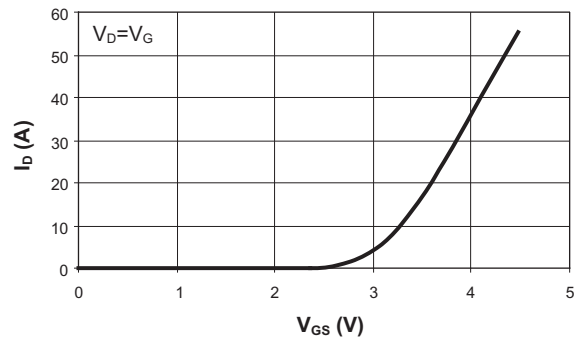
(b) With minimum copper pads on 1 x 1 inch FR4 board.

Typical Characteristics

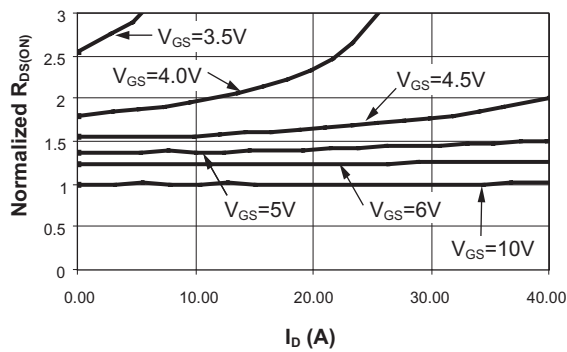
Output Characteristics



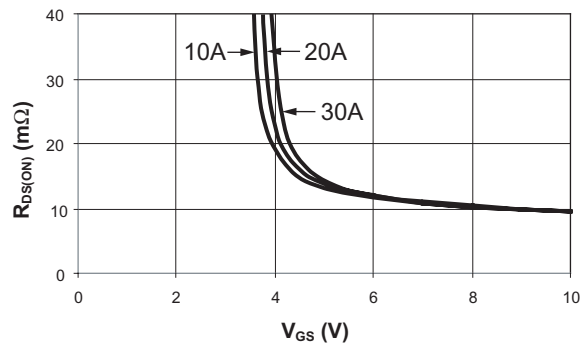
Transfer Characteristics



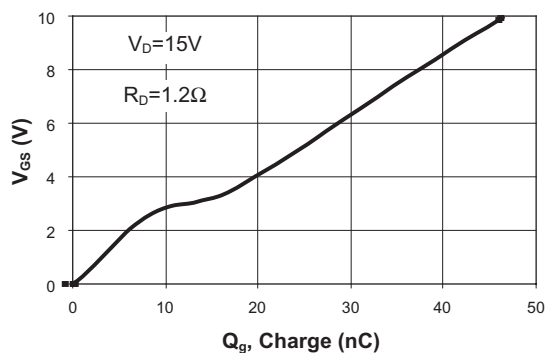
Normalized On-Resistance vs. Drain Current



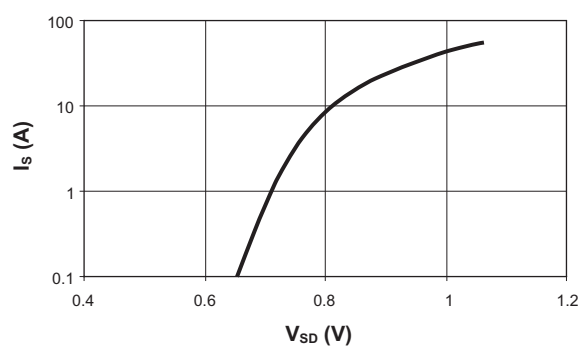
On-Resistance vs. Gate to Source Voltage



Gate Charge



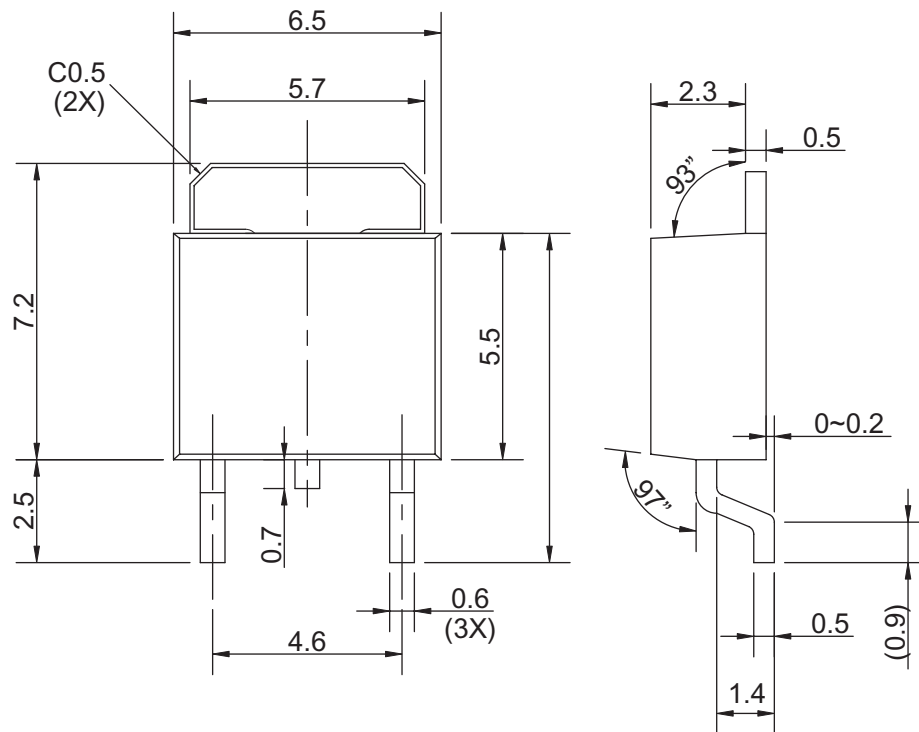
Source-Drain Diode Forward Voltage





| Package | Marking | Part Number | | | |
|---------------|---------|-------------|-----|-----------------|------|
| | | Bulk | MPQ | Tape and Reel | MPQ |
| TO-252 (DPAK) | 6030LX | N/A | N/A | AHK6030LXINY-T1 | 2100 |

TO-252 (DPAK)



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