



# AHK6030L

## 30V N-Channel Power MOSFET

### General Description

Utilizing Analogic Tech's state-of-the-art TrenchDMOS<sup>®</sup> process, the AHK6030L 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 converters.

### Applications

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

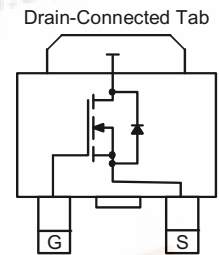
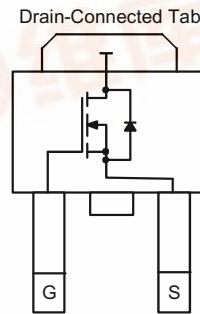
### Features

**PWMSwitch™**

- $V_{DS(MAX)} = 30V$
- $I_{D(MAX)}^{(a)} = 44 A @ 25^{\circ}C$
- $I_{APP(MAX)} = 17A$  in typical computer application
- Low Gate Charge
- Low  $R_{DS(ON)}$ :  
 13.5 mΩ (max), 9.5 mΩ (typ) @  $V_{GS} = 10V$   
 20 mΩ (max), 14 mΩ (typ) @  $V_{GS} = 4.5V$

### DPAK-L Package

### DPAK Package



### Absolute Maximum Ratings (T<sub>A</sub>=25°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 <sub>J</sub> =150°C <sup>(a)</sup>	±44	A	
$I_{DM}$	Pulsed Drain Current <sup>(a)</sup>	±52		
$I_S$	Continuous Source Current (Source-Drain Diode) <sup>(a)</sup>	23		
$P_D$	Maximum Power Dissipation <sup>(a)</sup>	T <sub>A</sub> = 25°C	39	W
		T <sub>A</sub> = 70°C	25	
T <sub>J</sub> , T <sub>STG</sub>	Operating Junction and Storage Temperature Range	-55 to 150	°C	

Thermal Resistance			
$R_{\theta JA}$	Maximum Junction-to-Ambient <sup>(a)</sup>	96	°C/W
$R_{\theta JC}$	Maximum Junction-to-Case <sup>(a)</sup>	3.2	°C/W

Preliminary Information

### Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

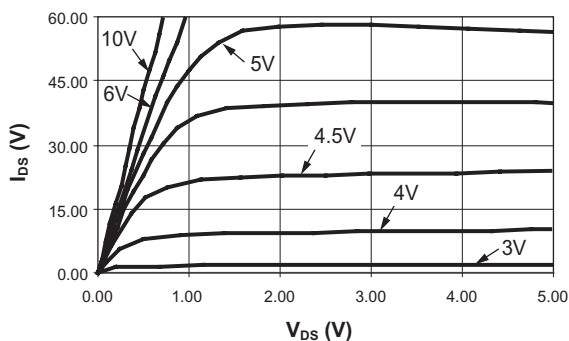
Symbol	Description	Conditions	Min	Typ	Max	Units
<b>DC Characteristics</b>						
B <sub>VDS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	30			V
R <sub>DS(ON)</sub>	Drain-Source ON-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =10A		9.5	13.5	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =5A		14	20	
I <sub>D(ON)</sub>	On-State Drain Current	V <sub>GS</sub> =10V, V <sub>DS</sub> =5V (Pulsed)	56			A
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250μA	1.0			V
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V			±100	nA
I <sub>DSS</sub>	Drain Source Leakage Current	V <sub>GS</sub> =0V, V <sub>DS</sub> =30V			1	μA
		V <sub>GS</sub> =0V, V <sub>DS</sub> =30V, T <sub>A</sub> =70°C			25	
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =15V, I <sub>D</sub> =10A		19		S
<b>Dynamic Characteristics</b>						
Q <sub>G</sub>	Total Gate Charge	V <sub>DS</sub> =15V, I <sub>D</sub> =15A, V <sub>GS</sub> =10V		36	52	nC
Q <sub>GS</sub>	Gate-Source Charge			7		nC
Q <sub>GD</sub>	Gate-Drain Charge			6		nC
t <sub>D(ON)</sub>	Turn-ON Delay	V <sub>DD</sub> =15V, V <sub>GS</sub> =10V, I <sub>D</sub> =15A, R <sub>G</sub> =6Ω		17	30	ns
t <sub>r</sub>	Turn-ON Rise Time			11	20	ns
t <sub>D(OFF)</sub>	Turn-OFF Delay			48	80	ns
t <sub>f</sub>	Turn-OFF Fall Time			36	64	ns
<b>Source-Drain Diode Characteristics</b>						
V <sub>SD</sub>	Source-Drain Forward Voltage	V <sub>GS</sub> =0, I <sub>S</sub> =28A		1	1.5	V
I <sub>S</sub>	Continuous Diode Current				23	A

#### Notes:

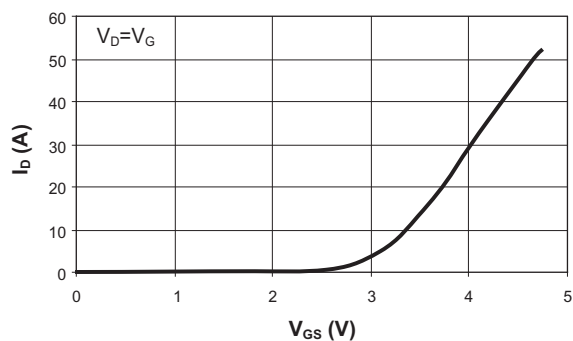
- Based on thermal dissipation from junction to case.  $R_{\theta JC} + R_{\theta CA} = R_{\theta JA}$  where the case thermal reference is defined as the solder mounting surface of the drain pins.  $R_{\theta JC}$  is guaranteed by design, however  $R_{\theta CA}$  is determined by the PCB design. Package current is limited to 26A DC.
- With minimum copper pads on 1 x 1 inch FR4 board.

### Typical Characteristics

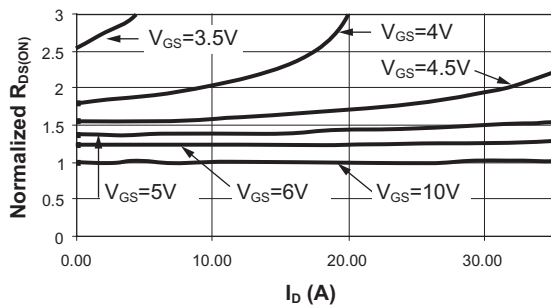
Output Characteristics



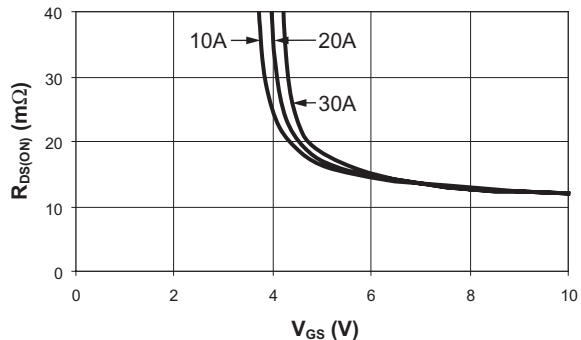
Transfer Characteristics



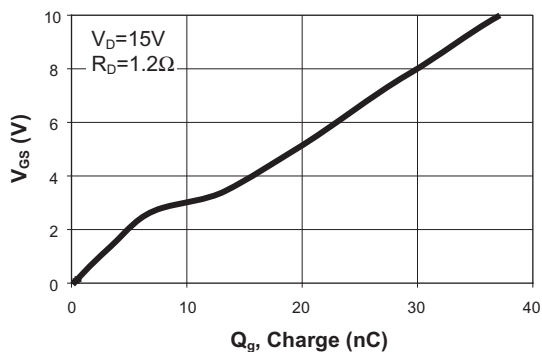
Normalized On-Resistance vs. Drain Current



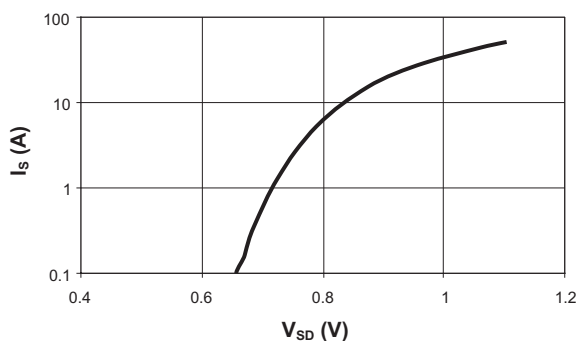
On-Resistance vs. Gate to Source Voltage



Gate Charge



Source-Drain Diode Forward Voltage



**Ordering Information**

Package	Marking	Part Number			
		Bulk	MPQ	Tape and Reel	MPQ
TO-252 (DPAK)	6030L	N/A	N/A	AHK6030LINY-T1	2100

**Package Information**

**TO-252 (DPAK)**

