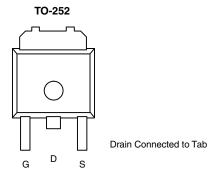


### K416STL-VB Datasheet N-Channel 60 V (D-S) MOSFET

PRODUCT SUMMARY					
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω) Max.	I <sub>D</sub> (A)	Q <sub>g</sub> (Typ.)		
60	0.073 at V <sub>GS</sub> = 10 V	18	19.8		
60	0.085 at V <sub>GS</sub> = 4.5 V	15	19.0		



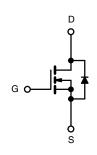
#### FEATURES

- Trench Power MOSFET
- 100 % R<sub>g</sub> and UIS Tested
- Material categorization:
  For definitions of compliance please see

RoHS COMPLIANT HALOGEN FREE

#### **APPLICATIONS**

- DC/DC Converters
- DC/AC Inverters
- Motor Drives



N-Channel MOSFET

<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_C = 25 \text{ °C}$ , unless otherwise noted)						
Parameter	Symbol	Limit	Unit			
Drain-Source Voltage	V <sub>DS</sub>	60	v			
Gate-Source Voltage	V <sub>GS</sub>	± 20	- V			
Continuous Drain Current	T <sub>C</sub> = 25 °C		18			
Continuous Drain Current	T <sub>C</sub> = 70 °C	I <sub>D</sub>	14	A		
Pulsed Drain Current (t = 300 µs)	I <sub>DM</sub>	25	A			
Avalanche Current	I <sub>AS</sub>	15				
Single Avalanche Energy <sup>a</sup>	L = 0.1 mH	E <sub>AS</sub>	11.25	mJ		
Maximum Power Dissipation <sup>a</sup>	T <sub>C</sub> = 25 °C	P	41.7 <sup>b</sup>	w		
Maximum Fower Dissipation	T <sub>A</sub> = 25 °C <sup>c</sup>	P <sub>D</sub>	2.1	vv		
Operating Junction and Storage Tempe	T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150	°C			

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Limit	Unit		
Junction-to-Ambient (PCB Mount) <sup>c</sup>	R <sub>thJA</sub>	60	°C/W		
Junction-to-Case (Drain)	R <sub>thJC</sub>	3	0/11		

Notes:

a. Duty cycle  $\leq$  1 %.

b. See SOA curve for voltage derating.

c. When mounted on 1" square PCB (FR-4 material).

d. Base on T<sub>C</sub> = 25 °C.

$\mathcal{B}^{\circ}$	VBsemi
www.V	Bsemi.com

Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Static	-						
Drain-Source Breakdown Voltage	V <sub>DS</sub>	$V_{GS} = 0 \text{ V}, \text{ I}_{D} = 250 \mu\text{A}$	60			v	
Gate Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V_{GS}, I_D = 250 \ \mu A$	1.0		3.0	v	
Gate-Body Leakage	I <sub>GSS</sub>	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 250	nA	
		$V_{DS} = 60 V, V_{GS} = 0 V$			1	μΑ	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	$V_{DS} = 60 \text{ V}, \text{ V}_{GS} = 0 \text{ V}, \text{ T}_{J} = 125 ^{\circ}\text{C}$			50		
		$V_{DS} = 60 \text{ V}, \text{ V}_{GS} = 0 \text{ V}, \text{ T}_{J} = 150 ^{\circ}\text{C}$			250	1	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	$V_{DS} \ge$ 10 V, $V_{GS}$ = 10 V	20			Α	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 6.6 A		0.073		Ω	
Drain-Source On-State Resistance <sup>a</sup>	R <sub>DS(on)</sub>	$V_{GS} = 4.5 \text{ V}, \text{ I}_{D} = 6 \text{ A}$		0.085			
Forward Transconductance <sup>a</sup>	9 <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 6.6 A		25		S	
Dynamic <sup>b</sup>		·					
Input Capacitance	C <sub>iss</sub>			660		pF	
Output Capacitance	C <sub>oss</sub>	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V, f = 1 MHz		85			
Reverse Transfer Capacitance	C <sub>rss</sub>			40			
Total Gate Charge <sup>c</sup>	Qg			19.8	30	nC	
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>	$V_{DS} = 30 \text{ V}, \text{ V}_{GS} = 10 \text{ V}, \text{ I}_{D} = 6.6 \text{ A}$		3.6			
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			4.1			
Gate Resistance	R <sub>g</sub>	f = 1 MHz	0.4	2	4	Ω	
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>			8	16		
Rise Time <sup>c</sup>	tr	$V_{DD} = 30 \text{ V}, \text{ R}_{L} = 9.6 \Omega$		11	20		
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>	$I_D \cong 5.2$ Å, $V_{GEN} = 10$ V, $R_g = 1 \Omega$		18	27		
Fall Time <sup>c</sup>	t <sub>f</sub>			5	10		
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>			38	57	ns	
Rise Time <sup>c</sup>	t <sub>r</sub>	$V_{DD} = 30 \text{ V}, \text{ R}_{1} = 9.6 \Omega$		58	87	1	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>	$I_D \cong 5.2$ Å, $V_{GEN} = 4.5$ V, $R_g = 1 \Omega$		18	27		
Fall Time <sup>c</sup>	t <sub>f</sub>			8	16		
Drain-Source Body Diode Ratings a	nd Characteri	stics <sup>b</sup> T <sub>C</sub> = 25 °C					
Continuous Current	۱ <sub>S</sub>				18		
Pulsed Current	I <sub>SM</sub>				25	A	
Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>F</sub> = 5.2 A, V <sub>GS</sub> = 0 V		0.8	1.5	V	
Reverse Recovery Time	t <sub>rr</sub>			34	51	ns	
Peak Reverse Recovery Current	I <sub>RM(REC)</sub>	I <sub>F</sub> = 5.2 A, dl/dt = 100 A/μs		3	5	Α	
Reverse Recovery Charge	Q <sub>rr</sub>			50	75	nC	

Notes:

a. Pulse test; pulse width  $\leq$  300 µs, duty cycle  $\leq$  2 %.

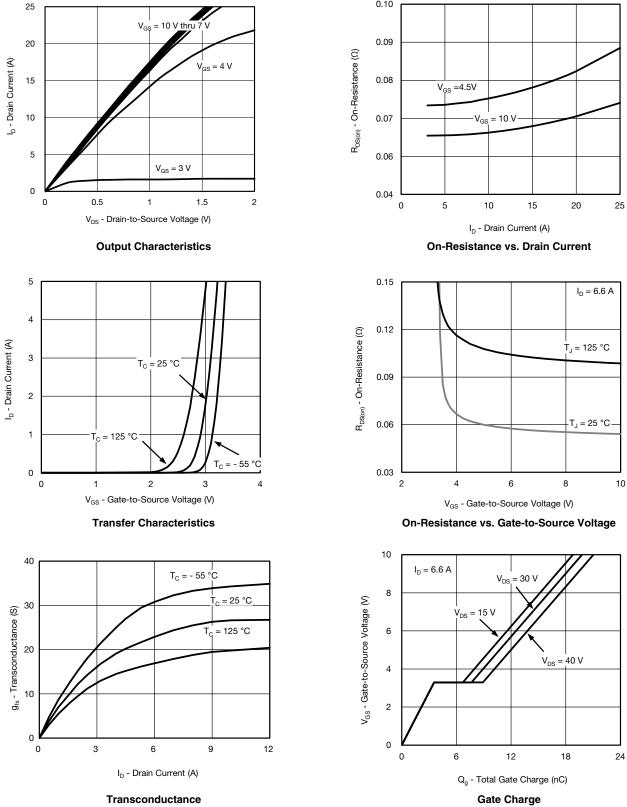
b. Guaranteed by design, not subject to production testing.

c. Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



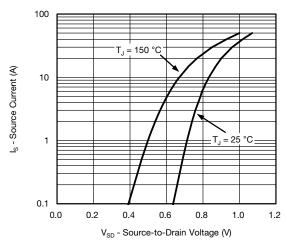




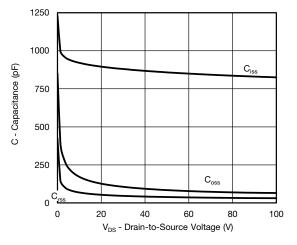
服务热线:400-655-8788



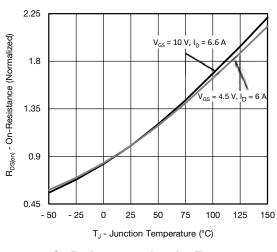




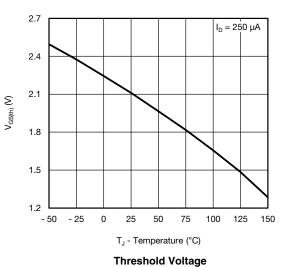
Source-Drain Diode Forward Voltage



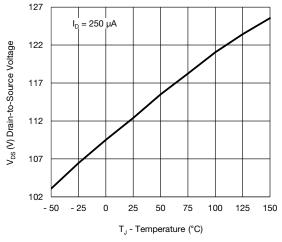




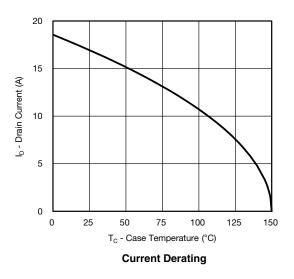
On-Resistance vs. Junction Temperature



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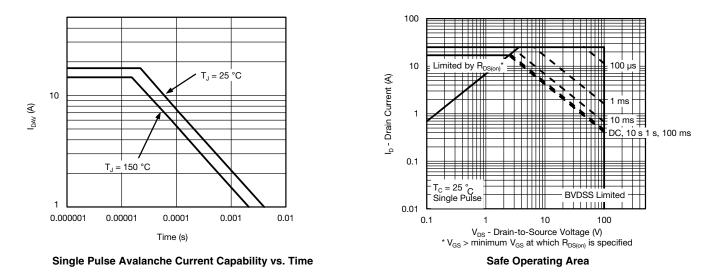


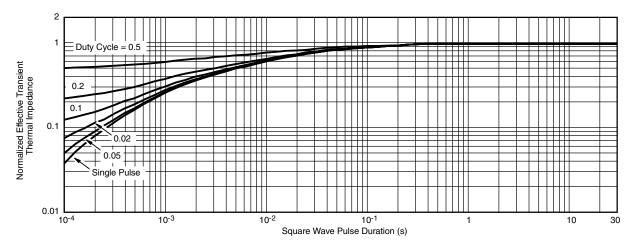
Drain Source Breakdown vs. Junction Temperature





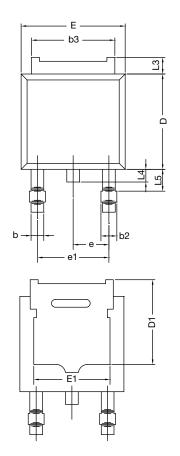
### TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



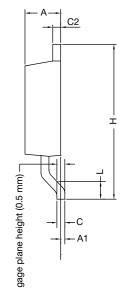


Normalized Thermal Transient Impedance, Junction-to-Case





### **TO-252AA Case Outline**



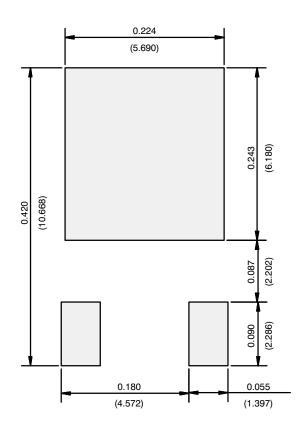
	MILLIMETERS		INC	HES
DIM.	MIN.	MAX.	MIN.	MAX.
А	2.18	2.38	0.086	0.094
A1	-	0.127	-	0.005
b	0.64	0.88	0.025	0.035
b2	0.76	1.14	0.030	0.045
b3	4.95	5.46	0.195	0.215
С	0.46	0.61	0.018	0.024
C2	0.46	0.89	0.018	0.035
D	5.97	6.22	0.235	0.245
D1	4.10	-	0.161	-
Е	6.35	6.73	0.250	0.265
E1	4.32	-	0.170	-
Н	9.40	10.41	0.370	0.410
е	2.28 BSC		0.090 BSC	
e1	4.56 BSC		0.180 BSC	
L	1.40	1.78	0.055	0.070
L3	0.89	1.27	0.035	0.050
L4	-	1.02	-	0.040
L5	1.01	1.52	0.040	0.060
ECN: T16-0236-Rev. P, 16-May-16 DWG: 5347				

#### Notes

• Dimension L3 is for reference only.



### **RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)**



Recommended Minimum Pads Dimensions in Inches/(mm)



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