

# BUK7511-55A-VB Datasheet N-Channel 60-V (D-S) MOSFET

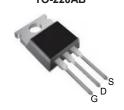
PRODUCT SUMMARY					
V <sub>DS</sub> (V)	$R_{DS(on)}\left(\Omega\right)$	I <sub>D</sub> (A) <sup>a</sup>			
60	0.011 at V <sub>GS</sub> = 10 V	60			
	0.013 at V <sub>GS</sub> = 4.5 V	50			

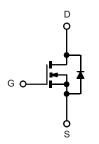
### **FEATURES**

- 175 °C Junction Temperature
- Trench Power MOSFET
- Material categorization:









N-Channel MOSEET	

ABSOLUTE MAXIMUM RATINGS (T <sub>C</sub> = 25 °C, unless otherwise noted)					
Parameter	Symbol	Limit	Unit		
Gate-Source Voltage	V <sub>GS</sub>	± 20	V		
Continuous Prain Current /T = 175 °C\h	T <sub>C</sub> = 25 °C	- I <sub>D</sub>	60		
Continuous Drain Current (T <sub>J</sub> = 175 °C) <sup>b</sup>	T <sub>C</sub> = 100 °C	טי	50ª		
Pulsed Drain Current	I <sub>DM</sub>	200	Α		
Continuous Source Current (Diode Conduction)		I <sub>S</sub>	50ª		
Avalanche Current		I <sub>AS</sub>	50	1	
Single Avalanche Energy (Duty Cycle ≤ 1 %)	L = 0.1 mH	E <sub>AS</sub>	125	mJ	
Maximum Power Dissipation	T <sub>C</sub> = 25 °C	P <sub>D</sub>	136	W	
iviaximum rowei Dissipation	T <sub>A</sub> = 25 °C	] 'D [	3 <sup>b</sup> , 8.3 <sup>b, c</sup>		
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	- 55 to 175	°C	

THERMAL RESISTANCE RATINGS						
Parameter		Symbol	Typical	Maximum	Unit	
Marrian Instanta A Auchinuta	t ≤ 10 sec	R <sub>thJA</sub>	15	18		
Maximum Junction-to-Ambient <sup>a</sup>	Steady State		40	50	°C/W	
Maximum Junction-to-Case		R <sub>thJC</sub>	0.85	1.1		

#### Notes:

- a. Package limited.
- b. Surface mounted on 1" x 1" FR4 board.
- $c.\ t \leq 10\ s.$



Parameter	Symbol	Test Conditions Min.		Typ.a	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V <sub>DS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA 60				V
Gate Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V_{GS}, I_D = 250 \mu A$ 1			3	V
Gate-Body Leakage	I <sub>GSS</sub>	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			± 100	nA
		V <sub>DS</sub> = 60 V, V <sub>GS</sub> = 0 V			1	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 60 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C			50	μΑ
		V <sub>DS</sub> = 60 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175 °C			250	1
On-State Drain Current <sup>b</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 10 V	60			Α
Drain-Source On-State Resistance <sup>b</sup>		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A		0.011		
	D	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A, T <sub>J</sub> = 125 °C		0.014		Ω
	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A, T <sub>J</sub> = 175 °C		0.018		
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 15 A		0.013		
Forward Transconductance <sup>b</sup>	9 <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 20 A		60		S
Dynamic						
Input Capacitance	C <sub>iss</sub>			4200		
Output Capacitance	C <sub>oss</sub>	$V_{GS} = 0 \text{ V}, V_{DS} = 25 \text{ V}, f = 1 \text{ MHz}$		570		pF
Reverse Transfer Capacitance	C <sub>rss</sub>			325		
Total Gate Charge <sup>c</sup>	Qg			47		
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>	$V_{DS} = 30 \text{ V}, V_{GS} = 10 \text{ V}, I_{D} = 50 \text{ A}$		10		nC
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$			12		
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>			10	20	
Rise Time <sup>c</sup>	t <sub>r</sub>	$V_{DD}$ = 30 V, $R_L$ = 0.6 $\Omega$		15	25	no
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>	$I_D \cong 50 \text{ A}, V_{GEN} = 10 \text{ V}, R_g = 2.5 \Omega$		35	50	ns
Fall Time <sup>c</sup>	t <sub>f</sub>			20	30	
Source-Drain Diode Ratings and Cha	aracteristics (	T <sub>C</sub> = 25 °C)			<u>'</u>	
Pulsed Current	I <sub>SM</sub>				60	Α
Diode Forward Voltage	V <sub>SD</sub>	I <sub>F</sub> = 20 A, V <sub>GS</sub> = 0 V		1	1.5	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 20 A, di/dt = 100 A/μs		45	100	ns

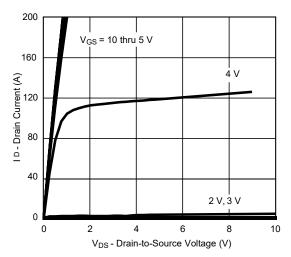
#### Notes:

- a. For design aid only; not subject to production testing.
- b. Pulse test; pulse width  $\leq$  300 µs, duty cycle  $\leq$  2 %.
- c. Independent of operating temperature.

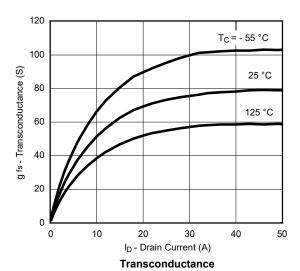
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

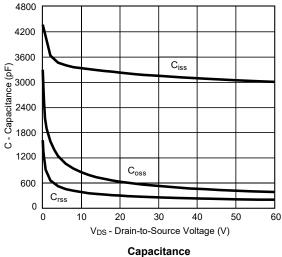


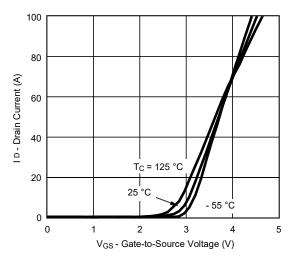
# TYPICAL CHARACTERISTICS (25 °C unless noted)



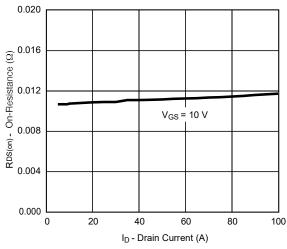
#### **Output Characteristics**



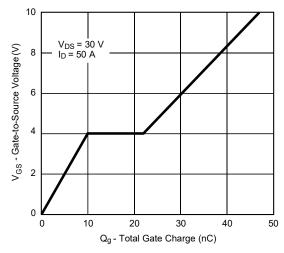




**Transfer Characteristics** 



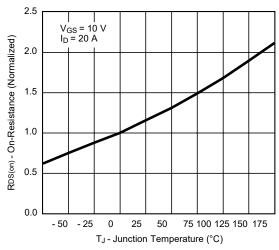
On-Resistance vs. Drain Current



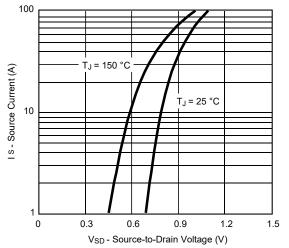
**Gate Charge** 



# TYPICAL CHARACTERISTICS (25 °C unless noted)



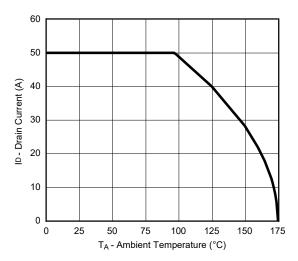
On-Resistance vs. Junction Temperature

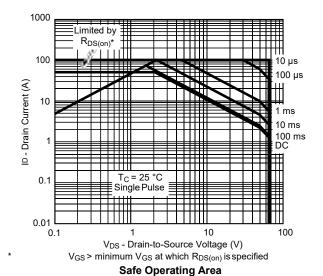


Source-Drain Diode Forward Voltage

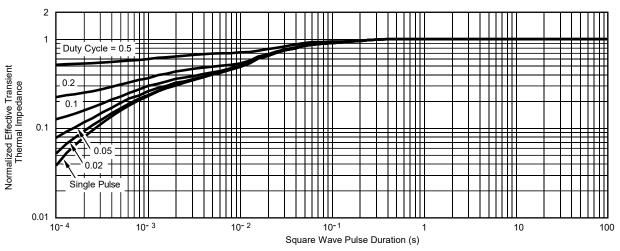


### THERMAL RATINGS





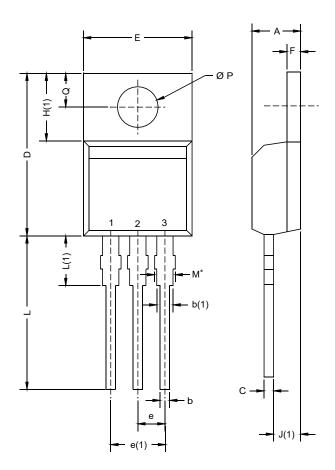
**Maximum Drain Current vs. Ambient Temperature** 



Normalized Thermal Transient Impedance, Junction-to-Case



# **TO-220AB**



DIM	MILLIM	IETERS	INCHES		
DIM.	MIN.	MAX.	MIN.	MAX.	
Α	4.24	4.65	0.167	0.183	
b	0.69	1.02	0.027	0.040	
b(1)	1.14	1.78	0.045	0.070	
С	0.36	0.61	0.014	0.024	
D	14.33	15.85	0.564	0.624	
Е	9.96	10.52	0.392	0.414	
е	2.41	2.67	0.095	0.105	
e(1)	4.88	5.28	0.192	0.208	
F	1.14	1.40	0.045	0.055	
H(1)	6.10	6.71	0.240	0.264	
J(1)	2.41	2.92	0.095	0.115	
L	13.36	14.40	0.526	0.567	
L(1)	3.33	4.04	0.131	0.159	
ØР	3.53	3.94	0.139	0.155	
Q	2.54	3.00	0.100	0.118	
ECN: X15-0 DWG: 603	0364-Rev. C,	14-Dec-15			

## Note

• M\* = 0.052 inches to 0.064 inches (dimension including protrusion), heatsink hole for HVM



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