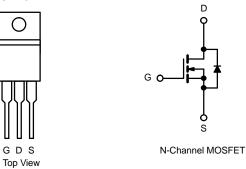


# BUK653R7-30C-VB Datasheet N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY					
V <sub>DS</sub> (V)	30				
$R_{DS(on)} (\Omega)$ at $V_{GS} = 10 V$	0. 003				
$R_{DS(on)} (\Omega)$ at $V_{GS} = 4.5 V$	0.004				
I <sub>D</sub> (A)	120				
Configuration	Single				

#### TO-220AB



## **FEATURES**

- Trench Power MOSFET
  100 % R<sub>g</sub> and UIS Tested
- Compliant to RoHS Directive 2011/65/EU

### **APPLICATIONS**

- OR-ing
- Server •
- DC/DC

Parameter	Symbol	Limit	Unit	
Drain-Source Voltage		V <sub>DS</sub>	30	V
Gate-Source Voltage		V <sub>GS</sub>	± 20	v
	T <sub>C</sub> = 25 °C		120	
Continuous Drain Current (T - 175 °C)	T <sub>C</sub> = 70 °C		60 <sup>e</sup>	
Continuous Drain Current (T <sub>J</sub> = 175 °C)	T <sub>A</sub> = 25 °C	I <sub>D</sub>	28.8 <sup>b, c</sup>	Α
	T <sub>A</sub> = 70 °C		19 <sup>b, c</sup>	A
Pulsed Drain Current	I <sub>DM</sub>	380		
Avalanche Current Pulse			36	
Single Pulse Avalanche Energy	L = 0.1 mH	E <sub>AS</sub>	64.8	V
Continuous Source-Drain Diode Current	T <sub>C</sub> = 25 °C	L.	90 <sup>a, e</sup>	A
	T <sub>A</sub> = 25 °C	۱ <sub>S</sub>	3.13 <sup>b, c</sup>	A
	T <sub>C</sub> = 25 °C		250 <sup>a</sup>	
Maximum Power Dissipation	T <sub>C</sub> = 70 °C	P <sub>D</sub>	175	w
	T <sub>A</sub> = 25 °C	۲D	3.75 <sup>b, c</sup>	VV
	T <sub>A</sub> = 70 °C		2.63 <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	Тур.	Max.	Unit	
Maximum Junction-to-Ambient <sup>b, d</sup>	$t \le 10 \text{ sec}$	R <sub>thJA</sub>	32	40	°C/W	
Maximum Junction-to-Case	Steady State	R <sub>thJC</sub>	0.5	0.6	0,00	

Notes:

a. Based on  $T_C = 25 \text{ °C}$ . b. Surface mounted on 1" x 1" FR4 board.

c. t = 10 sec.

d. Maximum under steady state conditions is 90 °C/W.
 e. Calculated based on maximum junction temperature. Package limitation current is 90 A.



Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Static				•	•	•	
Drain-Source Breakdown Voltage	V <sub>DS</sub>	$V_{GS} = 0 V, I_{D} = 250 \mu A$	30			V	
V <sub>DS</sub> Temperature Coefficient	$\Delta V_{DS}/T_{J}$	1 250 4		35			
V <sub>GS(th)</sub> Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	I <sub>D</sub> = 250 μA		- 7.5		mV/°C	
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V_{GS}, I_{D} = 250 \ \mu A$	1.0		2.5	V	
Gate-Source Leakage	I <sub>GSS</sub>	$V_{DS} = 0 V$ , $V_{GS} = \pm 20 V$			± 100	nA	
Zero Gate Voltage Drain Current	1	$V_{DS} = 30 \text{ V}, V_{GS} = 0 \text{ V}$			1		
	I <sub>DSS</sub>	$V_{DS} = 30 \text{ V}, V_{GS} = 0 \text{ V}, T_{J} = 55 \text{ °C}$			10 <sup>µ</sup>		
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	$V_{DS} \ge 5 \text{ V}, V_{GS} = 10 \text{ V}$	90			А	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 28.8 A		0.003			
Drain-Source On-State Resistance <sup>a</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 27 A		0.004		Ω	
Forward Transconductance <sup>a</sup>	9 <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 28.8 A		160		S	
Dynamic <sup>b</sup>							
Input Capacitance	C <sub>iss</sub>			3100			
Output Capacitance	C <sub>oss</sub>	$V_{DS}$ = 15 V, $V_{GS}$ = 0 V, f = 1 MHz		725		pF	
Reverse Transfer Capacitance	C <sub>rss</sub>			370		1	
Total Gate Charge	0	$V_{DS}$ = 15 V, $V_{GS}$ = 10 V, $I_{D}$ = 28.8 A		171	257	nC	
	Qg	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 28.8 A		81.5	123		
Gate-Source Charge	Q <sub>gs</sub>			34			
Gate-Drain Charge	Q <sub>gd</sub>			29			
Gate Resistance	R <sub>g</sub>	f = 1 MHz		1.4	2.1	Ω	
Turn-On Delay Time	t <sub>d(on)</sub>			18	27		
Rise Time	t <sub>r</sub>	$V_{DD}$ = 15 V, $R_L$ = 0.625 $\Omega$		11	17		
Turn-Off Delay Time	t <sub>d(off)</sub>	$I_D \cong$ 24 A, $V_{GEN}$ = 10 V, $R_g$ = 1 $\Omega$		70	105		
Fall Time	t <sub>f</sub>			10	15		
Turn-On Delay Time	t <sub>d(on)</sub>			55	83	ns	
Rise Time	t <sub>r</sub>	$V_{DD}$ = 15 V, $R_L$ = 0.67 $\Omega$		180	270		
Turn-Off Delay Time	t <sub>d(off)</sub>	$\rm I_D \cong 22.5$ A, $\rm V_{GEN}$ = 4.5 V, $\rm R_g$ = 1 $\Omega$		55	83	1	
Fall Time	t <sub>f</sub>			12	18	1	
Drain-Source Body Diode Characteristic	cs						
Continuous Source-Drain Diode Current	۱ <sub>S</sub>	T <sub>C</sub> = 25 °C			90	Δ	
Pulse Diode Forward Current <sup>a</sup>	I <sub>SM</sub>				90	A	
Body Diode Voltage	V <sub>SD</sub>	I <sub>S</sub> = 22 A		0.8	1.2	V	
Body Diode Reverse Recovery Time	t <sub>rr</sub>			52	78	ns	
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>	I <sub>F</sub> = 20 A, di/dt = 100 A/μs, Τ <sub>.1</sub> = 25 °C		70.2	105	nC	
Reverse Recovery Fall Time	t <sub>a</sub>	$r_F = 20 \text{ A}, \text{ al/al} = 100 \text{ A/}\text{µs}, r_J = 25 \text{ °C}$		27			
Reverse Recovery Rise Time	t <sub>b</sub>			25		ns	

Notes:

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

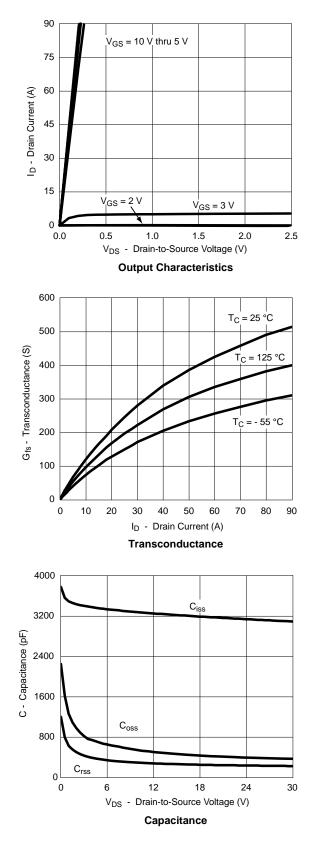
b. Guaranteed by design, not subject to production testing.

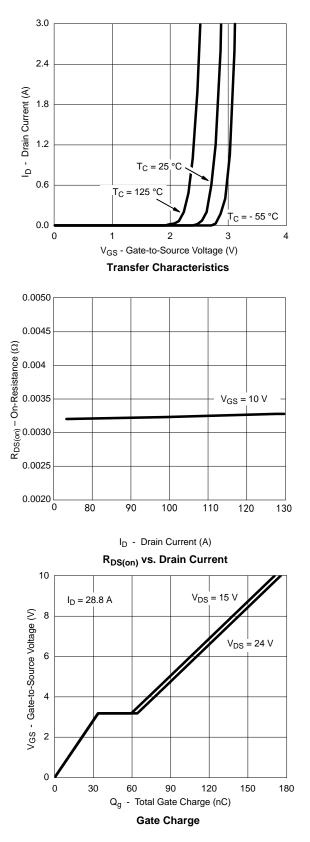
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

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

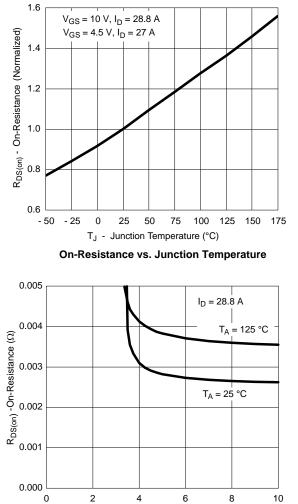




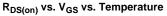
服务热线:400-655-8788

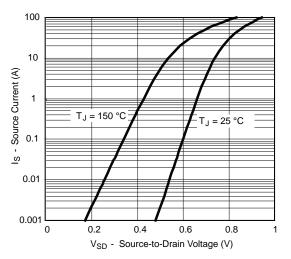


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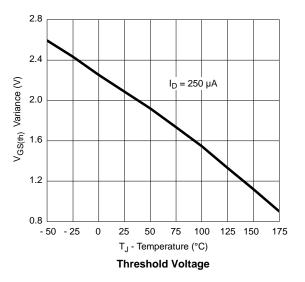


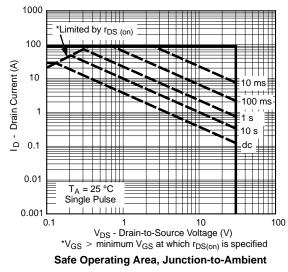
2 4 6 8 V<sub>GS</sub> - Gate-to-Source Voltage (V)

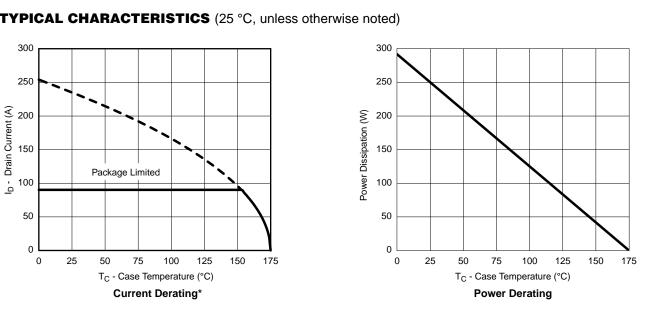




Forward Diode Voltage vs. Temperature

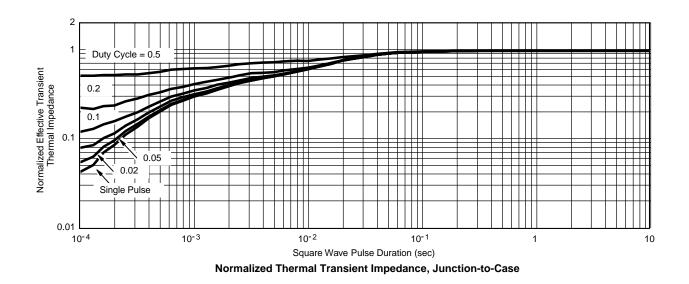






## TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

\*The power dissipation  $P_D$  is based on  $T_{J(max)}$  = 175 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

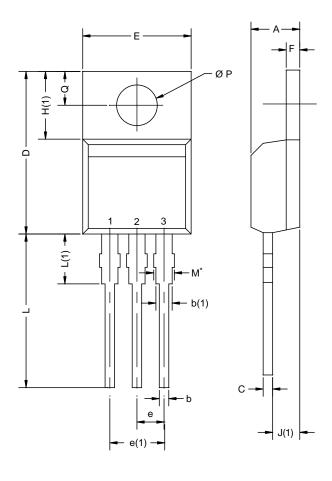


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# **TO-220AB**



	MILLIM	IETERS	INCHES		
DIM.	MIN.	MAX.	MIN.	MAX.	
А	4.25	4.65	0.167	0.183	
b	0.69	1.01	0.027	0.040	
b(1)	1.20	1.73	0.047	0.068	
С	0.36	0.61	0.014	0.024	
D	14.85	15.49	0.585	0.610	
Е	10.04	10.51	0.395	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)	6.09	6.48	0.240	0.255	
J(1)	2.41	2.92	0.095	0.115	
L	13.35	14.02	0.526	0.552	
L(1)	3.32	3.82	0.131	0.150	
ØΡ	3.54	3.94	0.139	0.155	
Q	2.60	3.00	0.102	0.118	

#### Notes

\* M = 1.32 mm to 1.62 mm (dimension including protrusion) Heatsink hole for HVM



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