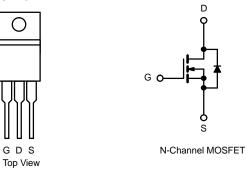


N303AP-VB Datasheet N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY	
V _{DS} (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 _D (A)	120
Configuration	Single

TO-220AB



FEATURES

- Trench Power MOSFET
 100 % R_g and UIS Tested
- Compliant to RoHS Directive 2011/65/EU

APPLICATIONS

- OR-ing
- Server ٠
- DC/DC

Parameter	Symbol	Limit	Unit		
Drain-Source Voltage		V _{DS}	30	V	
Gate-Source Voltage		V _{GS}	± 20	V	
	T _C = 25 °C		120	A	
Continuous Drain Current (T $= 175 ^{\circ}\text{C}$)	T _C = 70 °C		60 ^e		
Continuous Drain Current (T _J = 175 °C)	T _A = 25 °C	I _D	28.8 ^{b, c}		
	T _A = 70 °C		19 ^{b, c}	A	
Pulsed Drain Current		I _{DM}	380	_	
Avalanche Current Pulse		I _{AS}	36		
Single Pulse Avalanche Energy	L = 0.1 MH	E _{AS}	64.8	V	
Continuous Source-Drain Diode Current	T _C = 25 °C	I _S	90 ^{a, e}	Α	
Continuous Source-Drain Diode Current	T _A = 25 °C	'S	3.13 ^{b, c}	A	
	T _C = 25 °C		250 ^a		
Maximum Power Dissipation	T _C = 70 °C	P _D	175	w	
	T _A = 25 °C	' D	3.75 ^{b, c}		
	T _A = 70 °C		2.63 ^{b, c}		
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 175	°C	

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Тур.	Max.	Unit
Maximum Junction-to-Ambient ^{b, d}	$t \le 10 \text{ sec}$	R _{thJA}	32	40	°C/W
Maximum Junction-to-Case	Steady State	R _{thJC}	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 _{DS}	$V_{GS} = 0 V, I_{D} = 250 \mu A$	30			V	
V _{DS} Temperature Coefficient	$\Delta V_{DS}/T_{J}$	I _D = 250 μA		35			
V _{GS(th)} Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	$I_D = 250 \ \mu A$		- 7.5		mv/°C	
Gate-Source Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}, I_D = 250 \ \mu A$	1.0		2.5	V	
Gate-Source Leakage	I _{GSS}	$V_{DS} = 0 V$, $V_{GS} = \pm 20 V$			± 100	nA	
		$V_{DS} = 30 \text{ V}, \text{ V}_{GS} = 0 \text{ V}$			1		
Zero Gate Voltage Drain Current	I _{DSS}	$V_{DS} = 30 \text{ V}, \text{ V}_{GS} = 0 \text{ V}, \text{ T}_{J} = 55 ^{\circ}\text{C}$			10	mV/°(μA
On-State Drain Current ^a	I _{D(on)}	$V_{DS} \ge 5 \text{ V}, \text{ V}_{GS} = 10 \text{ V}$	90			Α	
	D C	V _{GS} = 10 V, I _D = 28.8 A		0.003		Ω	
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 4.5 V, I _D = 27 A		0.004			
Forward Transconductance ^a	9 _{fs}	V _{DS} = 15 V, I _D = 28.8 A		160		S	
Dynamic ^b					•	1	
Input Capacitance	C _{iss}			3100			
Output Capacitance	C _{oss}	V _{DS} = 15 V, V _{GS} = 0 V, f = 1 MHz		725		pF	
Reverse Transfer Capacitance	C _{rss}			370			
	$V_{DS} = 15 V_{V} V_{CS} = 10 V_{V}$	V _{DS} = 15 V, V _{GS} = 10 V, I _D = 28.8 A		171	257		
Total Gate Charge	Qg	2 _g		81.5	123	-	
Gate-Source Charge	Q _{gs}	V_{DS} = 15 V, V_{GS} = 4.5 V, I_{D} = 28.8 A		34		nC	
Gate-Drain Charge	Q _{gd}			29			
Gate Resistance	Rg	f = 1 MHz		1.4	2.1	Ω	
Turn-On Delay Time	t _{d(on)}			18	27		
Rise Time	t _r	V_{DD} = 15 V, R_{L} = 0.625 Ω		11	17		
Turn-Off Delay Time	t _{d(off)}	$I_D \cong 24$ A, V_{GEN} = 10 V, R_g = 1 Ω		70	105		
Fall Time	t _f			10	15		
Turn-On Delay Time	t _{d(on)}			55	83	ns	
Rise Time	t _r	V_{DD} = 15 V, R_{L} = 0.67 Ω		180	270		
Turn-Off Delay Time	t _{d(off)}	$I_D \cong 22.5 \text{ A}, \text{ V}_{\text{GEN}} = 4.5 \text{ V}, \text{ R}_{\text{g}} = 1 \Omega$		55	83		
Fall Time	t _f	-		12	18		
Drain-Source Body Diode Characteristic			1			1	
Continuous Source-Drain Diode Current	۱ _S	T _C = 25 °C			90	•	
Pulse Diode Forward Current ^a	I _{SM}				90	A	
Body Diode Voltage	V _{SD}	I _S = 22 A		0.8	1.2	V	
Body Diode Reverse Recovery Time	t _{rr}			52	78	ns	
Body Diode Reverse Recovery Charge	Q _{rr}			70.2	105	nC	
Reverse Recovery Fall Time	t _a	$I_F = 20 \text{ A}, \text{ di/dt} = 100 \text{ A/}\mu\text{s}, T_J = 25 \text{ °C}$		27			
Reverse Recovery Rise Time	t _b			25		ns	

Notes:

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

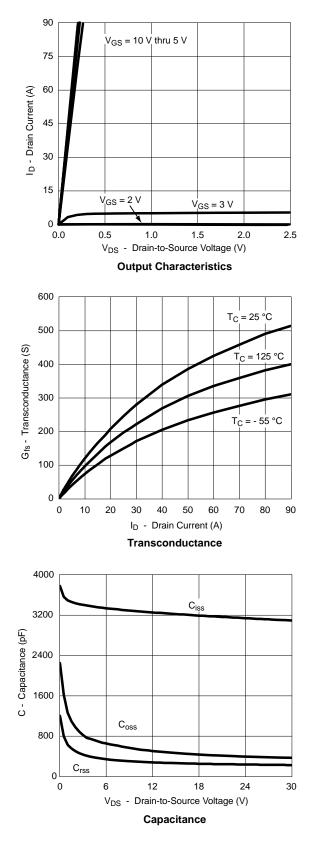
b. Guaranteed by design, not subject to production testing.

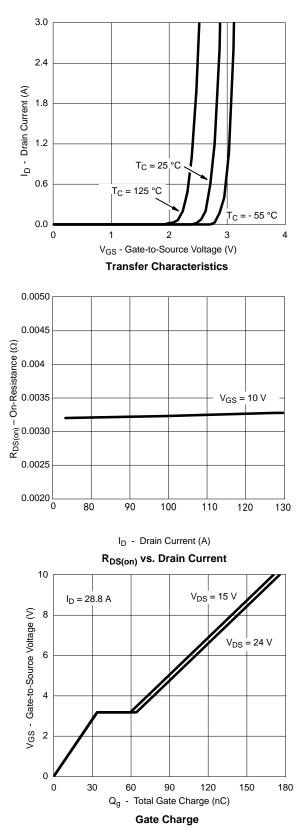
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

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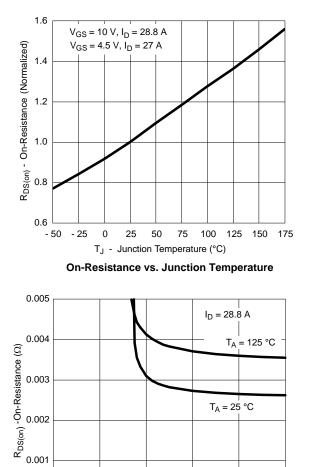


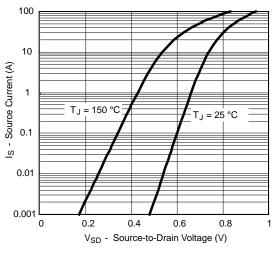




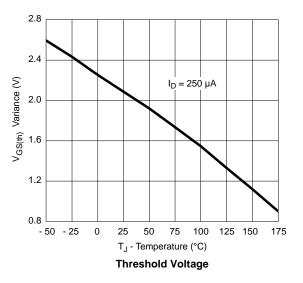


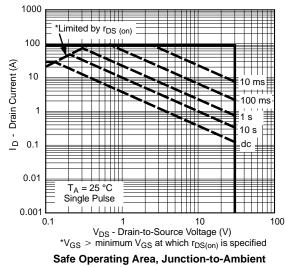
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)





Forward Diode Voltage vs. Temperature





0.000

0

2

4

6

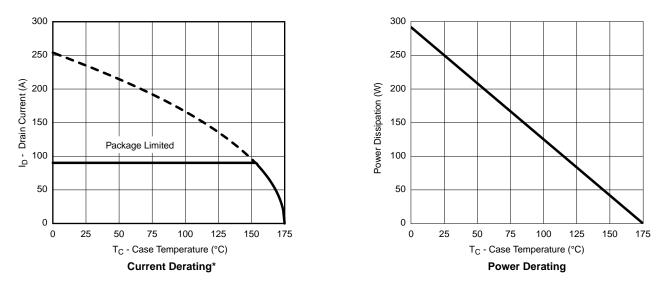
 V_{GS} - Gate-to-Source Voltage (V)

R_{DS(on)} vs. V_{GS} vs. Temperature

8

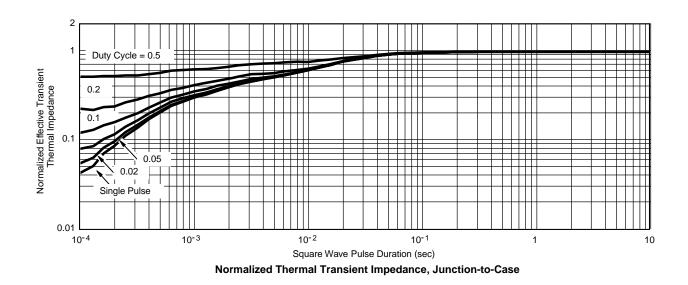
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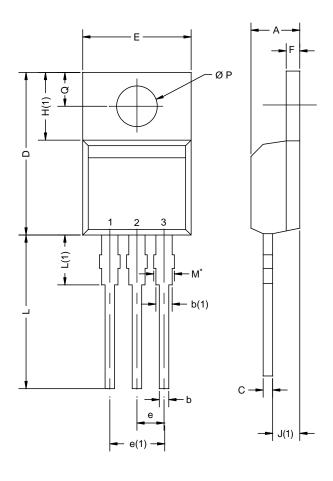
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

*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.





TO-220AB



	MILLIM	IETERS	INC	HES
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
ØР	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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