

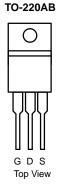
PHP78NQ03LT-VB Datasheet N-Channel 30-V (D-S) MOSFET

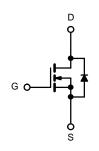
PRODUCT SUMMARY	
V _{DS} (V)	30
$R_{DS(on)}(\Omega)$ at $V_{GS} = 10 \text{ V}$	0. 003
$R_{DS(on)}(\Omega)$ at $V_{GS} = 4.5 \text{ V}$	0. 004
I _D (A)	120
Configuration	Single

FEATURES

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







N-Channel MOSFET

APPLICATIONS

- OR-ing
- Server
- DC/DC

Parameter		Symbol	Limit	Unit	
Drain-Source Voltage		V _{DS}	30	V	
Gate-Source Voltage		V _{GS}	± 20		
Continuous Drain Current (T _J = 175 °C)	T _C = 25 °C		120		
	T _C = 70 °C	L	60 ^e	A	
	T _A = 25 °C	I _D	28.8 ^{b, c}		
	T _A = 70 °C		19 ^{b, c}		
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	
Ocationary Oceana Basis Bis to Oceana	T _C = 25 °C	l.	90 ^{a, e}		
Continuous Source-Drain Diode Current	T _A = 25 °C	I _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 ≤ 10 sec	R _{thJA}	32	40	°C/W	
Maximum Junction-to-Case	Steady State	R _{thJC}	0.5	0.6		

- a. Based on T_C = 25 °C.
 b. Surface mounted on 1" x 1" FR4 board.

- d. 1 = 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				<u>'</u>		•	
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$	30			V	
V _{DS} Temperature Coefficient	$\Delta V_{DS}/T_{J}$	J 250 A		35		>//00	
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}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			± 100	nA	
Zana Oata Valtana Basis Oursest		$V_{DS} = 30 \text{ V}, V_{GS} = 0 \text{ V}$			1		
Zero Gate Voltage Drain Current	IDSS	$V_{DS} = 30 \text{ V}, V_{GS} = 0 \text{ V}, T_{J} = 55 ^{\circ}\text{C}$			10	μA	
On-State Drain Current ^a	I _{D(on)}	$V_{DS} \ge 5 \text{ V}, V_{GS} = 10 \text{ V}$	90			Α	
		$V_{GS} = 10 \text{ V}, I_D = 28.8 \text{ A}$		0.003		Ω	
Drain-Source On-State Resistance ^a	R _{DS(on)}	$V_{GS} = 4.5 \text{ V}, I_D = 27 \text{ A}$		0.004			
Forward Transconductance ^a	9 _{fs}	V _{DS} = 15 V, I _D = 28.8 A		160		S	
Dynamic ^b				•			
Input Capacitance	C _{iss}			3100		pF	
Output Capacitance	C _{oss}	$V_{DS} = 15 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		725			
Reverse Transfer Capacitance	C _{rss}			370			
Total Gate Charge	0	$V_{DS} = 15 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 28.8 \text{ A}$		171	257	nC	
	Q_g			81.5	123		
Gate-Source Charge	Q _{gs}	$V_{DS} = 15 \text{ V}, V_{GS} = 4.5 \text{ V}, I_{D} = 28.8 \text{ A}$		34			
Gate-Drain Charge	Q_{gd}			29			
Gate Resistance	R _g	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)}	$I_D \cong 24 \text{ A}, V_{GEN} = 10 \text{ V}, R_g = 1 \Omega$		70	105		
Fall Time	t _f			10	15	1	
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)}	$I_D\cong 22.5$ A, $V_{GEN}=4.5$ V, $R_g=1$ Ω		55	83		
Fall Time	t _f			12	18	1	
Drain-Source Body Diode Characteristic	cs						
Continuous Source-Drain Diode Current	I _S	$T_C = 25 ^{\circ}C$			90	۸	
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}	L_ = 20 A di/dt = 100 A/vo T = 25 °C		70.2	105	nC	
Reverse Recovery Fall Time	t _a	$I_F = 20 \text{ A}, \text{ di/dt} = 100 \text{ A/}\mu\text{s}, T_J = 25 ^{\circ}\text{C}$		27			
Reverse Recovery Rise Time	t _b	7		25		ns	

Notes:

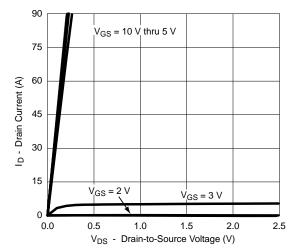
- a. Pulse test; pulse width $\leq 300~\mu s,$ duty cycle $\leq 2~\%.$
- b. Guaranteed by design, not subject to production testing.

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.

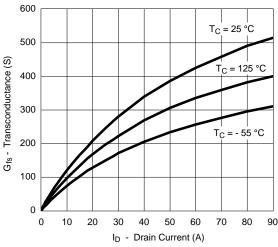
服务热线:400-655-8788



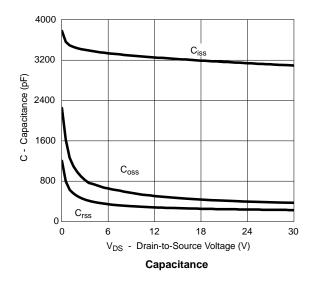
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

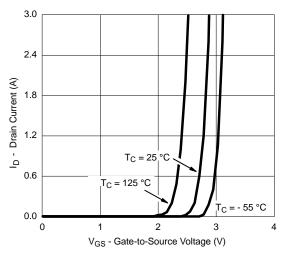


Output Characteristics

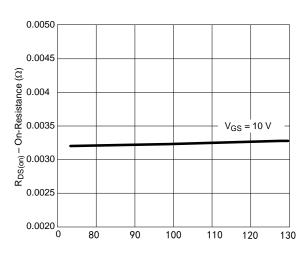


Transconductance

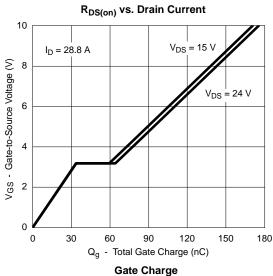




Transfer Characteristics



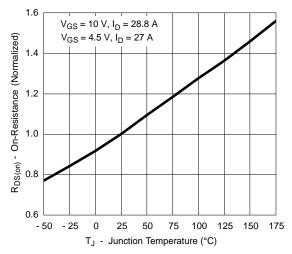
 I_D - Drain Current (A)



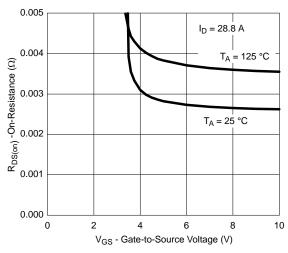
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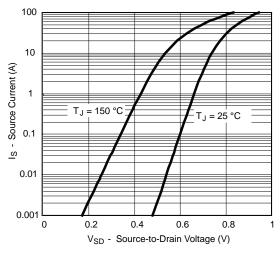
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On-Resistance vs. Junction Temperature



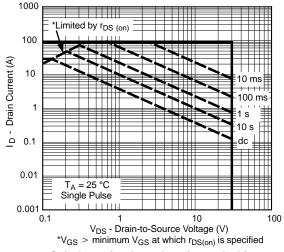
 $R_{DS(on)}$ vs. V_{GS} vs. Temperature



Forward Diode Voltage vs. Temperature



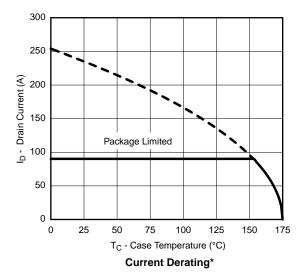
Threshold Voltage

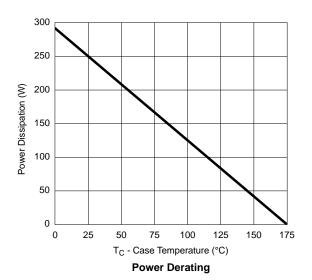


Safe Operating Area, Junction-to-Ambient

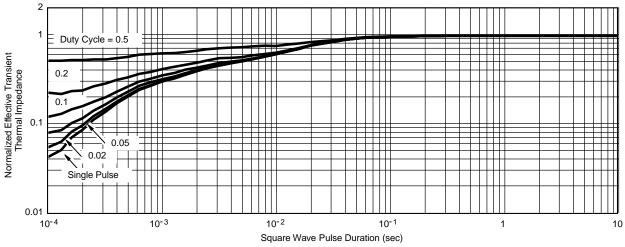


TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)





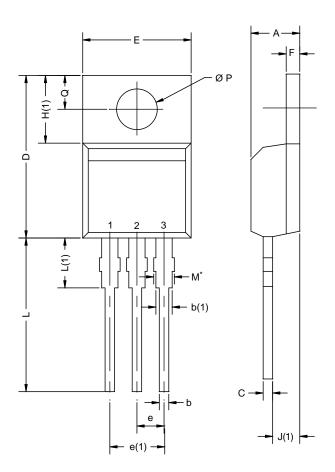
*The power dissipation P_D is based on $T_{J(max)}$ = 175 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.



Normalized Thermal Transient Impedance, Junction-to-Case



TO-220AB



	MILLIN	IETERS	INC	HES	
DIM.	MIN.	MAX.	MIN.	MAX.	
Α	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	
ECN: X12-0208-Rev. N, 08-Oct-12 DWG: 5471					

Notes

 $^{^{\}star}$ M = 1.32 mm to 1.62 mm (dimension including protrusion) Heatsink hole for HVM



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