NTB23N03R

Power MOSFET
23 Amps, 25 Volts
N−Channel D^{2}PAK

Designed for low voltage, high speed switching applications in power supplies, converters and power motor controls and bridge circuits.

Typical Applications

- Planar HD3e Process for Fast Switching Performance
- Low $R_{DS(on)}$ to Minimize Conduction Loss
- Low C_{iss} to Minimize Driver Loss
- Low Gate Charge
- Optimized for High Side Switching Requirements in High−Efficiency DC−DC Converters

MAXIMUM RATINGS (T_J = 25°C unless otherwise specified)

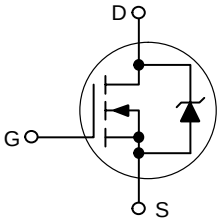
Parameter	Symbol	Value	Unit
Drain−to−Source Voltage	V_{DSS}	25	Vdc
Gate−to−Source Voltage − Continuous	V_{GS}	±20	Vdc
Drain Current − Continuous @ T_A = 25°C, Limited by Chip − Continuous @ T_A = 25°C, Limited by Package − Single Pulse (t_p = 10 μs)	 I_D I_D I_{DM}	 23 6.0 60	A
Total Power Dissipation @ T_A = 25°C	P_D	37.5	W
Operating and Storage Temperature Range	T_J, T_{stg}	−55 to 150	°C
Thermal Resistance − Junction−to−Case	$R_{\theta JC}$	3.3	°C/W
Maximum Lead Temperature for Soldering Purposes, 1/8″ from case for 10 seconds	T_L	260	°C

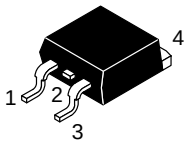
ON Semiconductor®

http://onsemi.com

23 AMPERES, 25 VOLTS
$R_{DS(on)}$ = 32 mΩ (Typ)

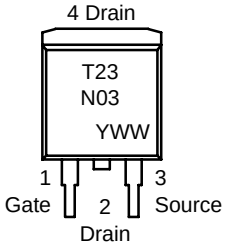
N−CHANNEL





D^{2}PAK
CASE 418B
Style 2

MARKING DIAGRAM & PIN ASSIGNMENTS



T23N03 = Specific Device Code
Y = Year
WW = Work Week

ORDERING INFORMATION

Device	Package	Shipping
NTB23N03R	D^{2}PAK	50 Units/Rail
NTB23N03RT4	D^{2}PAK	800/Tape & Reel

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise specified)

Characteristics		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain−to−Source Breakdown Voltage (Note 1) (V_{GS} = 0 Vdc, I_D = 250 μAdc) Temperature Coefficient (Positive)		$V(br)_{DSS}$	 25 −	 28 −	 − −	Vdc mV/°C
Zero Gate Voltage Drain Current (V_{DS} = 20 Vdc, V_{GS} = 0 Vdc) (V_{DS} = 20 Vdc, V_{GS} = 0 Vdc, T_J = 150°C)		I_{DSS}	 − −	 − −	 1.0 10	μAdc
Gate−Body Leakage Current (V_{GS} = ±20 Vdc, V_{DS} = 0 Vdc)		I_{GSS}	−	−	±100	nAdc
ON CHARACTERISTICS (Note 1)						
Gate Threshold Voltage (Note 1) (V_{DS} = V_{GS}, I_D = 250 μAdc) Threshold Temperature Coefficient (Negative)		$V_{GS(th)}$	 1.0 −	 1.8 −	 2.0 −	Vdc mV/°C
Static Drain−to−Source On−Resistance (Note 1) (V_{GS} = 4.5 Vdc, I_D = 6 Adc) (V_{GS} = 10 Vdc, I_D = 6 Adc)		$R_{DS(on)}$	 − −	 50.3 32.3	 60 45	mΩ
Forward Transconductance (Note 1) (V_{DS} = 10 Vdc, I_D = 6 Adc)		g_{FS}	 −	 14	 −	Mhos
DYNAMIC CHARACTERISTICS						
Input Capacitance	(V_{DS} = 20 Vdc, V_{GS} = 0 V, f = 1 MHz)	C_{iss}	−	225	−	pF
Output Capacitance		C_{oss}	−	108	−	
Transfer Capacitance		C_{rss}	−	48	−	
SWITCHING CHARACTERISTICS (Note 2)						
Turn−On Delay Time	(V_{GS} = 10 Vdc, V_{DD} = 10 Vdc, I_D = 6 Adc, R_G = 3 Ω)	$t_{d(on)}$	−	2.0	−	ns
Rise Time		t_r	−	14.9	−	
Turn−Off Delay Time		$t_{d(off)}$	−	9.9	−	
Fall Time		t_f	−	2.0	−	
Gate Charge	(V_{GS} = 4.5 Vdc, I_D = 6 Adc, V_{DS} = 10 Vdc) (Note 1)	Q_T	−	3.76	−	nC
		Q_1	−	1.7	−	
		Q_2	−	1.6	−	
SOURCE−DRAIN DIODE CHARACTERISTICS						
Forward On−Voltage	(I_S = 6 Adc, V_{GS} = 0 Vdc) (Note 1) (I_S = 6 Adc, V_{GS} = 0 Vdc, T_J = 125°C)	V_{SD}	 − −	 0.87 0.74	 1.2 −	Vdc
Reverse Recovery Time	(I_S = 6 Adc, V_{GS} = 0 Vdc, dI_S/dt = 100 A/μs) (Note 1)	t_{rr}	−	8.7	−	ns
		t_a	−	5.2	−	
		t_b	−	3.5	−	
Reverse Recovery Stored Charge		Q_{RR}	−	0.003	−	μC

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
2. Switching characteristics are independent of operating junction temperatures.

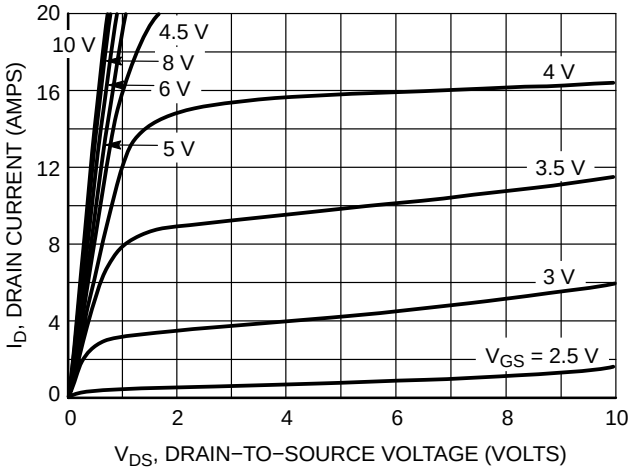


Figure 1. On−Region Characteristics

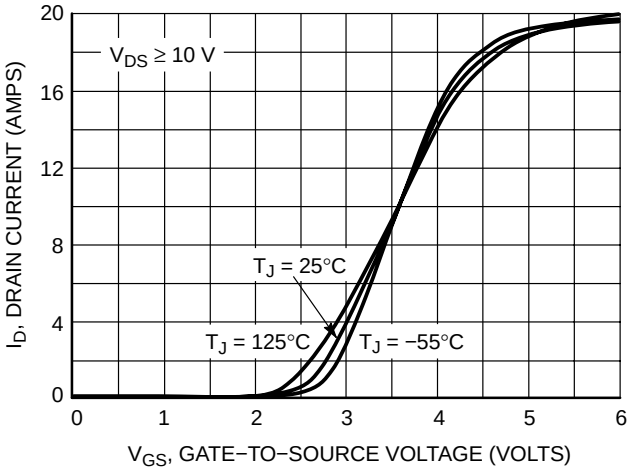


Figure 2. Transfer Characteristics

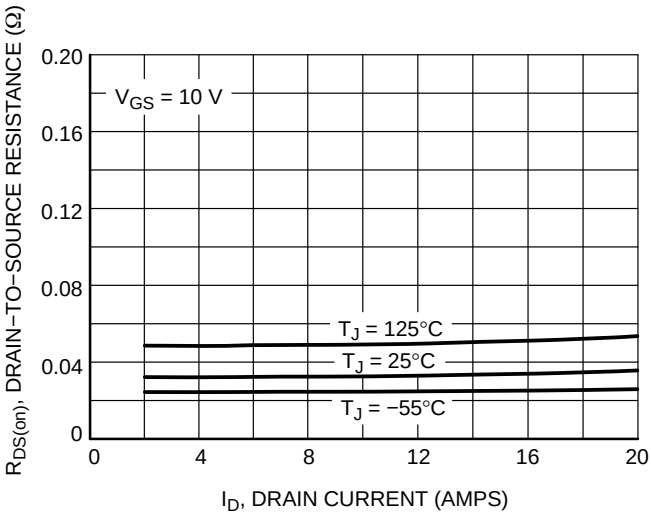


Figure 3. On−Resistance versus Drain Current and Temperature

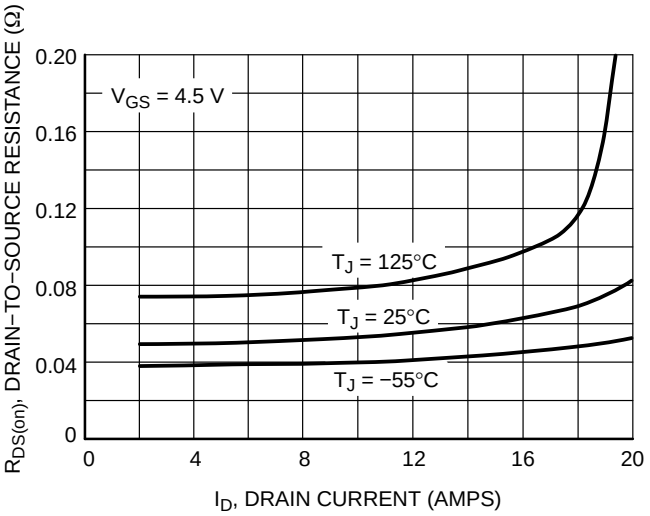


Figure 4. On−Resistance versus Drain Current and Temperature

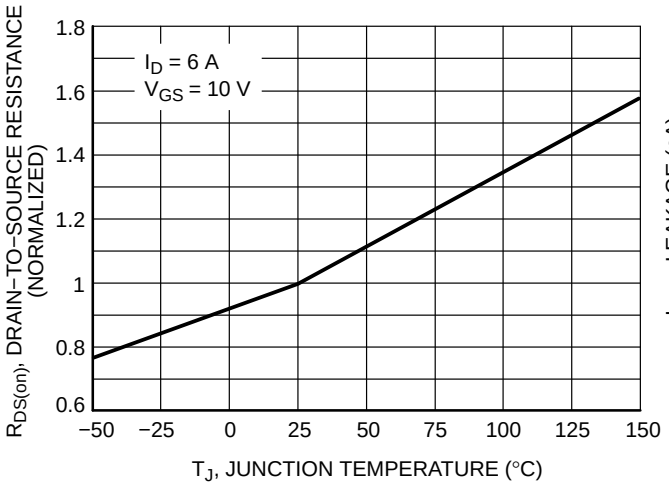


Figure 5. On−Resistance Variation with Temperature

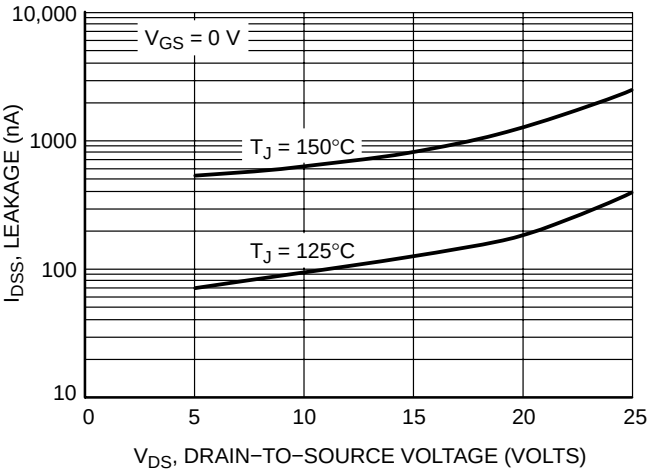


Figure 6. Drain−to−Source Leakage Current versus Voltage

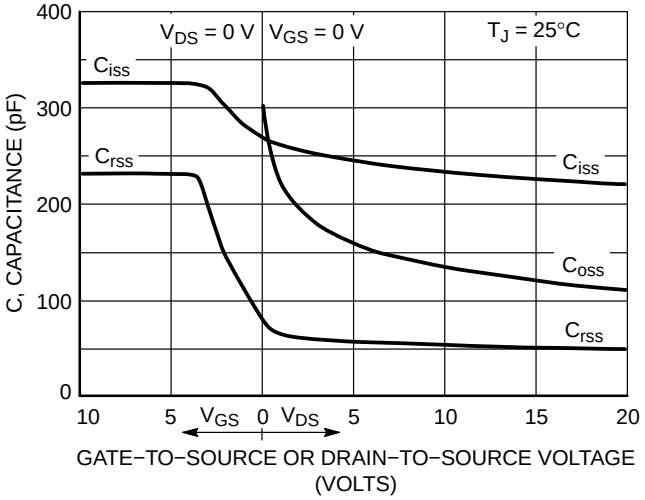


Figure 7. Capacitance Variation

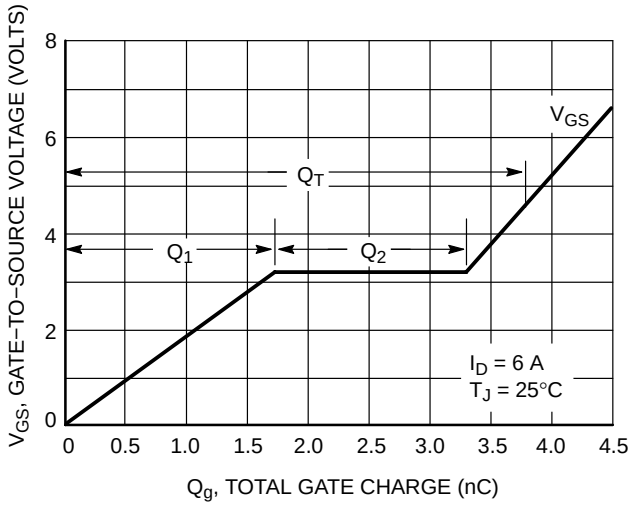


Figure 8. Gate−to−Source and Drain−to−Source Voltage versus Total Charge

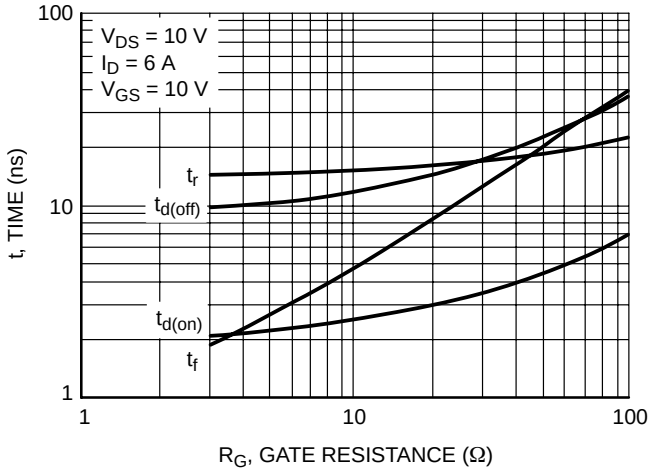


Figure 9. Resistive Switching Time Variation versus Gate Resistance

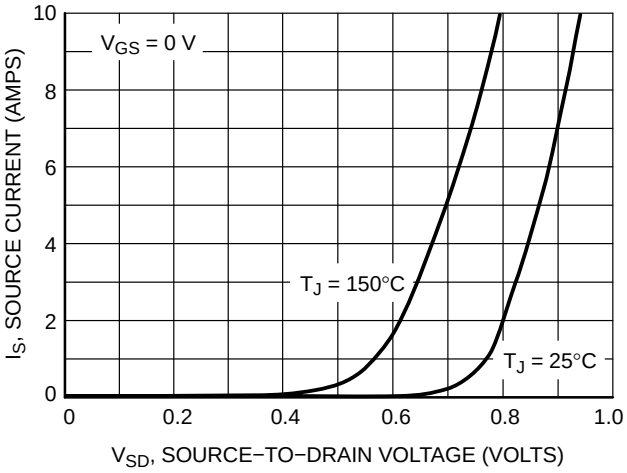
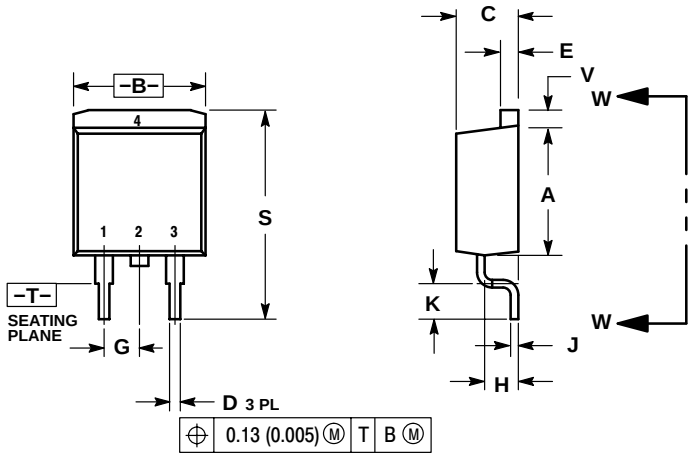


Figure 10. Diode Forward Voltage versus Current

PACKAGE DIMENSIONS

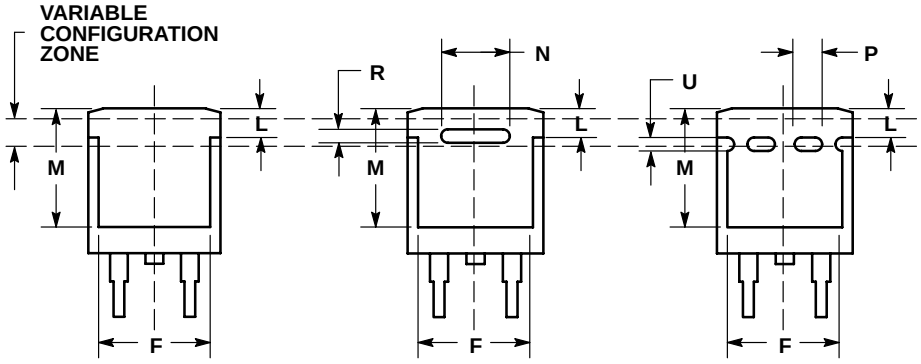
D²PAK
CASE 418B−04
ISSUE H



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 418B−01 THRU 418B−03 OBSOLETE, NEW STANDARD 418B−04.

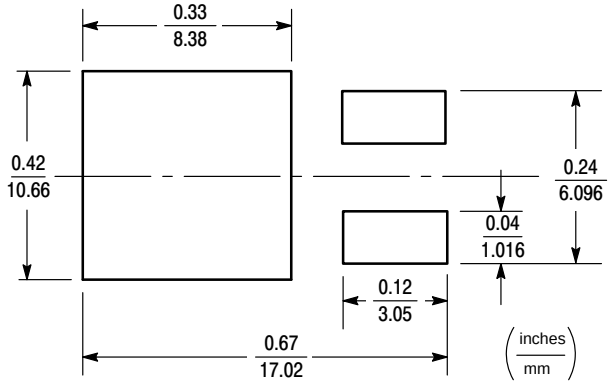
	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.340	0.380	8.64	9.65
B	0.380	0.405	9.65	10.29
C	0.160	0.190	4.06	4.83
D	0.020	0.035	0.51	0.89
E	0.045	0.055	1.14	1.40
F	0.310	0.350	7.87	8.89
G	0.100 BSC		2.54 BSC	
H	0.080	0.110	2.03	2.79
J	0.018	0.025	0.46	0.64
K	0.090	0.110	2.29	2.79
L	0.052	0.072	1.32	1.83
M	0.280	0.320	7.11	8.13
N	0.197 REF		5.00 REF	
P	0.079 REF		2.00 REF	
R	0.039 REF		0.99 REF	
S	0.575	0.625	14.60	15.88
V	0.045	0.055	1.14	1.40

STYLE 2:
PIN 1. GATE
2. DRAIN
3. SOURCE
4. DRAIN



VIEW W−W 1 | VIEW W−W 2 | VIEW W−W 3

RECOMMENDED FOOTPRINT



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