

NTP75N06, NTB75N06

Power MOSFET 75 Amps, 60 Volts N-Channel TO-220 and D²PAK

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

Typical Applications

- Power Supplies
- Converters
- Power Motor Controls
- Bridge Circuits

MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DS}	60	Vdc
Drain-to-Gate Voltage ($R_{GS} = 10\text{ M}\Omega$)	V_{DGR}	60	Vdc
Gate-to-Source Voltage	V_{GS}		Vdc
– Continuous	V_{GS}	± 20	
– Non-Repetitive ($t_p \leq 10\text{ ms}$)	V_{GS}	± 30	
Drain Current			
– Continuous @ $T_A = 25^\circ\text{C}$	I_D	75	Adc
– Continuous @ $T_A = 100^\circ\text{C}$	I_D	50	
– Single Pulse ($t_p \leq 10\text{ }\mu\text{s}$)	I_{DM}	225	Apk
Total Power Dissipation @ $T_A = 25^\circ\text{C}$	P_D	214	W
Derate above 25°C		1.4	W/ $^\circ\text{C}$
Total Power Dissipation @ $T_A = 25^\circ\text{C}$		2.4	W
Operating and Storage Temperature Range	T_J, T_{stg}	-55 to $+175$	$^\circ\text{C}$
Single Pulse Drain-to-Source Avalanche Energy – Starting $T_J = 25^\circ\text{C}$ ($V_{DD} = 50\text{ Vdc}$, $V_{GS} = 10\text{ Vdc}$, $L = 0.3\text{ mH}$, $I_L(\text{pk}) = 75\text{ A}$, $V_{DS} = 60\text{ Vdc}$)	E_{AS}	844	mJ
Thermal Resistance			$^\circ\text{C/W}$
– Junction-to-Case	$R_{\theta JC}$	0.7	
– Junction-to-Ambient	$R_{\theta JA}$	62.5	
Maximum Lead Temperature for Soldering Purposes, $1/8"$ from case for 10 seconds	T_L	260	$^\circ\text{C}$



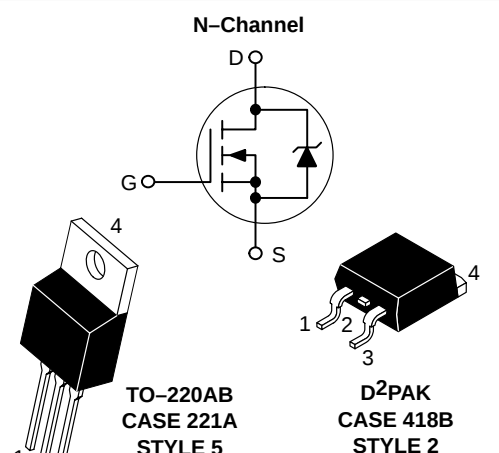
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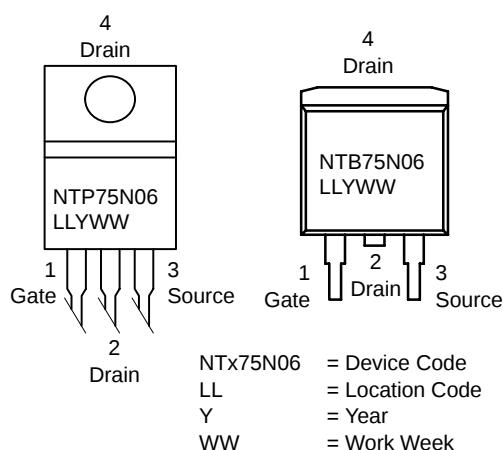
75 AMPERES

60 VOLTS

$R_{DS(on)} = 9.5\text{ m}\Omega$



MARKING DIAGRAMS & PIN ASSIGNMENTS



ORDERING INFORMATION

Device	Package	Shipping
NTP75N06	TO-220AB	50 Units/Rail
NTB75N06	D ² PAK	50 Units/Rail
NTB75N06T4	D ² PAK	800/Tape & Reel

NTP75N06, NTB75N06

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

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage (Note 1.) (V _{GS} = 0 Vdc, I _D = 250 μ Adc) Temperature Coefficient (Positive)	V _{(BR)DSS}	60 –	71 73	– –	Vdc mV/°C
Zero Gate Voltage Drain Current (V _{DS} = 60 Vdc, V _{GS} = 0 Vdc) (V _{DS} = 60 Vdc, V _{GS} = 0 Vdc, T _J = 150°C)	I _{DSS}	– –	– –	10 100	μ Adc
Gate-Body Leakage Current (V _{GS} = $\pm$ 20 Vdc, V _{DS} = 0 Vdc)	I _{GSS}	–	–	$\pm$ 100	nAdc

ON CHARACTERISTICS (Note 1.)

Gate Threshold Voltage (Note 1.) (V _{DS} = V _{GS} , I _D = 250 μ Adc) Threshold Temperature Coefficient (Negative)	V _{GS(th)}	2.0 –	2.8 8.0	4.0 –	Vdc mV/°C
Static Drain-to-Source On-Resistance (Note 1.) (V _{GS} = 10 Vdc, I _D = 37.5 Adc)	R _{DS(on)}	–	8.2	9.5	mOhm
Static Drain-to-Source On-Voltage (Note 1.) (V _{GS} = 10 Vdc, I _D = 75 Adc) (V _{GS} = 10 Vdc, I _D = 37.5 Adc, T _J = 150°C)	V _{DS(on)}	– –	0.72 0.63	0.86 –	Vdc
Forward Transconductance (Note 1.) (V _{DS} = 15 Vdc, I _D = 37.5 Adc)	g _{FS}	–	40.2	–	mhos

DYNAMIC CHARACTERISTICS

Input Capacitance	(V _{DS} = 25 Vdc, V _{GS} = 0 Vdc, f = 1.0 MHz)	C _{iss}	–	3220	4510	pF
Output Capacitance		C _{oss}	–	1020	1430	
Transfer Capacitance		C _{rss}	–	234	330	

SWITCHING CHARACTERISTICS (Note 2.)

Turn-On Delay Time	(V _{DD} = 30 Vdc, I _D = 75 Adc, V _{GS} = 10 Vdc, R _G = 9.1 Ω) (Note 1.)	t _{d(on)}	–	16	25	ns
Rise Time		t _r	–	112	155	
Turn-Off Delay Time		t _{d(off)}	–	90	125	
Fall Time		t _f	–	100	140	
Gate Charge	(V _{DS} = 48 Vdc, I _D = 75 Adc, V _{GS} = 10 Vdc) (Note 1.)	Q _T	–	92	130	nC
		Q ₁	–	14	–	
		Q ₂	–	44	–	

SOURCE-DRAIN DIODE CHARACTERISTICS

Forward On-Voltage	(I _S = 75 Adc, V _{GS} = 0 Vdc) (Note 1.) (I _S = 75 Adc, V _{GS} = 0 Vdc, T _J = 150°C)	V _{SD}	– –	1.0 0.9	1.1 –	Vdc
Reverse Recovery Time	(I _S = 75 Adc, V _{GS} = 0 Vdc, di _S /dt = 100 A/ μ s) (Note 1.)	t _{rr}	–	77	–	ns
		t _a	–	49	–	
		t _b	–	28	–	
Reverse Recovery Stored Charge		Q _{RR}	–	0.16	–	μ C

1. Pulse Test: Pulse Width $\leq$ 300 μ s, Duty Cycle $\leq$ 2%.
2. Switching characteristics are independent of operating junction temperatures.

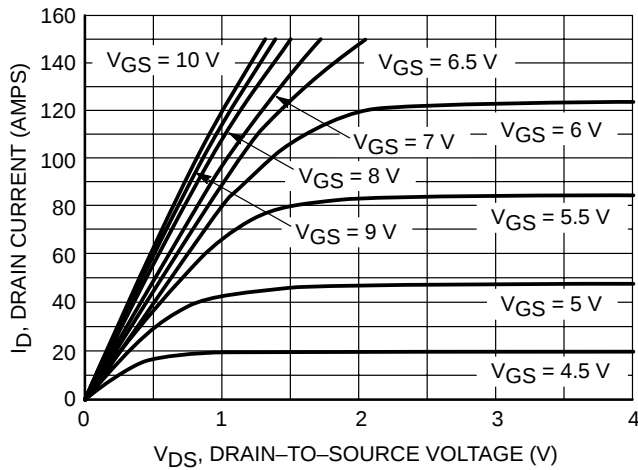


Figure 1. On-Region Characteristics

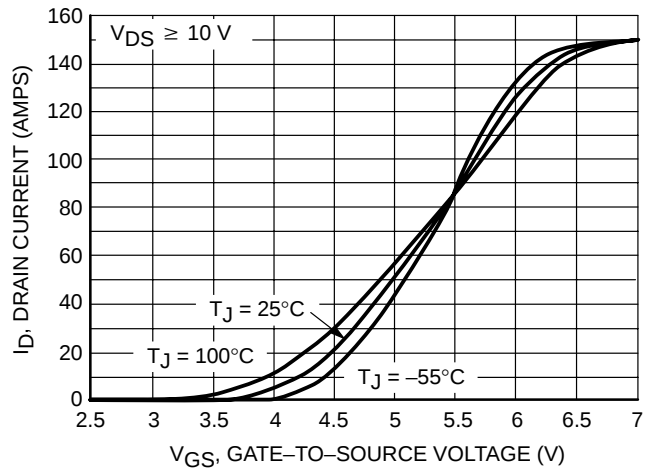


Figure 2. Transfer Characteristics

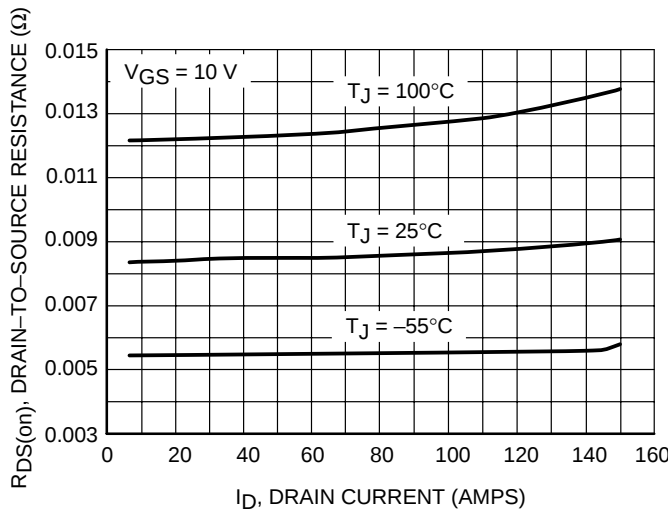


Figure 3. On-Resistance vs. Gate-to-Source Voltage

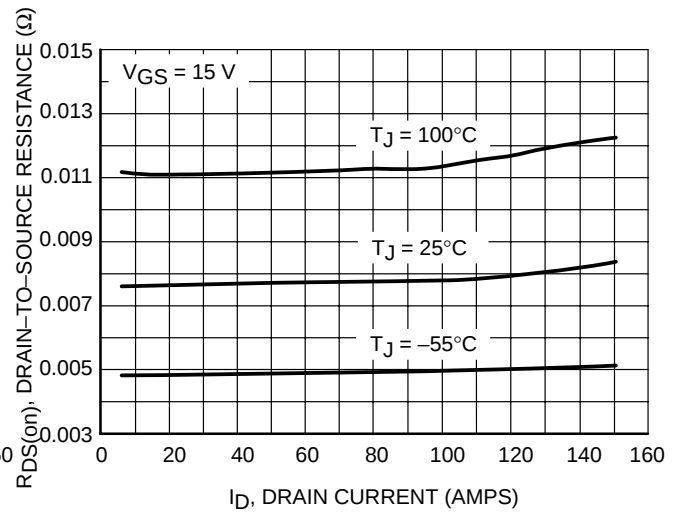


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

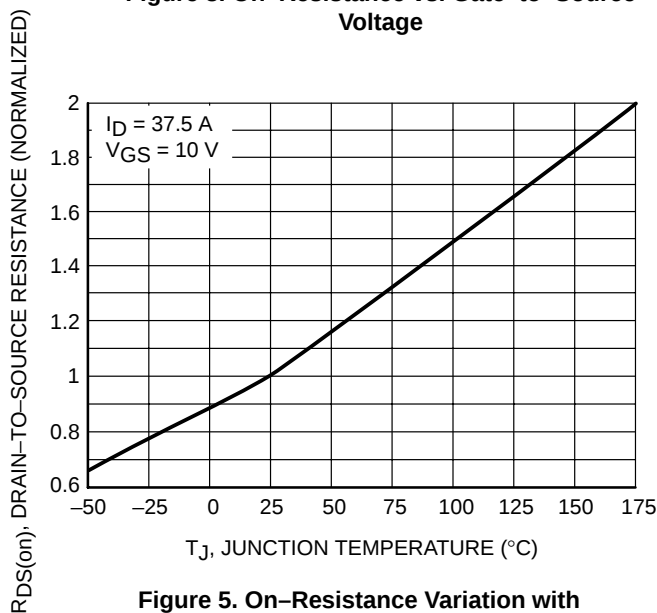


Figure 5. On-Resistance Variation with Temperature

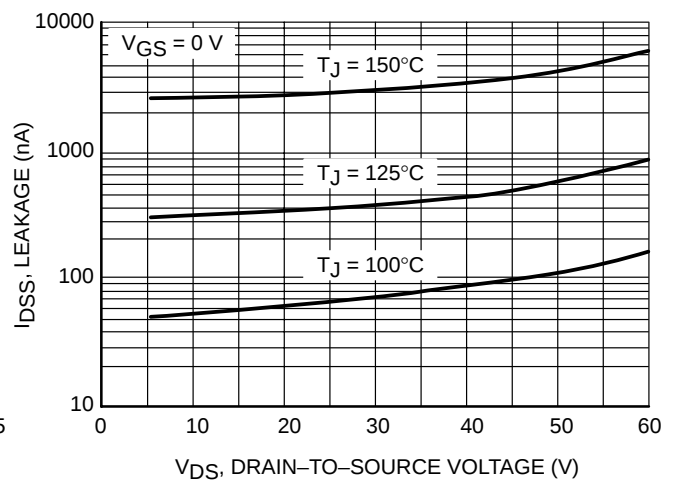


Figure 6. Drain-to-Source Leakage Current vs. Voltage

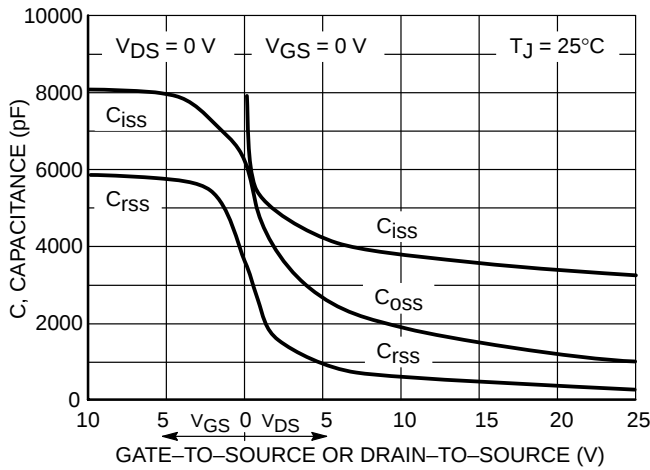


Figure 7. Capacitance Variation

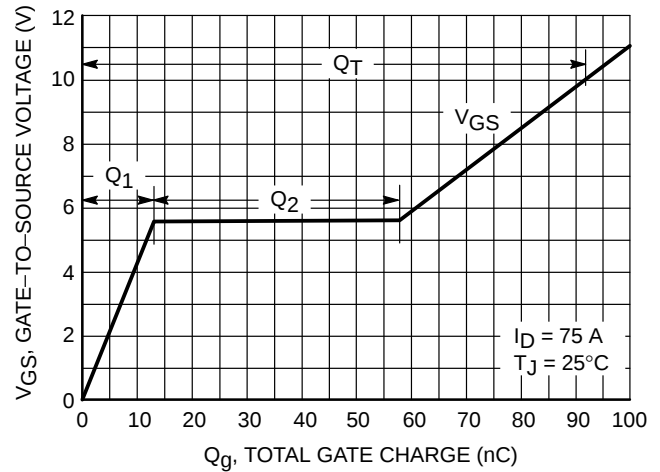


Figure 8. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

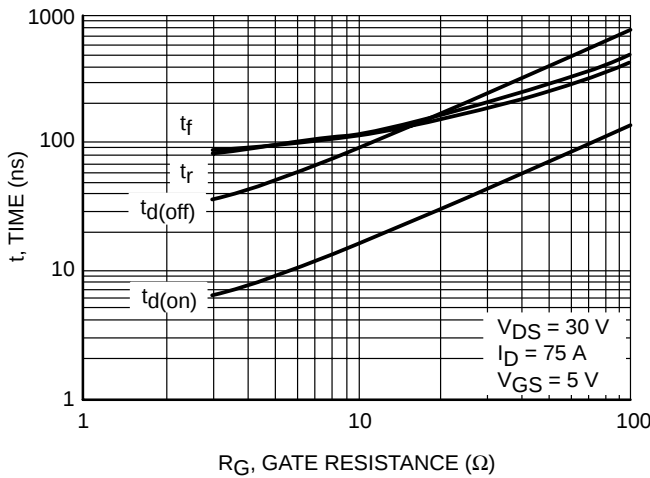


Figure 9. Resistive Switching Time Variations vs. Gate Resistance

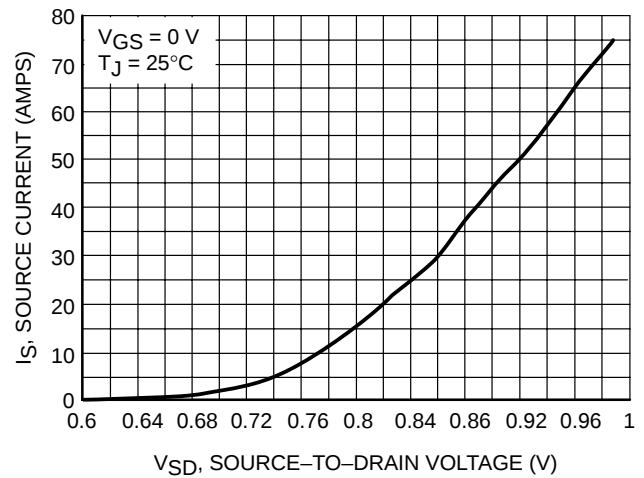


Figure 10. Diode Forward Voltage vs. Current

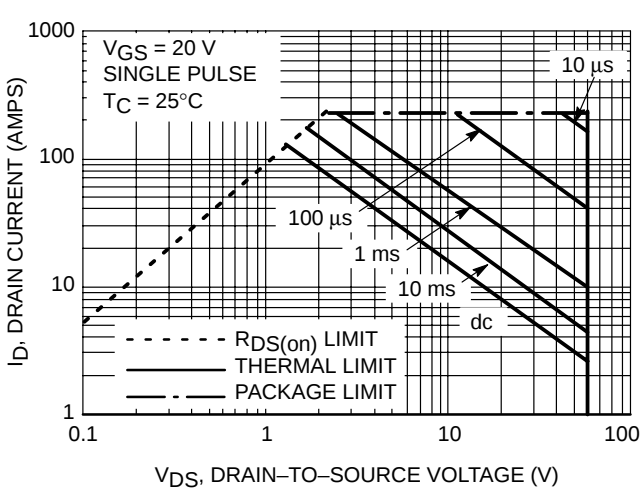


Figure 11. Maximum Rated Forward Biased Safe Operating Area

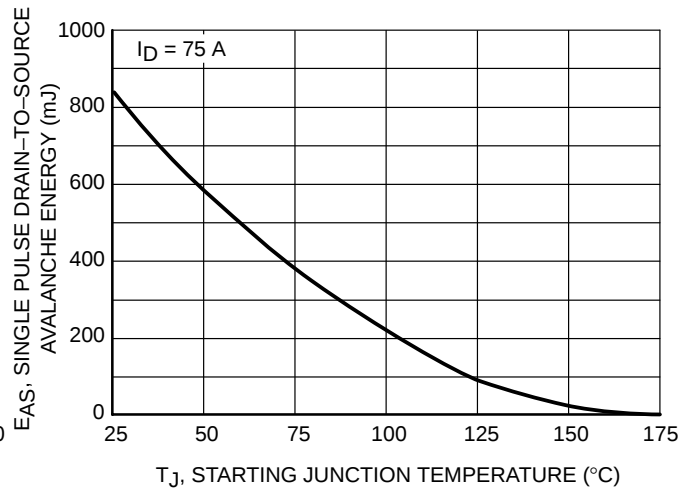


Figure 12. Maximum Avalanche Energy vs. Starting Junction Temperature

NTP75N06, NTB75N06

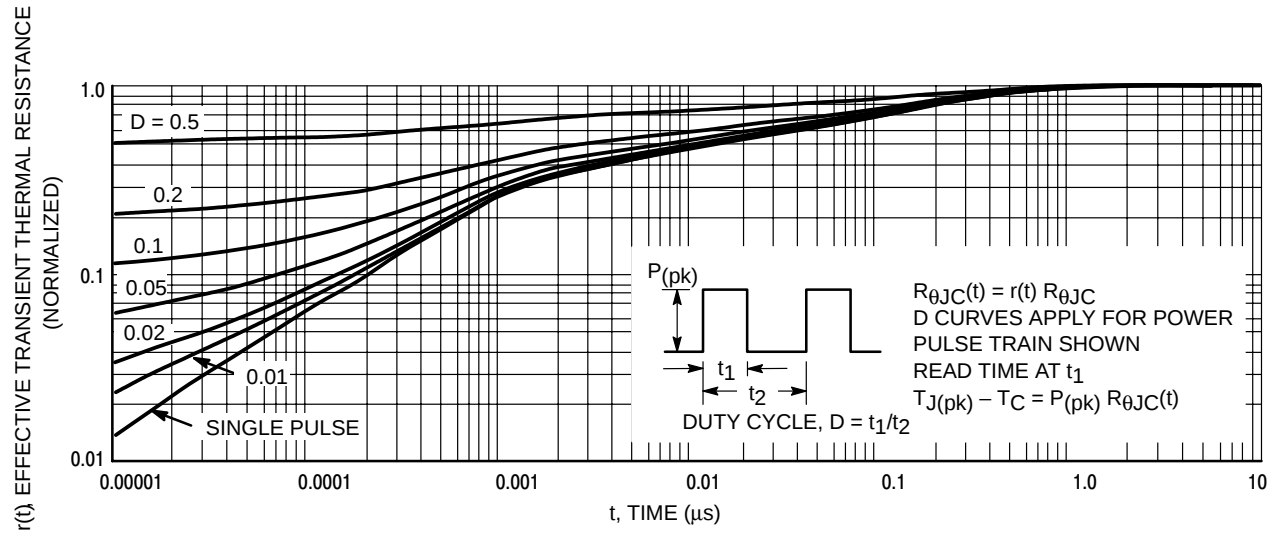


Figure 13. Thermal Response

NTP75N06, NTB75N06

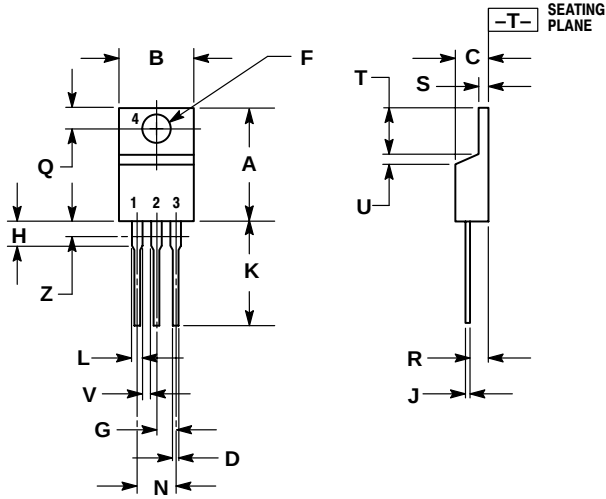
PACKAGE DIMENSIONS

TO-220 THREE-LEAD

TO-220AB

CASE 221A-09

ISSUE AA



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.018	0.025	0.46	0.64
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	---	1.15	---
Z	---	0.080	---	2.04

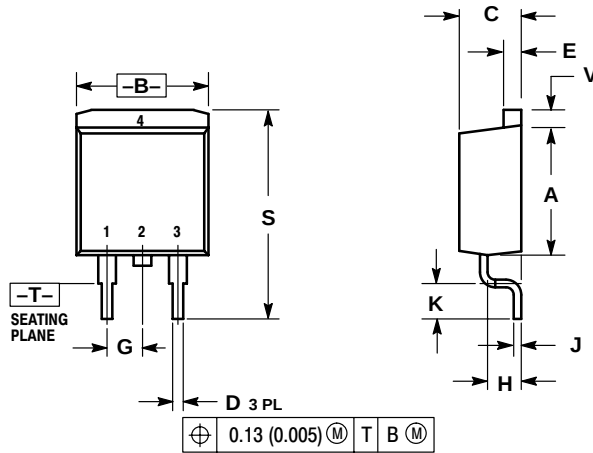
STYLE 5:

- PIN 1. GATE
2. DRAIN
3. SOURCE
4. DRAIN

NTP75N06, NTB75N06

PACKAGE DIMENSIONS

D²PAK
CASE 418B-03
ISSUE D



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	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
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
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

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