

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°C unless otherwise noted)

Rating	Symbol	Value	Unit
Drain-to-Source Voltage	V _{DSS}	60	Vdc
Drain-to-Gate Voltage (R _{GS} = 10 MΩ)	V _{DGR}	60	Vdc
Gate-to-Source Voltage	V _{GS}	±20	Vdc
- Continuous	V _{GS}	±30	
- Non-Repetitive (t _p ≤ 10 ms)			
Drain Current	I _D	75	A dc
- Continuous @ T _A = 25°C	I _D	50	
- Continuous @ T _A = 100°C	I _{DM}	225	A pk
- Single Pulse (t _p ≤ 10 μs)			
Total Power Dissipation @ T _A = 25°C	P _D	214	W
Derate above 25°C		1.4	W/°C
Total Power Dissipation @ T _A = 25°C		2.4	W
Operating and Storage Temperature Range	T _J , T _{stg}	-55 to +175	°C
Single Pulse Drain-to-Source Avalanche Energy - Starting T _J = 25°C (V _{DD} = 50 Vdc, V _{GS} = 10 Vdc, L = 0.3 mH I _{L(pk)} = 75 A, V _{DS} = 60 Vdc)	E _{AS}	844	mJ
Thermal Resistance	R _{θJC} R _{θJA}	0.7 62.5	°C/W
- Junction-to-Case			
- Junction-to-Ambient			
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds	T _L	260	°C

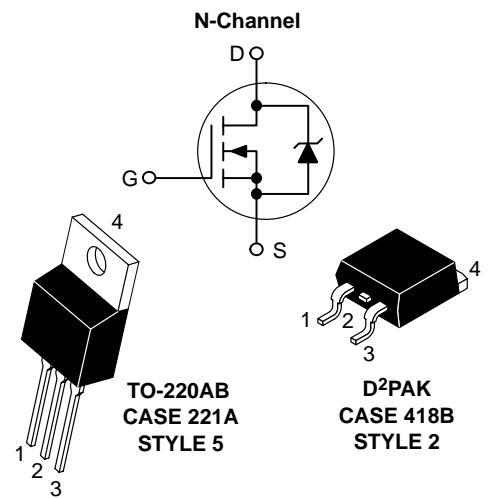


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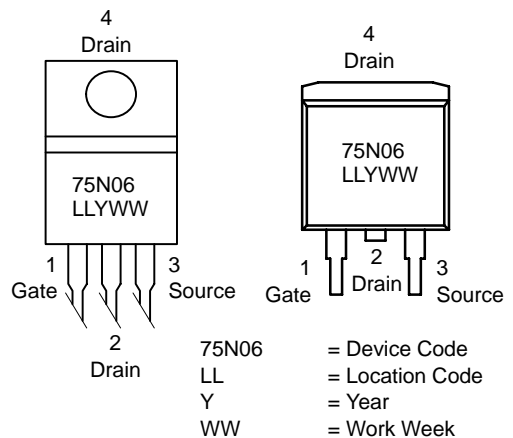
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**75 AMPERES
60 VOLTS**

R_{DS(on)} = 9.5 mΩ



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

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

Characteristic	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}	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	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)}	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/μs) (Note 1)	t _{rr}	-	77	-	ns
		t _a	-	49	-	
		t _b	-	28	-	
Reverse Recovery Stored Charge		Q _{RR}	-	0.16	-	μC

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

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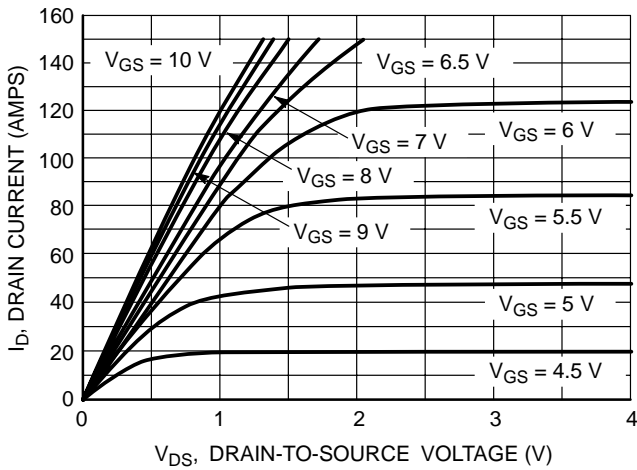


Figure 1. On-Region Characteristics

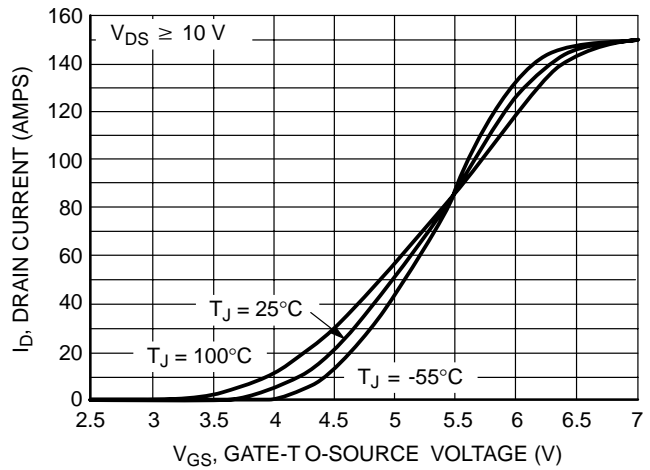


Figure 2. Transfer Characteristics

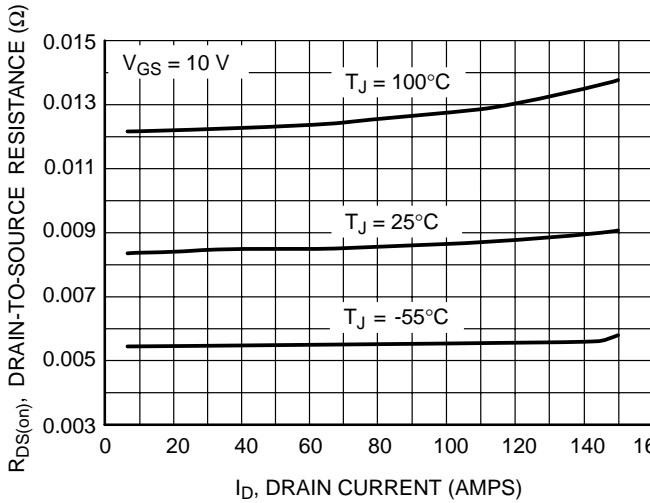


Figure 3. On-Resistance vs. Gate-to-Source Voltage

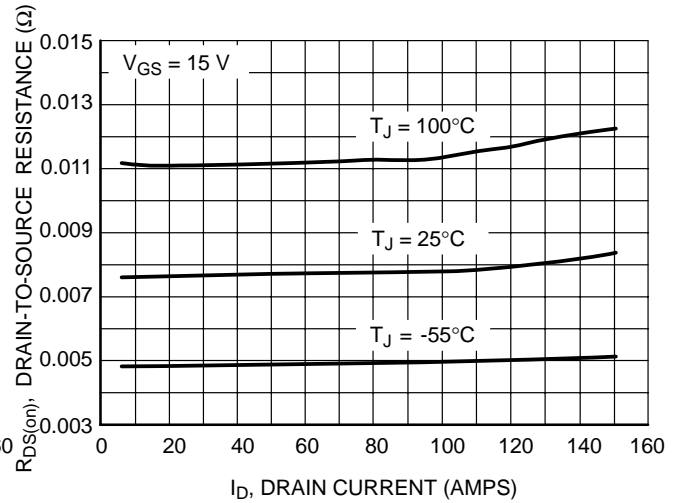


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

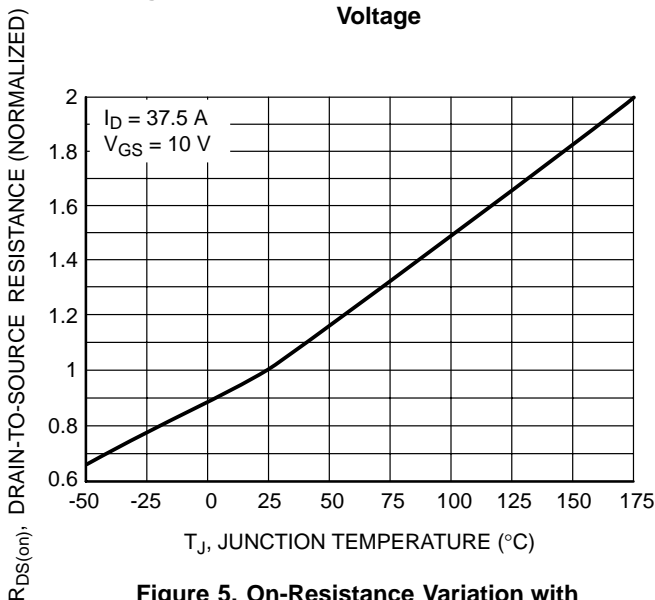


Figure 5. On-Resistance Variation with Temperature

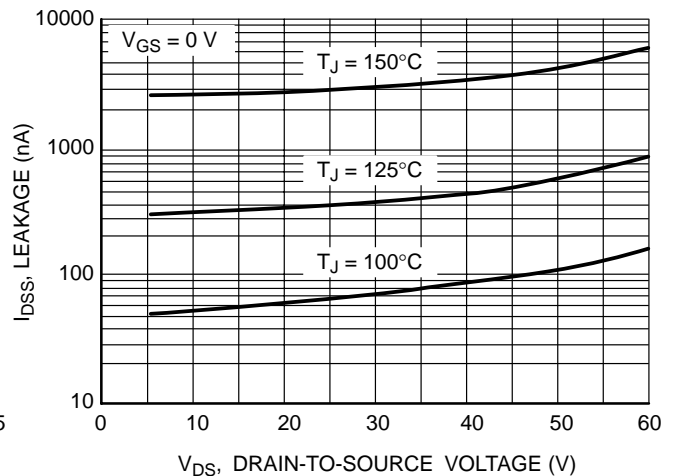


Figure 6. Drain-to-Source Leakage Current vs. Voltage

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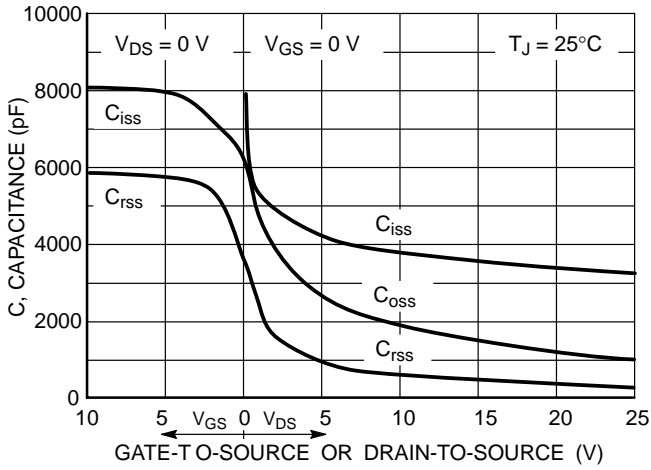


Figure 7. Capacitance Variation

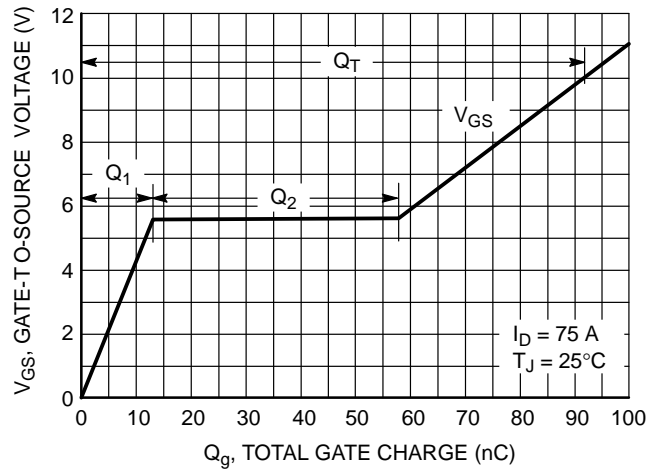


Figure 8. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

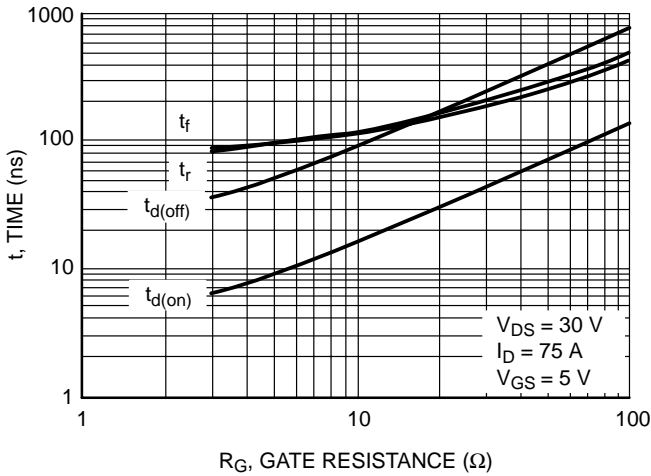


Figure 9. Resistive Switching Time Variations vs. Gate Resistance

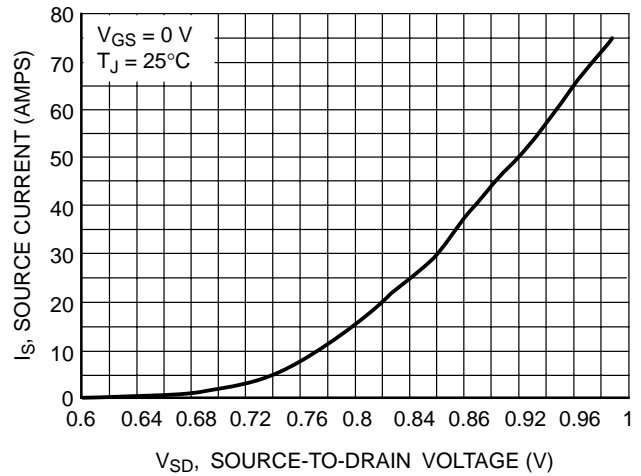


Figure 10. Diode Forward Voltage vs. Current

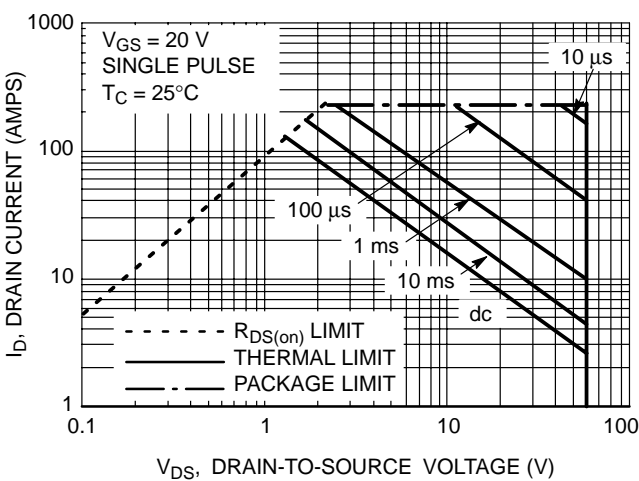


Figure 11. Maximum Rated Forward Biased Safe Operating Area

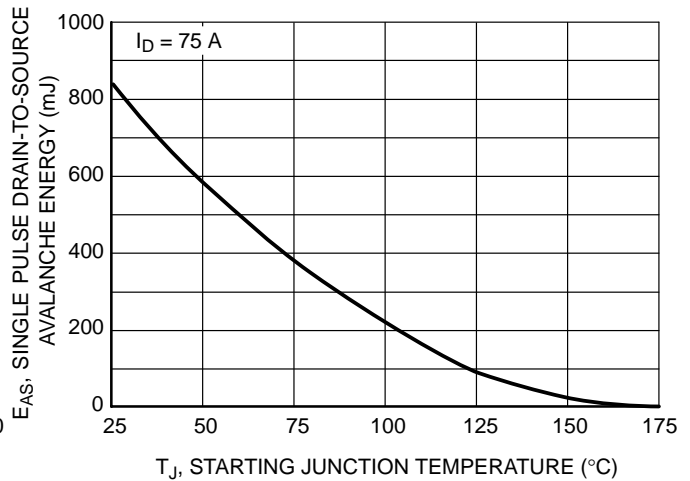


Figure 12. Maximum Avalanche Energy vs. Starting Junction Temperature

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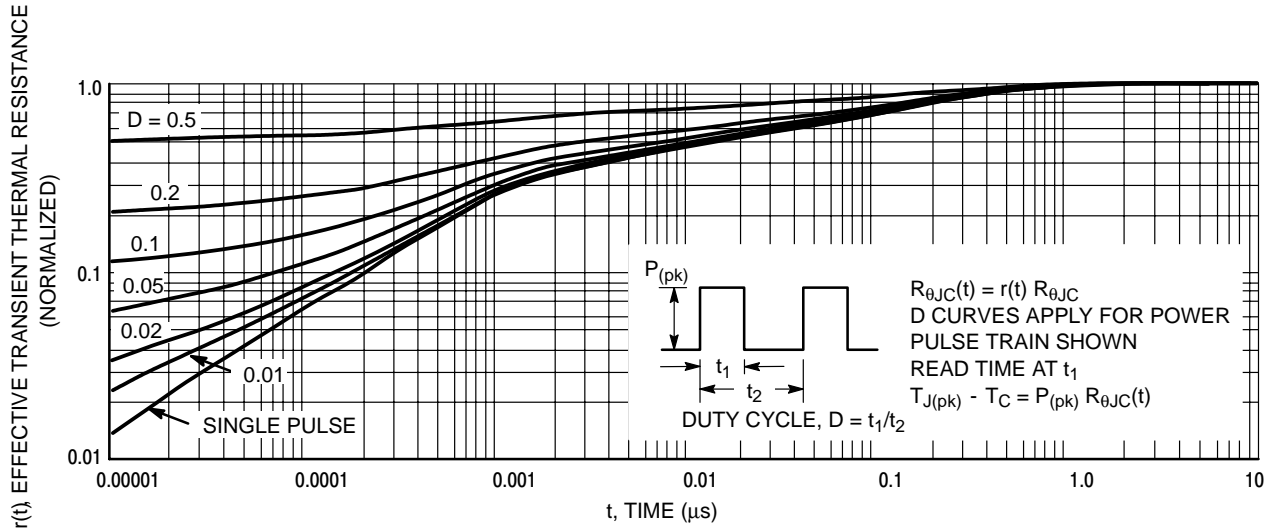
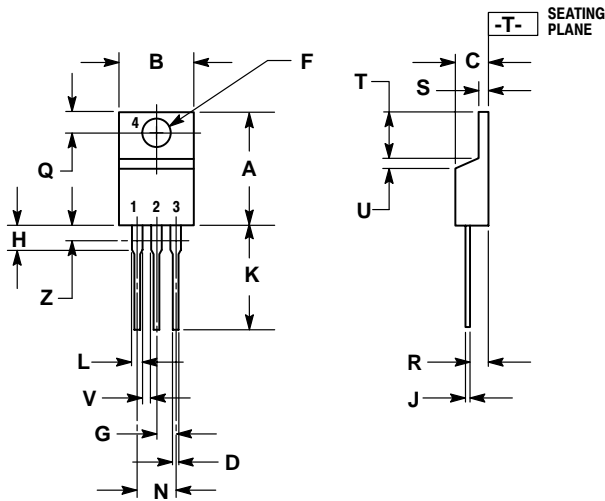


Figure 13. Thermal Response

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.

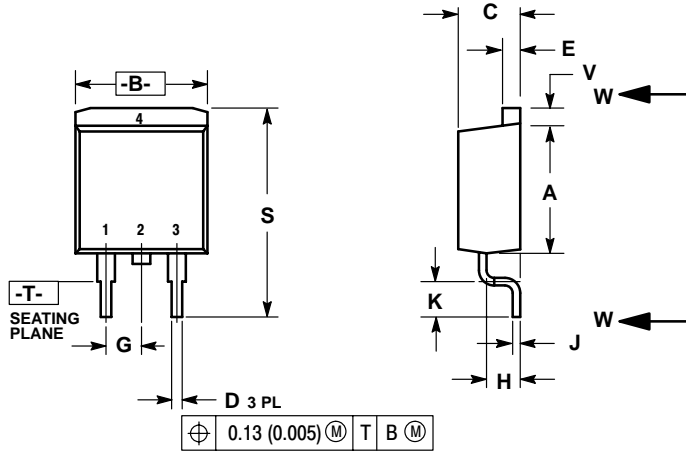
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.018	0.025	0.46	0.64
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	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

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PACKAGE DIMENSIONS

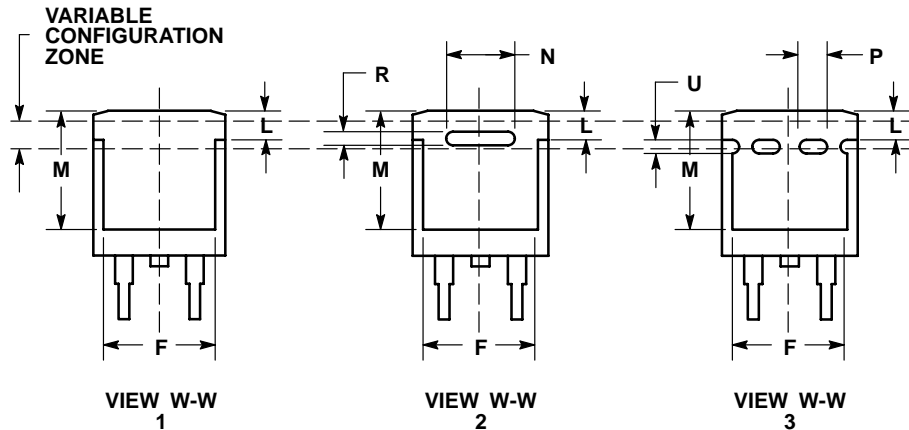
D²PAK
CASE 418B-04
ISSUE H



- 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.

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
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



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