NTD32N06L

Power MOSFET
32 Amps, 60 Volts, Logic Level
N–Channel DPAK

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

Features

- Smaller Package than MTB30N06VL
- Lower $R_{DS(on)}$
- Lower $V_{DS(on)}$
- Lower Total Gate Charge
- Lower and Tighter V_{SD}
- Lower Diode Reverse Recovery Time
- Lower Reverse Recovery Stored Charge

Typical Applications

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

ON Semiconductor®

http://onsemi.com

32 AMPERES
60 VOLTS
$R_{DS(on)} = 28\ m\Omega$

N–Channel

MARKING DIAGRAM

CASE 369A
DPAK
STYLE 2

YWW
NTD
32N06L

NTD32N06L = Device Code
Y = Year
WW = Work Week
T = MOSFET

PIN ASSIGNMENT

4
Drain

1   2   3
Gate   Drain   Source

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

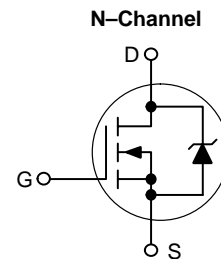| Rating	Symbol	Value	Unit
Drain–to–Source Voltage	V_{DSS}	60	Vdc
Drain–to–Gate Voltage (R_{GS} = 10 MΩ)	V_{DGR}	60	Vdc
Gate–to–Source Voltage – Continuous – Non–Repetitive ($t_p \leq 10$ ms)	 V_{GS} V_{GS}	 ±15 ±20	Vdc
Drain Current – Continuous @ T_A = 25°C – Continuous @ T_A = 100°C – Single Pulse ($t_p \leq 10$ µs)	 I_D I_D I_{DM}	 32 22 90	Adc Apk
Total Power Dissipation @ T_A = 25°C Derate above 25°C Total Power Dissipation @ T_A = 25°C (Note 1.) Total Power Dissipation @ T_A = 25°C (Note 2.)	P_D	93.75 0.625 2.88 1.5	W W/°C W 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 (Note 3.) (V_{DD} = 50 Vdc, V_{GS} = 5 Vdc, L = 1.0 mH, $I_{L(pk)}$ = 25 A, V_{DS} = 60 Vdc, R_G = 25 Ω)	E_{AS}	313	mJ
Thermal Resistance – Junction–to–Case – Junction–to–Ambient (Note 1.) – Junction–to–Ambient (Note 2.)	 $R_{\theta JC}$ $R_{\theta JA}$ $R_{\theta JA}$	 1.6 52 100	°C/W
Maximum Lead Temperature for Soldering Purposes, 1/8″ from case for 10 seconds	T_L	260	°C

1. When surface mounted to an FR4 board using 1″ pad size, (Cu Area 1.127 in^2).
2. When surface mounted to an FR4 board using minimum recommended pad size, (Cu Area 0.412 in^2).
3. Repetitive rating; pulse width limited by maximum junction temperature.
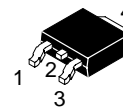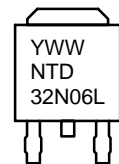
ORDERING INFORMATION

Device	Package	Shipping
NTD32N06L	DPAK	75 Units/Rail
NTD32N06L–1	DPAK	75 Units/Rail
NTD32N06LT4	DPAK	2500 Tape & Reel

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NTD32N06L

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

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Drain–to–Source Breakdown Voltage (Note 1)	$V_{(BR)DSS}$				Vdc
(V_{GS} = 0 Vdc, I_D = 250 µAdc)		60	70	–	
Temperature Coefficient (Positive)		–	62	–	mV/°C
Zero Gate Voltage Drain Current	I_{DSS}				µAdc
(V_{DS} = 60 Vdc, V_{GS} = 0 Vdc)		–	–	1.0	
(V_{DS} = 60 Vdc, V_{GS} = 0 Vdc, T_J = 150°C)		–	–	10	
Gate–Body Leakage Current (V_{GS} = ±15 Vdc, V_{DS} = 0 Vdc)	I_{GSS}	–	–	±100	nAdc
ON CHARACTERISTICS (Note 1)					
Gate Threshold Voltage (Note 1)	$V_{GS(th)}$				Vdc
(V_{DS} = V_{GS}, I_D = 250 µAdc)		1.0	1.7	2.0	
Threshold Temperature Coefficient (Negative)		–	4.8	–	mV/°C
Static Drain–to–Source On–Resistance (Note 1)	$R_{DS(on)}$				mΩ
(V_{GS} = 5 Vdc, I_D = 16 Adc)		–	23.7	28	
Static Drain–to–Source On–Resistance (Note 1)	$V_{DS(on)}$				Vdc
(V_{GS} = 5 Vdc, I_D = 20 Adc)		–	0.48	0.67	
(V_{GS} = 5 Vdc, I_D = 32 Adc)		–	0.78	–	
(V_{GS} = 5 Vdc, I_D = 16 Adc, T_J = 150°C)		–	0.61	–	
Forward Transconductance (Note 1) (V_{DS} = 6 Vdc, I_D = 16 Adc)	g_{FS}	–	27	–	mhos
DYNAMIC CHARACTERISTICS					
Input Capacitance	C_{iss}	–	1214	1700	pF
Output Capacitance (V_{DS} = 25 Vdc, V_{GS} = 0 Vdc, f = 1.0 MHz)	C_{oss}	–	343	480	
Transfer Capacitance	C_{rss}	–	87	180	
SWITCHING CHARACTERISTICS (Note 2)					
Turn–On Delay Time	$t_{d(on)}$	–	12.8	30	ns
Rise Time (V_{DD} = 30 Vdc, I_D = 32 Adc, V_{GS} = 5 Vdc, R_G = 9.1 Ω) (Note 1)	t_r	–	221	450	
Turn–Off Delay Time	$t_{d(off)}$	–	37	80	
Fall Time	t_f	–	128	260	
Gate Charge	Q_T	–	23	50	nC
(V_{DS} = 48 Vdc, I_D = 32 Adc, V_{GS} = 5 Vdc) (Note 1)	Q_1	–	4.5	–	
	Q_2	–	14	–	
SOURCE–DRAIN DIODE CHARACTERISTICS					
Forward On–Voltage (I_S = 20 Adc, V_{GS} = 0 Vdc) (Note 1)	V_{SD}	–	0.89	1.0	Vdc
(I_S = 32 Adc, V_{GS} = 0 Vdc) (Note 1)		–	0.95	–	
(I_S = 20 Adc, V_{GS} = 0 Vdc, T_J = 150°C)		–	0.74	–	
Reverse Recovery Time	t_{rr}	–	56	–	ns
(I_S = 32 Adc, V_{GS} = 0 Vdc, dI_S/dt = 100 A/µs) (Note 1)	t_a	–	31	–	
	t_b	–	25	–	
Reverse Recovery Stored Charge	Q_{RR}	–	0.093	–	µC

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

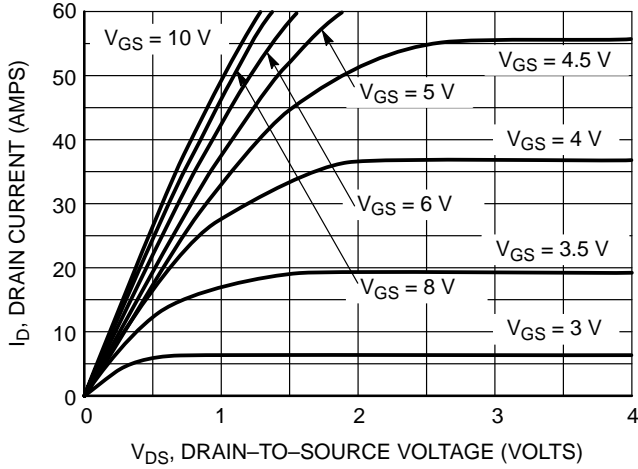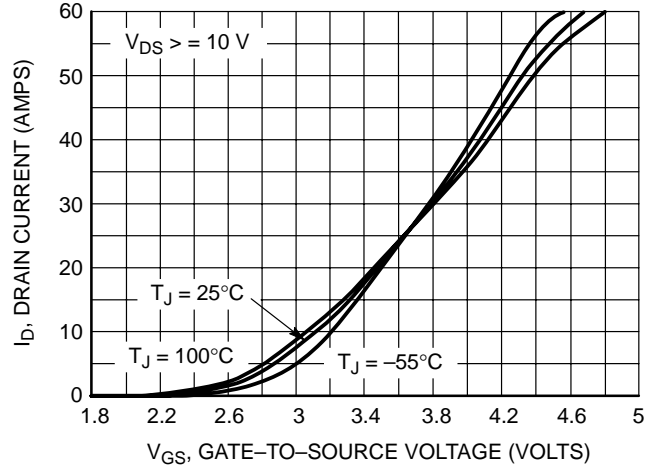**Figure 1. On–Region Characteristics**
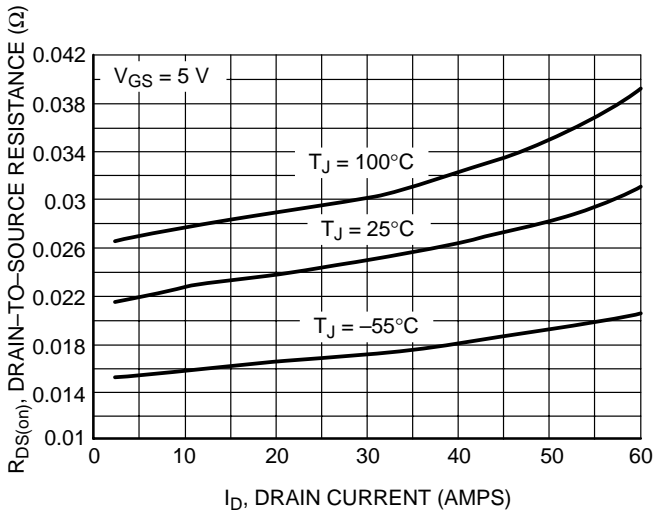

Figure 2. Transfer Characteristics

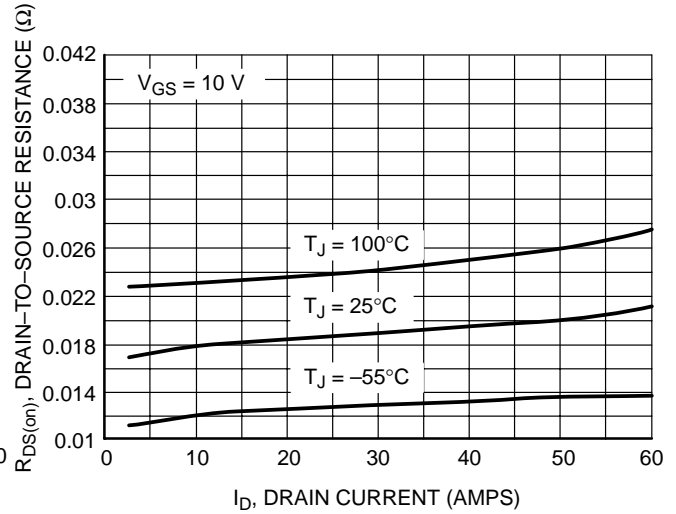**Figure 3. On–Resistance vs. Drain Current**

Figure 4. On–Resistance vs. Drain Current

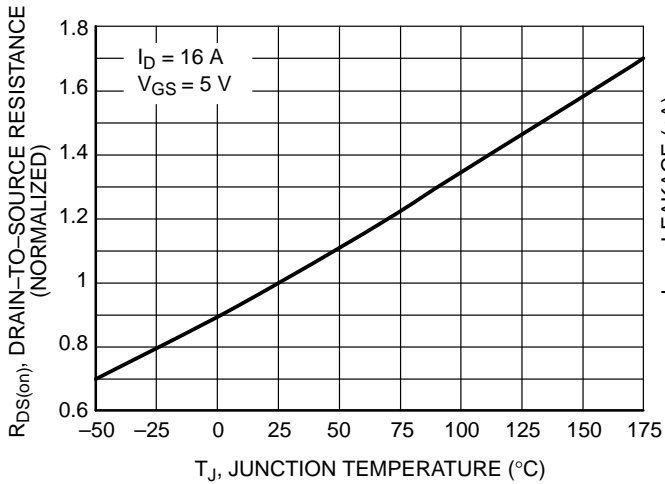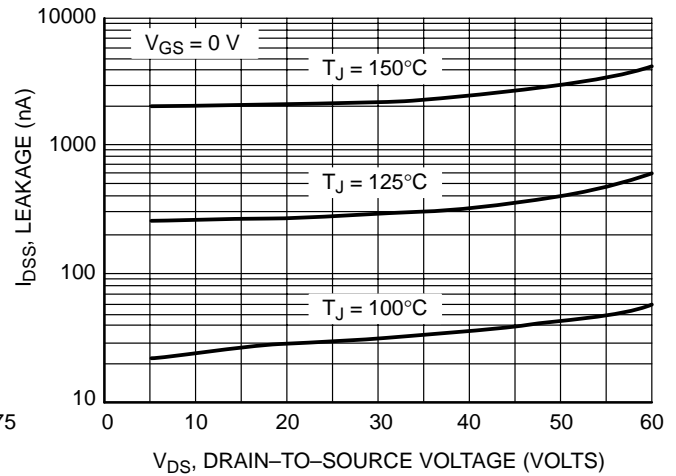**Figure 5. On–Resistance Variation with Temperature**

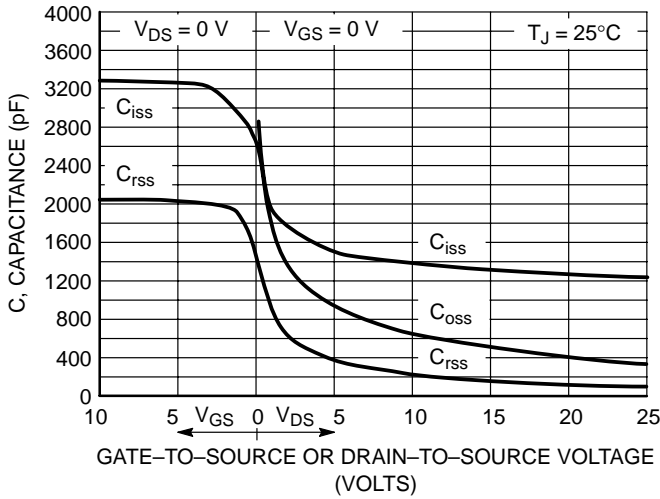**Figure 6. Drain–to–Source Leakage Current vs. Voltage**

Figure 7. Capacitance Variation
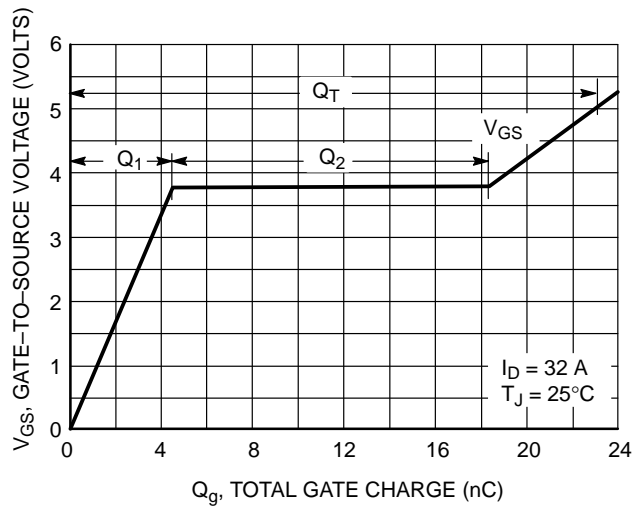

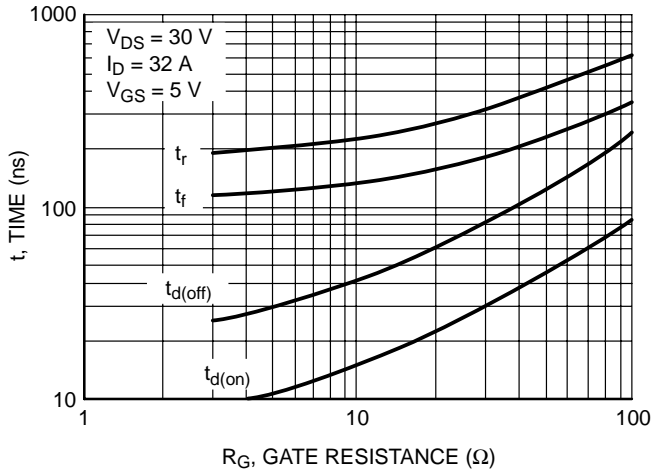**Figure 8. Gate–to–Source and
Drain–to–Source Voltage vs. Total Charge**

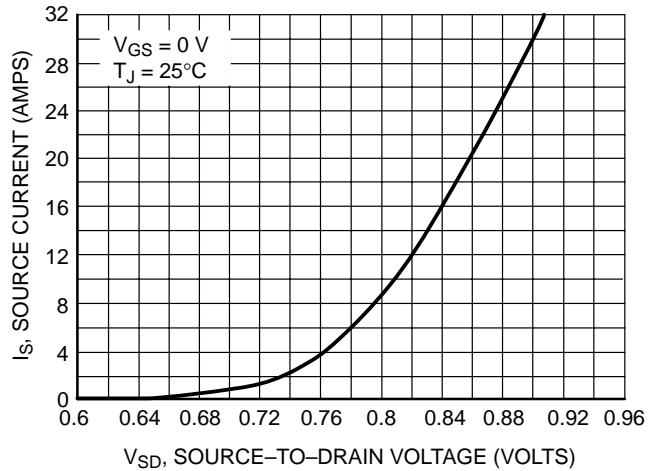
**Figure 9. Resistive Switching Time Variation
vs. Gate Resistance**

Figure 10. Diode Forward Voltage vs. Current
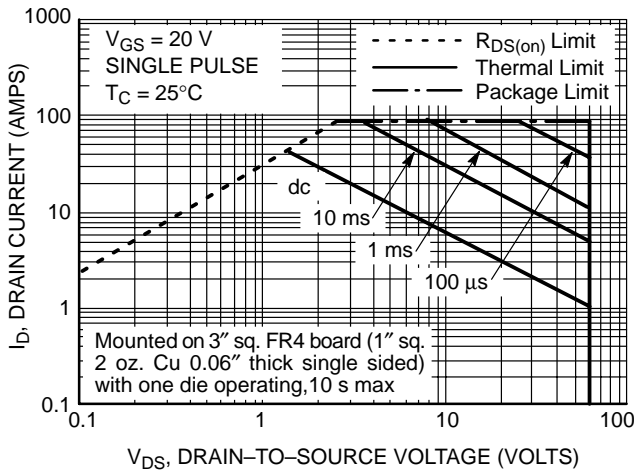
**Figure 11. Maximum Rated Forward Biased
Safe Operating Area**
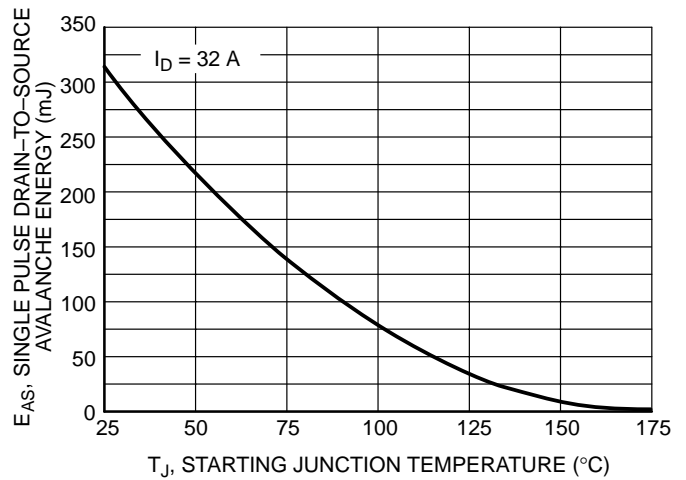
**Figure 12. Maximum Avalanche Energy vs.
Starting Junction Temperature**
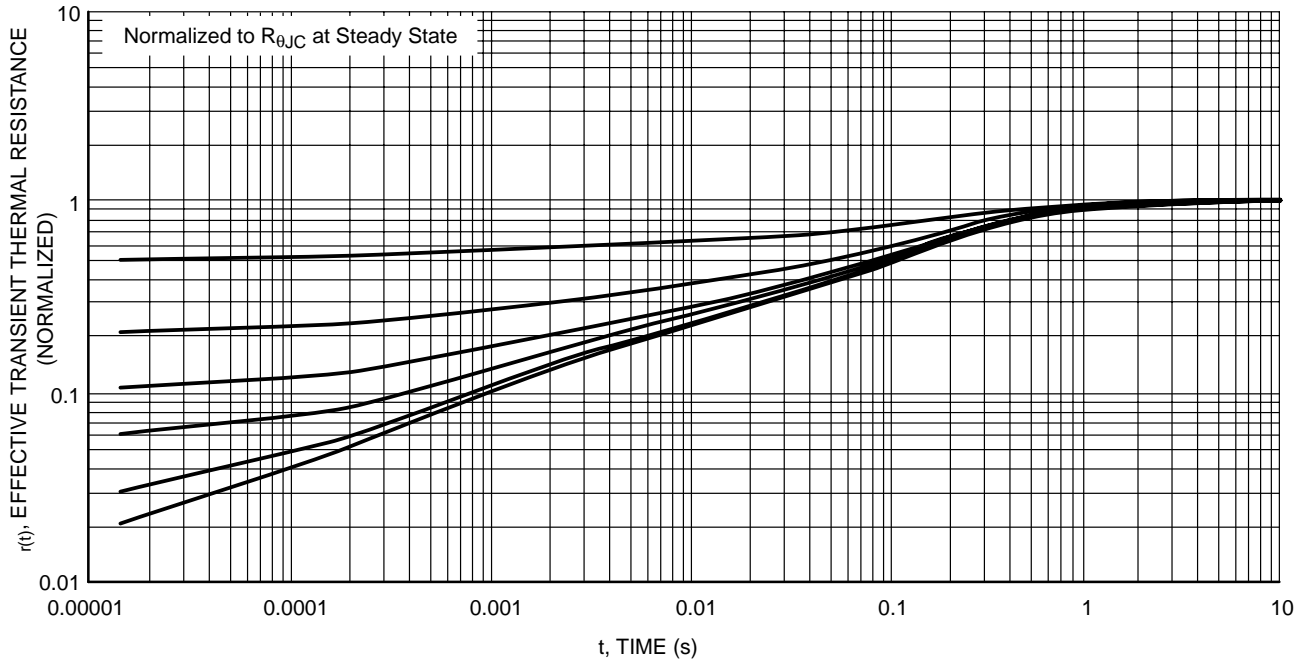
Figure 13. Thermal Response
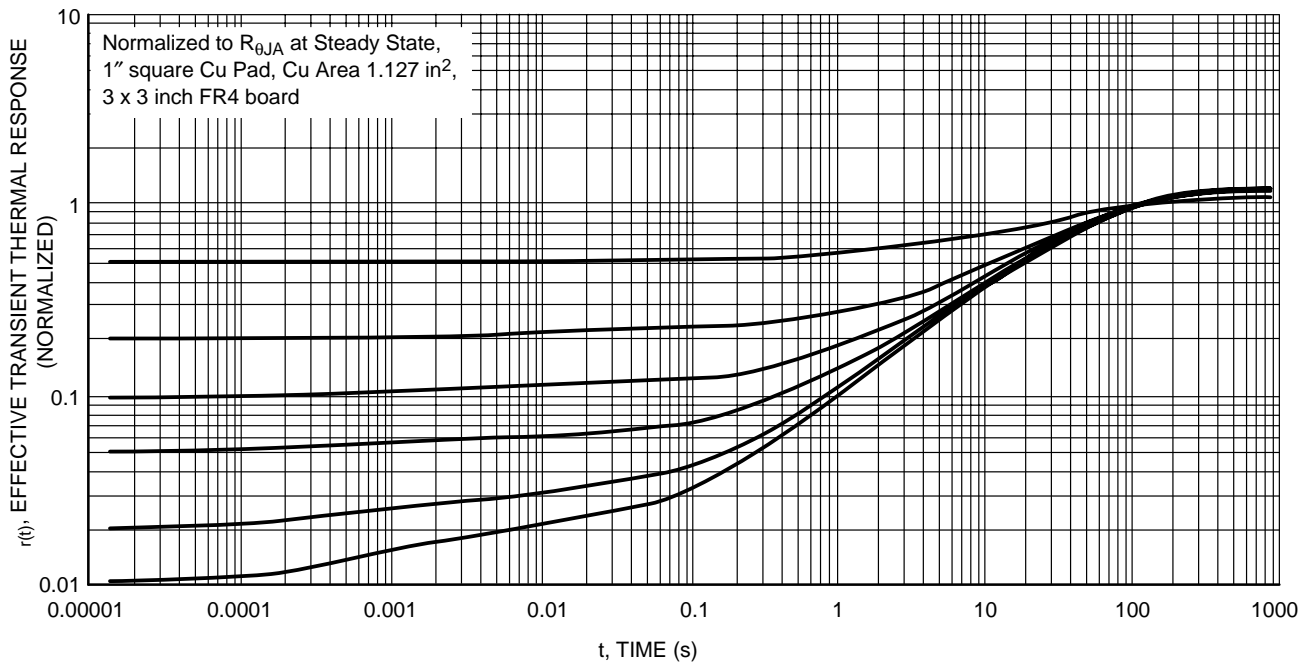
Figure 14. Thermal Response

NTD32N06L

PACKAGE DIMENSIONS

DPAK
CASE 369A–13
ISSUE AB
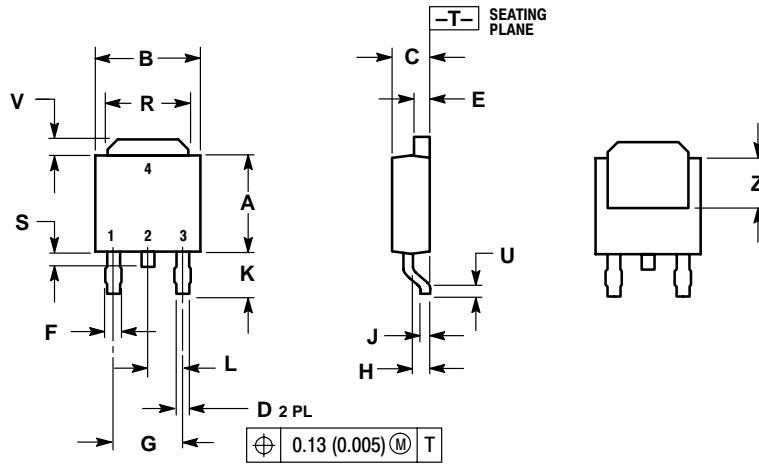
NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.235	0.250	5.97	6.35
B	0.250	0.265	6.35	6.73
C	0.086	0.094	2.19	2.38
D	0.027	0.035	0.69	0.88
E	0.033	0.040	0.84	1.01
F	0.037	0.047	0.94	1.19
G	0.180 BSC		4.58 BSC	
H	0.034	0.040	0.87	1.01
J	0.018	0.023	0.46	0.58
K	0.102	0.114	2.60	2.89
L	0.090 BSC		2.29 BSC	
R	0.175	0.215	4.45	5.46
S	0.020	0.050	0.51	1.27
U	0.020	---	0.51	---
V	0.030	0.050	0.77	1.27
Z	0.138	---	3.51	---

Notes

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PUBLICATION ORDERING INFORMATION