

NTP45N06, NTB45N06

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 3) (V _{GS} = 0 Vdc, I _D = 250 μ Adc) Temperature Coefficient (Positive)	V _{(BR)DSS}	60 –	70 57	– –	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}	– –	– –	1.0 10	μ Adc
Gate-Body Leakage Current (V _{GS} = $\pm$ 20 Vdc, V _{DS} = 0 Vdc)	I _{GSS}	–	–	$\pm$ 100	nAdc

ON CHARACTERISTICS (Note 3)

Gate Threshold Voltage (Note 3) (V _{DS} = V _{GS} , I _D = 250 μ Adc) Threshold Temperature Coefficient (Negative)	V _{GS(th)}	2.0 –	2.8 7.2	4.0 –	Vdc mV/°C
Static Drain-to-Source On-Resistance (Note 3) (V _{GS} = 10 Vdc, I _D = 22.5 Adc)	R _{DS(on)}	–	21	26	m Ω
Static Drain-to-Source On-Voltage (Note 3) (V _{GS} = 10 Vdc, I _D = 45 Adc) (V _{GS} = 10 Vdc, I _D = 22.5 Adc, T _J = 150°C)	V _{DS(on)}	– –	0.93 0.93	1.4 –	Vdc
Forward Transconductance (Note 3) (V _{DS} = 8.0 Vdc, I _D = 12 Adc)	g _{FS}	–	16.6	–	mhos

DYNAMIC CHARACTERISTICS

Input Capacitance	(V _{DS} = 25 Vdc, V _{GS} = 0 Vdc, f = 1.0 MHz)	C _{ISS}	–	1224	1725	pF
Output Capacitance		C _{OSS}	–	345	485	
Transfer Capacitance		C _{RSS}	–	76	160	

SWITCHING CHARACTERISTICS (Note 4)

Turn-On Delay Time	(V _{DD} = 30 Vdc, I _D = 45 Adc, V _{GS} = 10 Vdc, R _G = 9.1 Ω) (Note 3)	t _{d(on)}	–	10	25	ns
Rise Time		t _r	–	101	200	
Turn-Off Delay Time		t _{d(off)}	–	33	70	
Fall Time		t _f	–	106	220	
Gate Charge	(V _{DS} = 48 Vdc, I _D = 45 Adc, V _{GS} = 10 Vdc) (Note 3)	Q _T	–	33	46	nC
		Q ₁	–	6.4	–	
		Q ₂	–	15	–	

SOURCE-DRAIN DIODE CHARACTERISTICS

Forward On-Voltage	(I _S = 45 Adc, V _{GS} = 0 Vdc) (Note 3) (I _S = 45 Adc, V _{GS} = 0 Vdc, T _J = 150°C)	V _{SD}	– –	1.08 0.93	1.2 –	Vdc
Reverse Recovery Time	(I _S = 45 Adc, V _{GS} = 0 Vdc, di _S /dt = 100 A/ μ s) (Note 3)	t _{rr}	–	53.1	–	ns
		t _a	–	36	–	
		t _b	–	16.9	–	
Reverse Recovery Stored Charge		Q _{RR}	–	0.087	–	μ C

3. Pulse Test: Pulse Width $\leq$ 300 μ s, Duty Cycle $\leq$ 2%.

4. Switching characteristics are independent of operating junction temperatures.

ORDERING INFORMATION

Device	Package	Shipping [†]
NTP45N06	TO-220AB	50 Units / Rail
NTP45N06G	TO-220AB (Pb-Free)	50 Units / Rail
NTB45N06	D ² PAK	50 Units / Rail
NTB45N06G	D ² PAK (Pb-Free)	50 Units / Rail
NTB45N06T4	D ² PAK	800 Units / Tape & Reel
NTB45N06T4G	D ² PAK (Pb-Free)	800 Units / Tape & Reel

[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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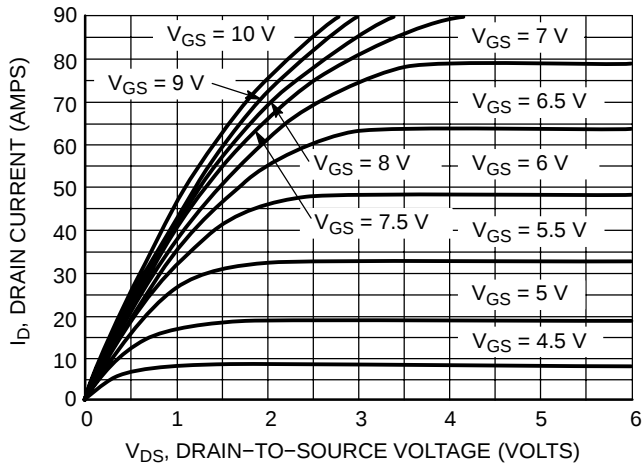


Figure 1. On-Region Characteristics

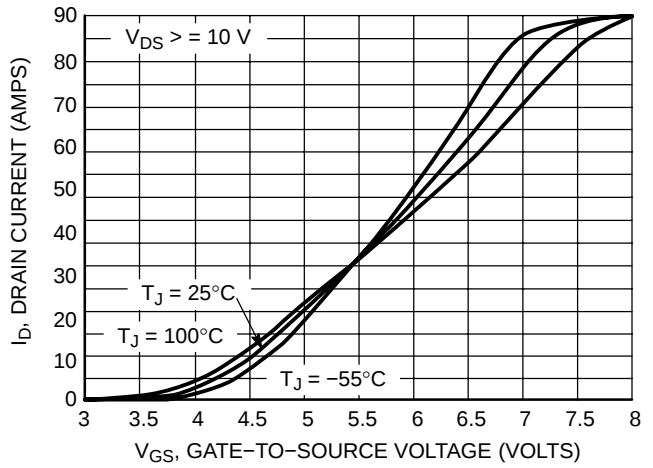


Figure 2. Transfer Characteristics

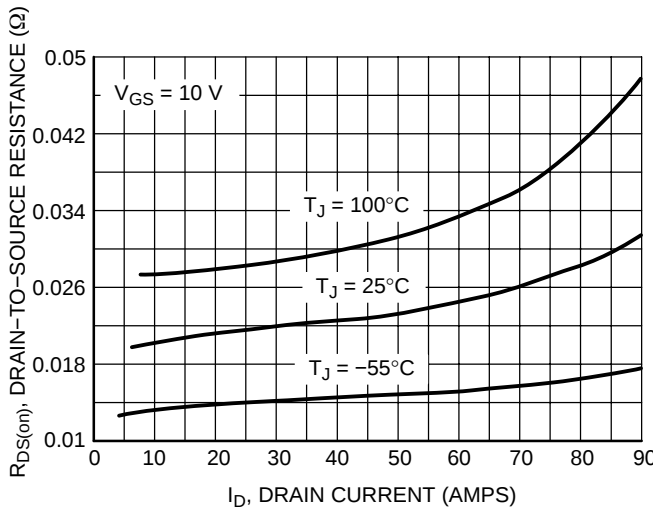


Figure 3. On-Resistance vs. Gate-to-Source Voltage

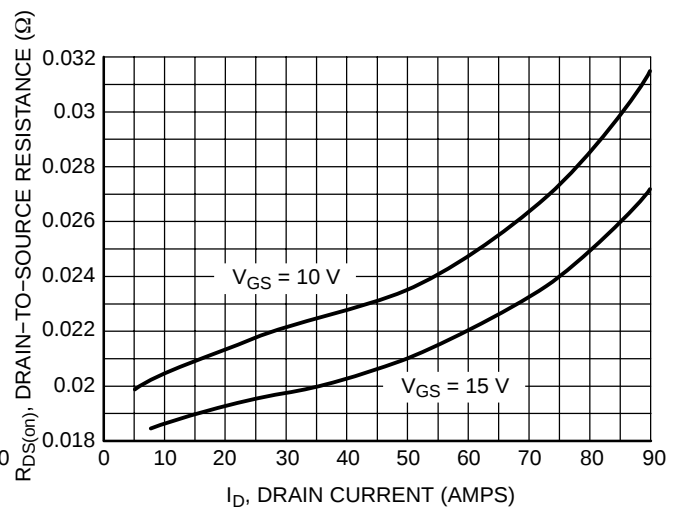


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

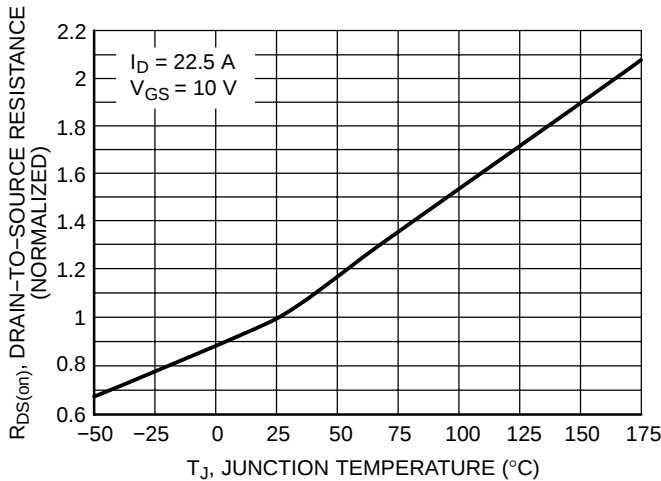


Figure 5. On-Resistance Variation with Temperature

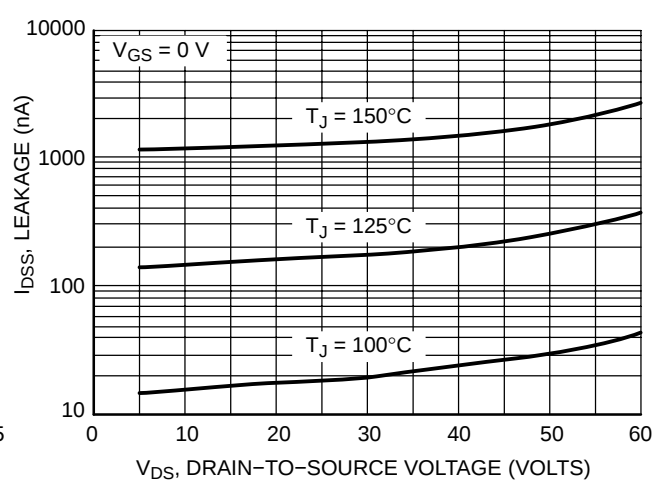


Figure 6. Drain-to-Source Leakage Current vs. Voltage

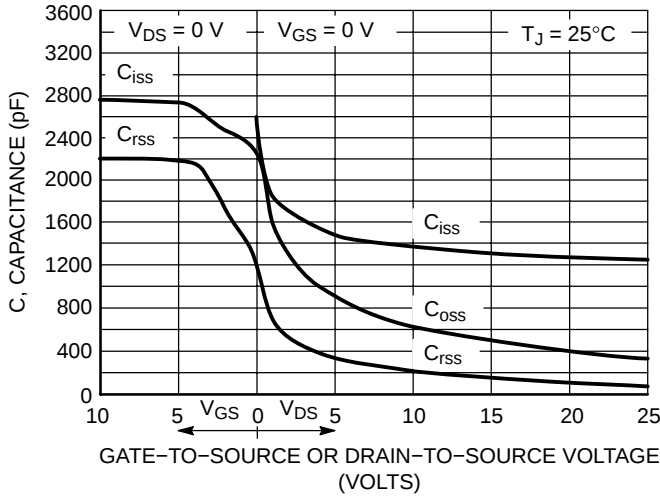


Figure 7. Capacitance Variation

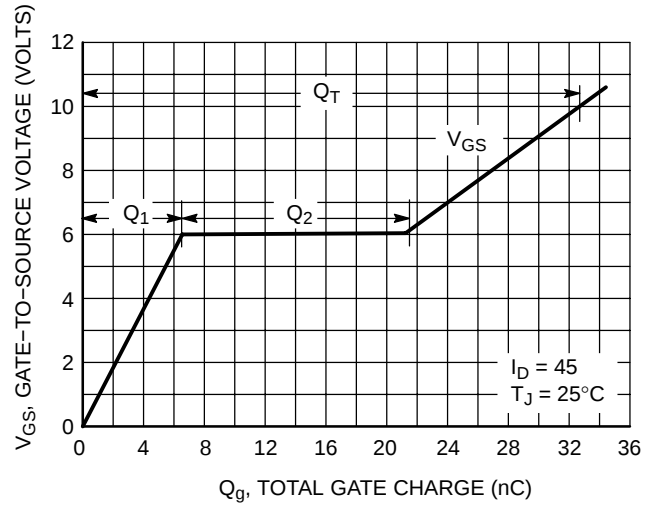


Figure 8. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

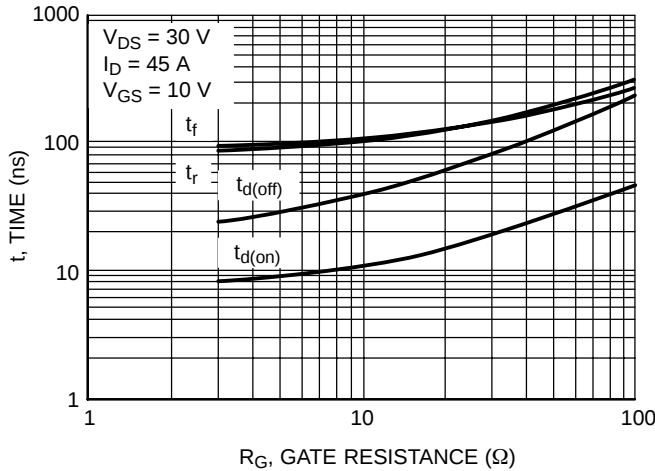


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

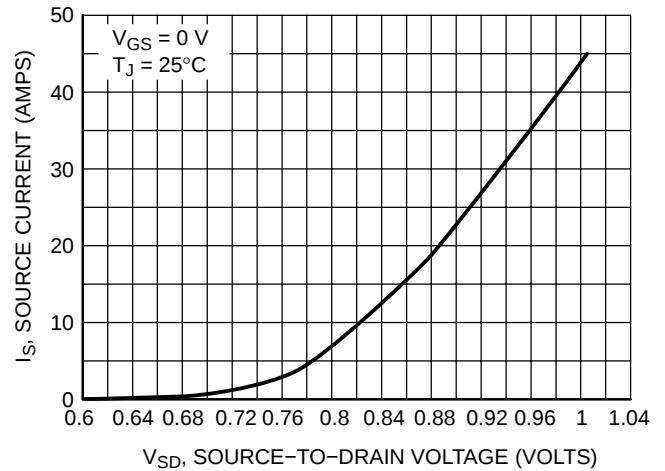


Figure 10. Diode Forward Voltage vs. Current

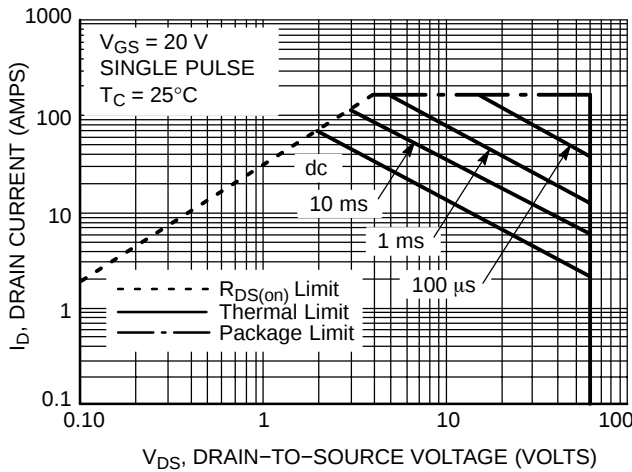


Figure 11. Maximum Rated Forward Biased Safe Operating Area

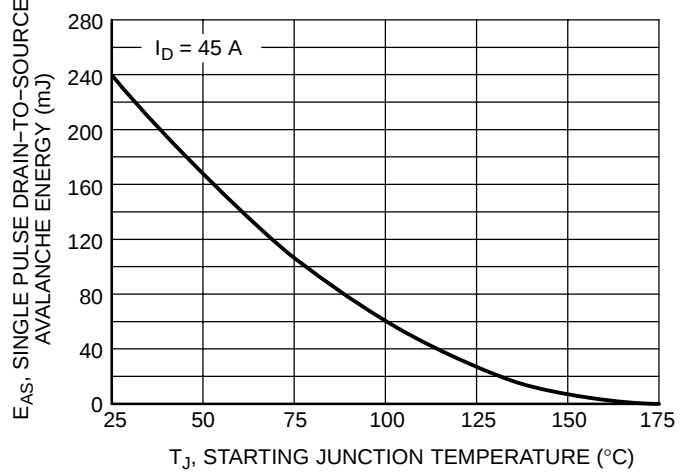


Figure 12. Maximum Avalanche Energy vs. Starting Junction Temperature

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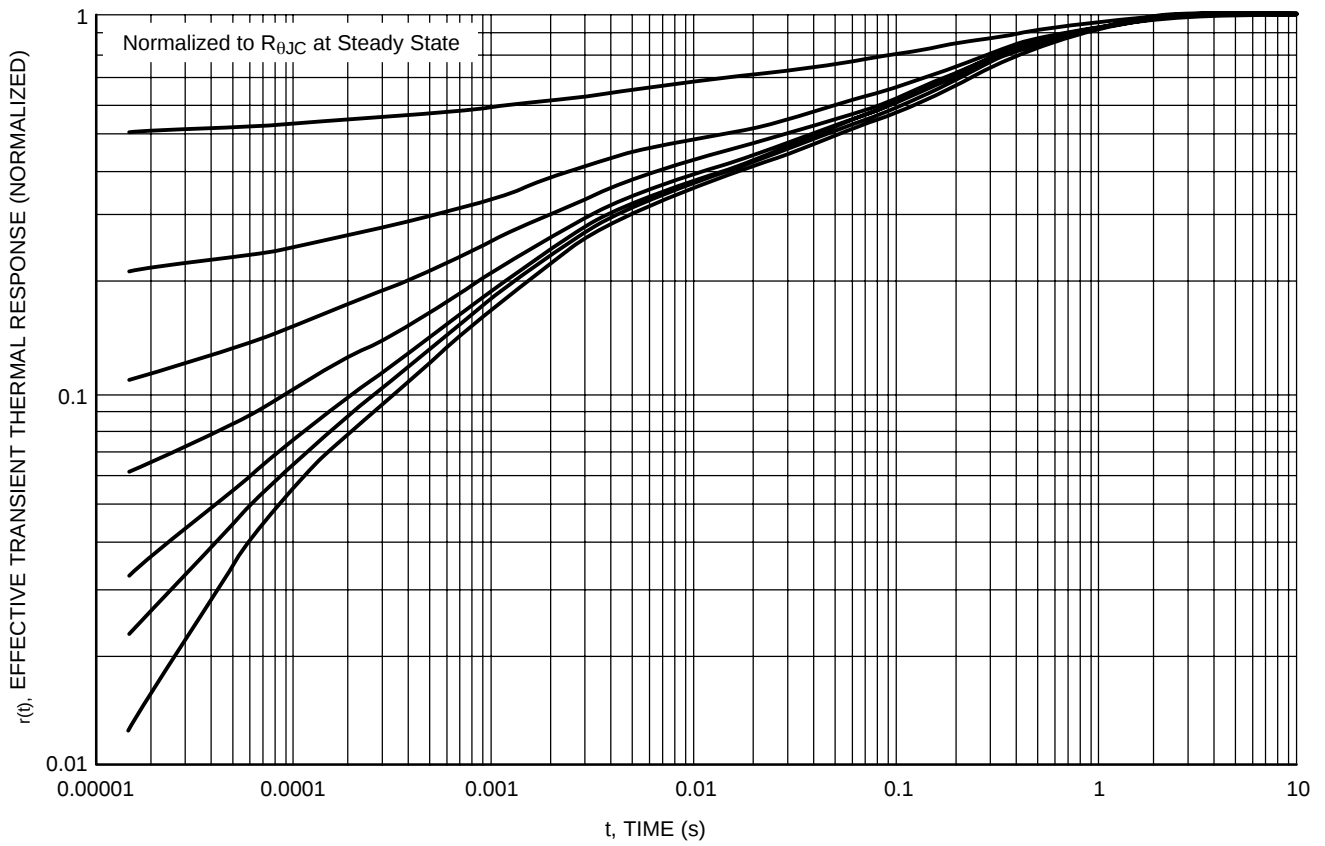


Figure 13. Thermal Response

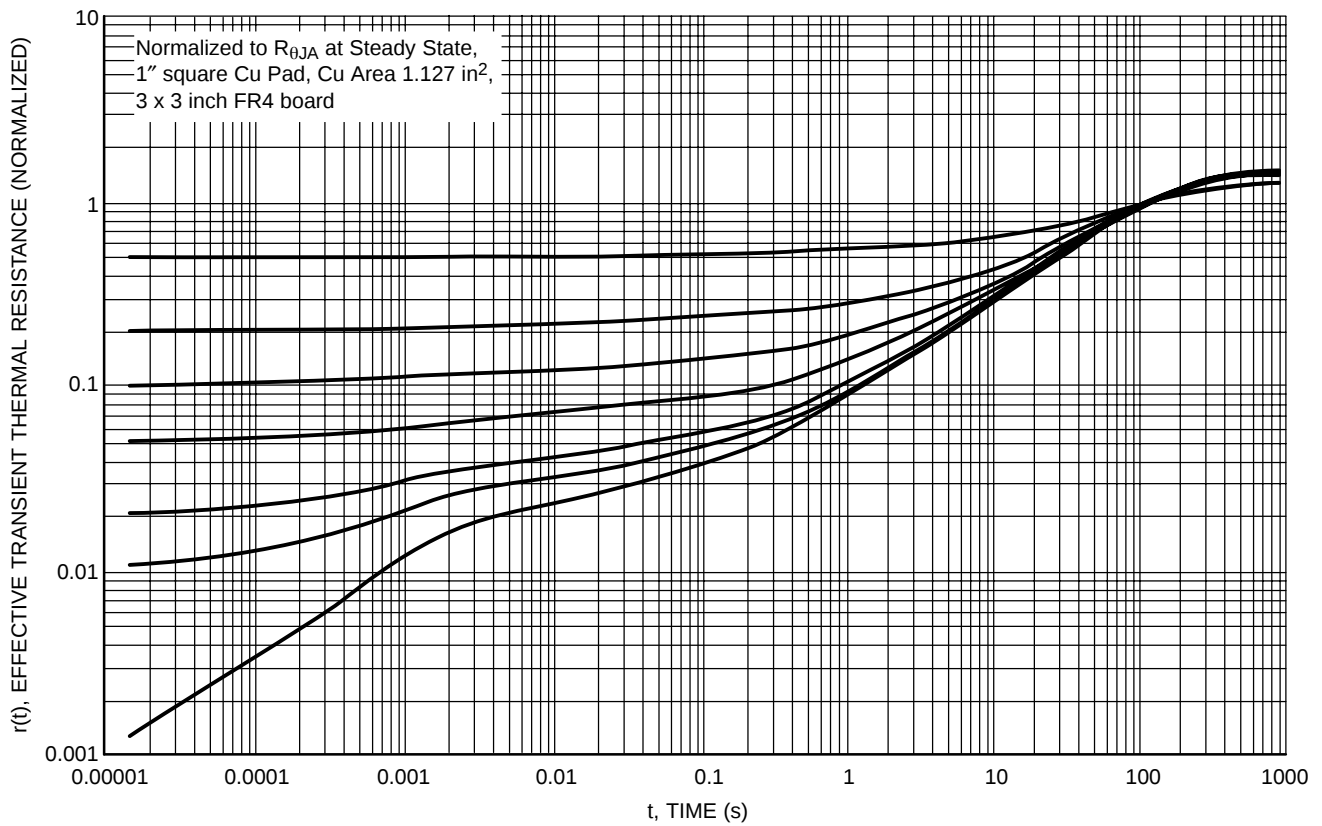
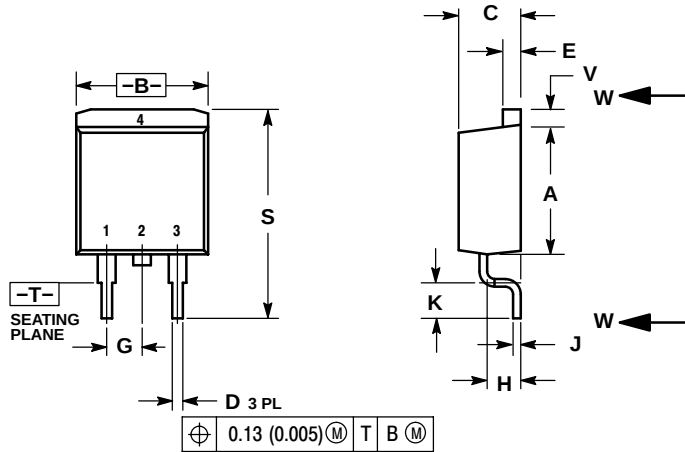


Figure 14. Thermal Response

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PACKAGE DIMENSIONS

D²PAK
CASE 418B-04
ISSUE J



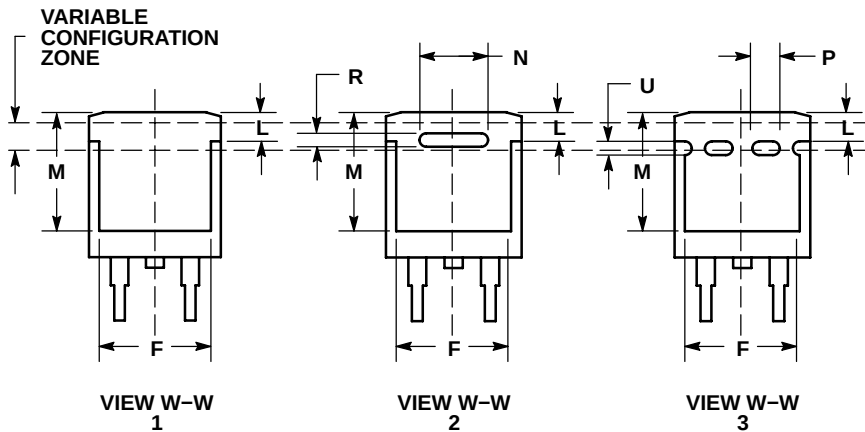
NOTES:

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

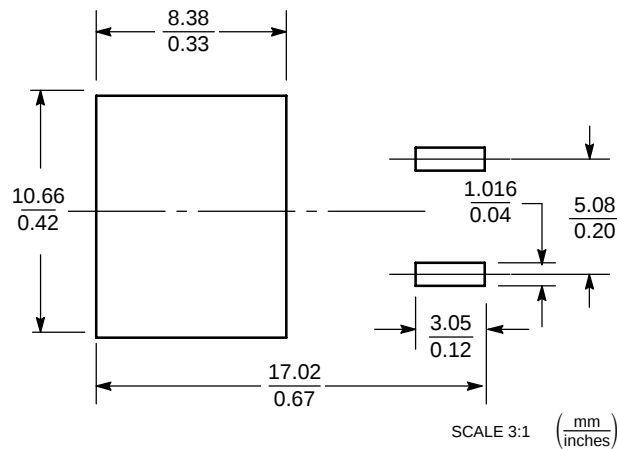
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.340	0.380	8.64	9.65
B	0.380	0.405	9.65	10.29
C	0.160	0.190	4.06	4.83
D	0.020	0.035	0.51	0.89
E	0.045	0.055	1.14	1.40
F	0.310	0.350	7.87	8.89
G	0.100 BSC		2.54 BSC	
H	0.080	0.110	2.03	2.79
J	0.018	0.025	0.46	0.64
K	0.090	0.110	2.29	2.79
L	0.052	0.072	1.32	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



SOLDERING FOOTPRINT*

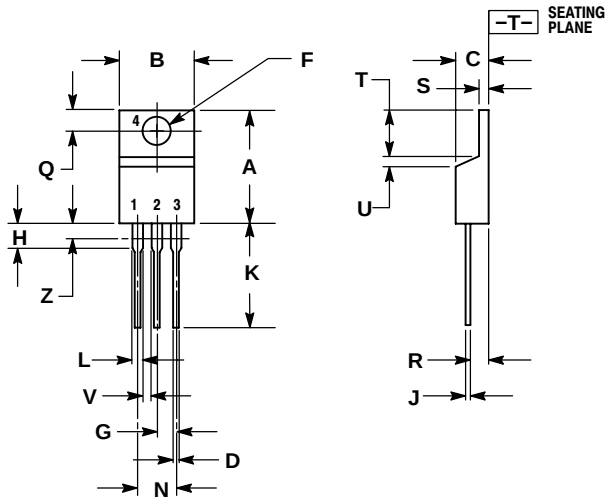


*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

NTP45N06, NTB45N06

PACKAGE DIMENSIONS

TO-220
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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