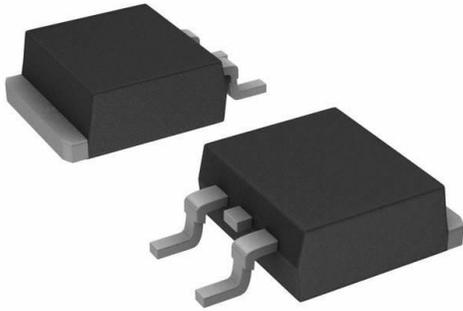


# NTD4910NT4G Datasheet

[www.digi-electronics.com](http://www.digi-electronics.com)



<https://www.DiGi-Electronics.com>

DiGi Electronics Part Number	NTD4910NT4G-DG
Manufacturer	<a href="#">onsemi</a>
Manufacturer Product Number	NTD4910NT4G
Description	MOSFET N-CH 30V 8.2A/37A DPAK
Detailed Description	N-Channel 30 V 8.2A (Ta), 37A (Tc) 1.37W (Ta), 27.3 W (Tc) Surface Mount DPAK



Tel: +00 852-30501935

RFQ Email: [Info@DiGi-Electronics.com](mailto:Info@DiGi-Electronics.com)

DiGi is a global authorized distributor of electronic components.

## Purchase and inquiry

Manufacturer Product Number:

NTD4910NT4G

Series:

-

FET Type:

N-Channel

Drain to Source Voltage (Vdss):

30 V

Drive Voltage (Max Rds On, Min Rds On):

4.5V, 10V

Vgs(th) (Max) @ Id:

2.2V @ 250 $\mu$ A

Vgs (Max):

$\pm$ 20V

FET Feature:

-

Operating Temperature:

-55°C ~ 175°C (Tj)

Supplier Device Package:

DPAK

Base Product Number:

NTD49

Manufacturer:

onsemi

Product Status:

Obsolete

Technology:

MOSFET (Metal Oxide)

Current - Continuous Drain (Id) @ 25°C:

8.2A (Ta), 37A (Tc)

Rds On (Max) @ Id, Vgs:

9mOhm @ 30A, 10V

Gate Charge (Qg) (Max) @ Vgs:

15.4 nC @ 10 V

Input Capacitance (Ciss) (Max) @ Vds:

1203 pF @ 15 V

Power Dissipation (Max):

1.37W (Ta), 27.3W (Tc)

Mounting Type:

Surface Mount

Package / Case:

TO-252-3, DPAK (2 Leads + Tab), SC-63

## Environmental & Export classification

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

REACH Status:

REACH Unaffected

HTSUS:

8541.29.0095

# NTD4910N

## Power MOSFET 30 V, 37 A, Single N-Channel, DPAK/IPAK

### Features

- Low  $R_{DS(on)}$  to Minimize Conduction Losses
- Low Capacitance to Minimize Driver Losses
- Optimized Gate Charge to Minimize Switching Losses
- These are Pb-Free Devices

### Applications

- CPU Power Delivery
- DC-DC Converters

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

Parameter	Symbol	Value	Unit			
Drain-to-Source Voltage	$V_{DS}$	30	V			
Gate-to-Source Voltage	$V_{GS}$	$\pm 20$	V			
Continuous Drain Current ( $R_{\theta JA}$ ) (Note 1)	$I_D$	$T_A = 25^\circ\text{C}$	11.2	A		
		$T_A = 100^\circ\text{C}$	7.9			
		Power Dissipation ( $R_{\theta JA}$ ) (Note 1)	$P_D$	$T_A = 25^\circ\text{C}$	2.6	W
				$T_A = 100^\circ\text{C}$	5.8	
		Continuous Drain Current ( $R_{\theta JA}$ ) (Note 2)	$I_D$	$T_A = 25^\circ\text{C}$	8.2	A
				$T_A = 100^\circ\text{C}$	5.8	
Power Dissipation ( $R_{\theta JA}$ ) (Note 2)	$P_D$	$T_A = 25^\circ\text{C}$	1.37	W		
		$T_C = 25^\circ\text{C}$	26			
Continuous Drain Current ( $R_{\theta JC}$ ) (Note 1)	$I_D$	$T_C = 25^\circ\text{C}$	37	A		
		$T_C = 100^\circ\text{C}$	26			
Power Dissipation ( $R_{\theta JC}$ ) (Note 1)	$P_D$	$T_C = 25^\circ\text{C}$	27.3	W		
		$T_C = 100^\circ\text{C}$	27.3			
Pulsed Drain Current	$t_p=10\mu\text{s}$	$T_A = 25^\circ\text{C}$	$I_{DM}$	152	A	
Current Limited by Package		$T_A = 25^\circ\text{C}$	$I_{DmaxPkg}$	60	A	
Operating Junction and Storage Temperature	$T_J, T_{stg}$	-55 to 175		$^\circ\text{C}$		
Source Current (Body Diode)	$I_S$	23		A		
Drain to Source dV/dt	dV/dt	7.0		V/ns		
Single Pulse Drain-to-Source Avalanche Energy ( $T_J = 25^\circ\text{C}$ , $V_{DD} = 50\text{ V}$ , $V_{GS} = 10\text{ V}$ , $L = 0.1\text{ mH}$ , $I_{L(pk)} = 22.5\text{ A}$ , $R_G = 25\ \Omega$ )	$E_{AS}$	25.3		mJ		
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)	$T_L$	260		$^\circ\text{C}$		

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

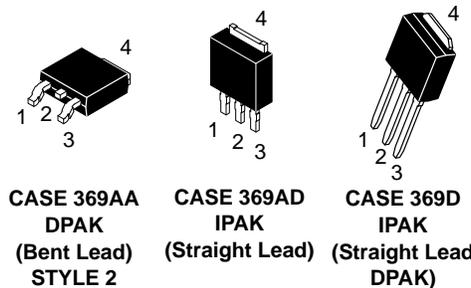
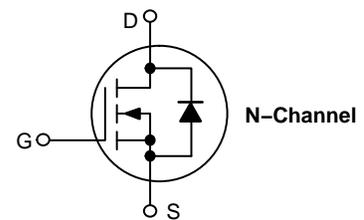
1. Surface-mounted on FR4 board using 1 in sq pad size, 1 oz Cu.
2. Surface-mounted on FR4 board using the minimum recommended pad size.



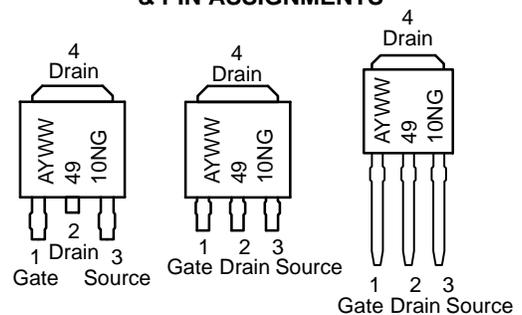
ON Semiconductor®

<http://onsemi.com>

$V_{(BR)DSS}$	$R_{DS(on)}$ MAX	$I_D$ MAX
30 V	9.0 m $\Omega$ @ 10 V	37 A
	13 m $\Omega$ @ 4.5 V	



### MARKING DIAGRAMS & PIN ASSIGNMENTS



A = Assembly Location  
Y = Year  
WW = Work Week  
4910N = Device Code  
G = Pb-Free Package

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 3 of this data sheet.

**NTD4910N****THERMAL RESISTANCE MAXIMUM RATINGS**

Parameter	Symbol	Value	Unit
Junction-to-Case (Drain)	$R_{\theta JC}$	5.5	°C/W
Junction-to-Tab (Drain)	$R_{\theta JC-TAB}$	4.3	
Junction-to-Ambient – Steady State (Note 3)	$R_{\theta JA}$	58.5	
Junction-to-Ambient – Steady State (Note 4)	$R_{\theta JA}$	109.7	

3. Surface-mounted on FR4 board using 1 in sq pad size, 1 oz Cu.  
4. Surface-mounted on FR4 board using the minimum recommended pad size.

**ELECTRICAL CHARACTERISTICS** ( $T_J = 25^\circ\text{C}$  unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
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**OFF CHARACTERISTICS**

Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	30			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$			15		mV/°C
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS} = 0\text{ V}, V_{DS} = 24\text{ V}$	$T_J = 25^\circ\text{C}$		1.0	$\mu\text{A}$
			$T_J = 125^\circ\text{C}$		10	
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA

**ON CHARACTERISTICS** (Note 5)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\ \mu\text{A}$	1.0	1.6	2.2	V	
Negative Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$			4.0		mV/°C	
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$	$I_D = 30\text{ A}$		7.5	9.0	m $\Omega$
			$I_D = 15\text{ A}$		7.5		
		$V_{GS} = 4.5\text{ V}$	$I_D = 30\text{ A}$		10.6	13	
			$I_D = 15\text{ A}$		10.6		
Forward Transconductance	$g_{FS}$	$V_{DS} = 1.5\text{ V}, I_D = 30\text{ A}$		40		S	

**CHARGES AND CAPACITANCES**

Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}, V_{DS} = 15\text{ V}$		1203		pF
Output Capacitance	$C_{oss}$			460		
Reverse Transfer Capacitance	$C_{riss}$			12.5		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 15\text{ V}, I_D = 30\text{ A}$		6.8		nC
Threshold Gate Charge	$Q_{G(TH)}$			1.95		
Gate-to-Source Charge	$Q_{GS}$			3.9		
Gate-to-Drain Charge	$Q_{GD}$			1.1		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 10\text{ V}, V_{DS} = 15\text{ V}, I_D = 30\text{ A}$		15.4		nC

**SWITCHING CHARACTERISTICS** (Note 6)

Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 15\text{ V}, I_D = 15\text{ A}, R_G = 3.0\ \Omega$		11.6		ns
Rise Time	$t_r$			21.8		
Turn-Off Delay Time	$t_{d(off)}$			16.5		
Fall Time	$t_f$			4.2		

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

5. Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2\%$ .  
6. Switching characteristics are independent of operating junction temperatures.  
7. Assume terminal length of 110 mils.

**NTD4910N****ELECTRICAL CHARACTERISTICS** ( $T_J = 25^\circ\text{C}$  unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 15\text{ V},$ $I_D = 15\text{ A}, R_G = 3.0\ \Omega$		7.3		ns
Rise Time	$t_r$			19.5		
Turn-Off Delay Time	$t_{d(off)}$			20.2		
Fall Time	$t_f$			2.0		

**DRAIN-SOURCE DIODE CHARACTERISTICS**

Forward Diode Voltage	$V_{SD}$	$V_{GS} = 0\text{ V},$ $I_S = 30\text{ A}$	$T_J = 25^\circ\text{C}$		0.91	1.1	V
			$T_J = 125^\circ\text{C}$		0.82		
Reverse Recovery Time	$t_{RR}$	$V_{GS} = 0\text{ V},$ $di/dt = 100\text{ A}/\mu\text{s},$ $I_S = 30\text{ A}$			27		ns
Charge Time	$t_a$				14		
Discharge Time	$t_b$				13		
Reverse Recovery Time	$Q_{RR}$				17		nC

**PACKAGE PARASITIC VALUES**

Source Inductance (Note 7)	$L_S$	$T_A = 25^\circ\text{C}$		2.99		nH
Drain Inductance, DPAK	$L_D$			0.0164		
Drain Inductance, IPAK (Note 7)	$L_D$			1.88		
Gate Inductance (Note 7)	$L_G$			4.9		
Gate Resistance	$R_G$			1.0	2.0	

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

5. Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2\%$ .
6. Switching characteristics are independent of operating junction temperatures.
7. Assume terminal length of 110 mils.

**ORDERING INFORMATION**

Order Number	Package	Shipping <sup>†</sup>
NTD4910NT4G	DPAK (Pb-Free)	2500 / Tape & Reel
NTD4910N-1G	IPAK (Pb-Free)	75 Units / Rail
NTD4910N-35G	IPAK Trimmed Lead (Pb-Free)	75 Units / Rail

<sup>†</sup>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.

# NTD4910N

## TYPICAL CHARACTERISTICS

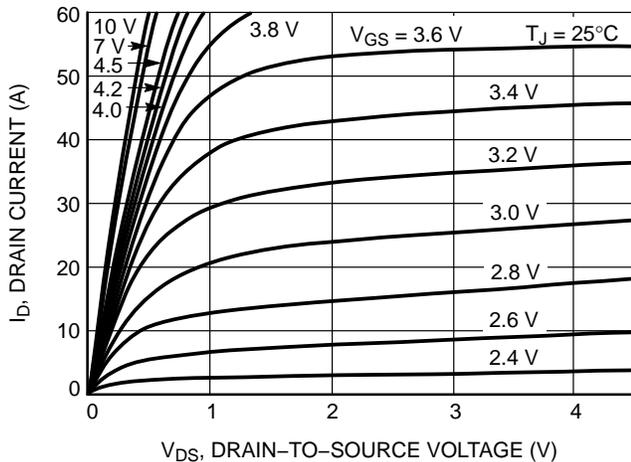


Figure 1. On-Region Characteristics

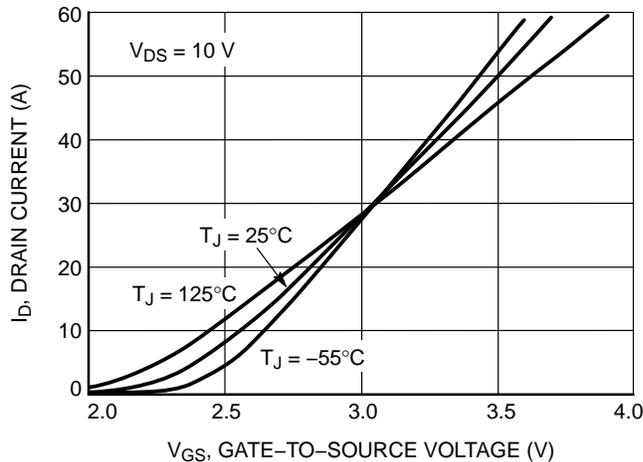


Figure 2. Transfer Characteristics

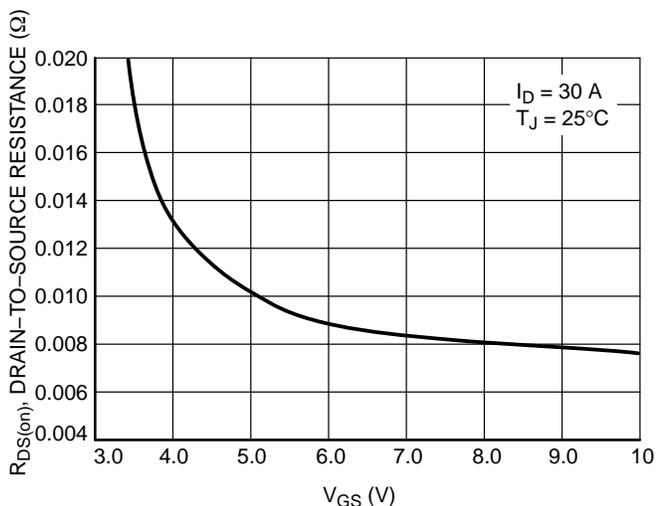


Figure 3. On-Resistance vs.  $V_{GS}$

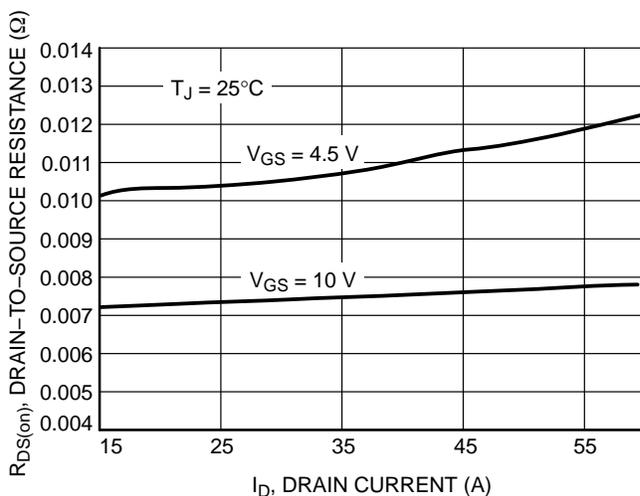


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

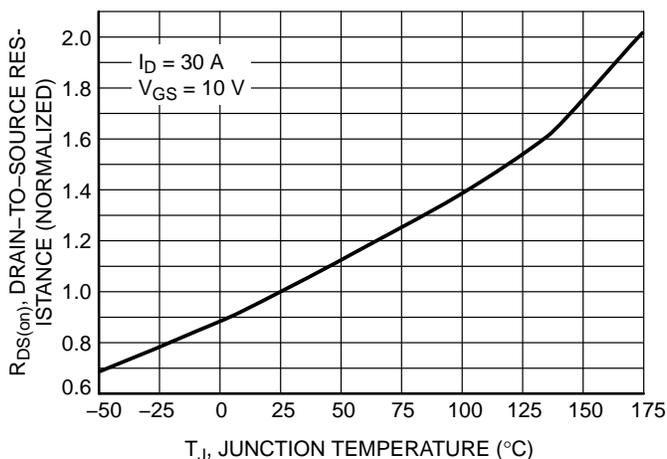


Figure 5. On-Resistance Variation with Temperature

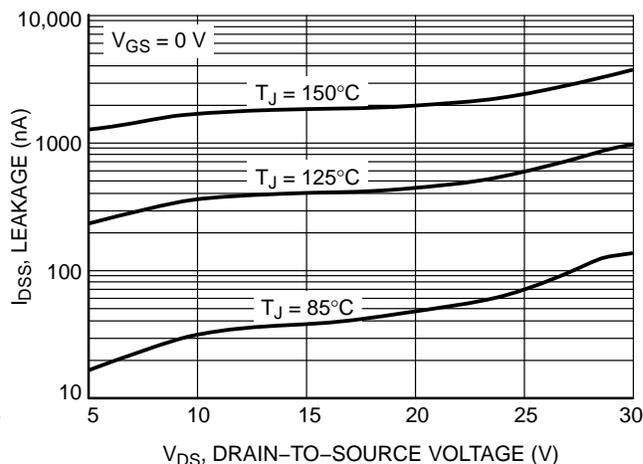


Figure 6. Drain-to-Source Leakage Current vs. Voltage

# NTD4910N

## TYPICAL CHARACTERISTICS

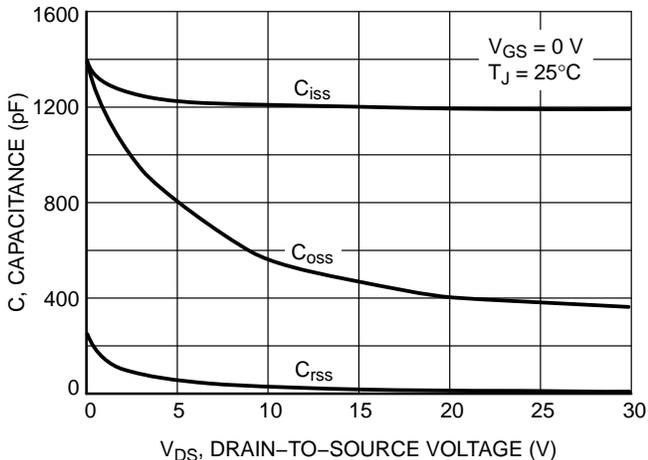


Figure 7. Capacitance Variation

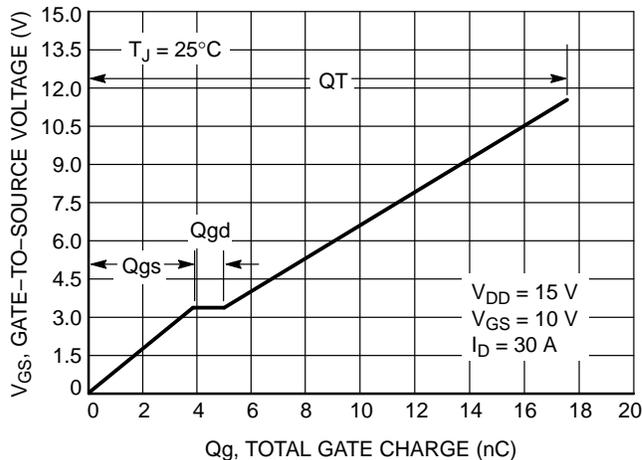


Figure 8. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

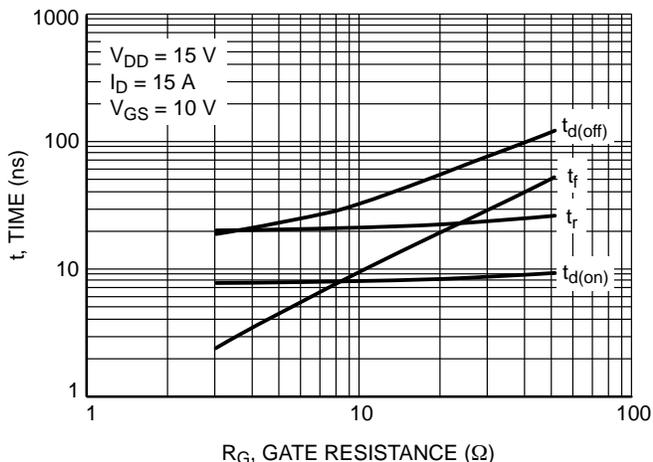


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

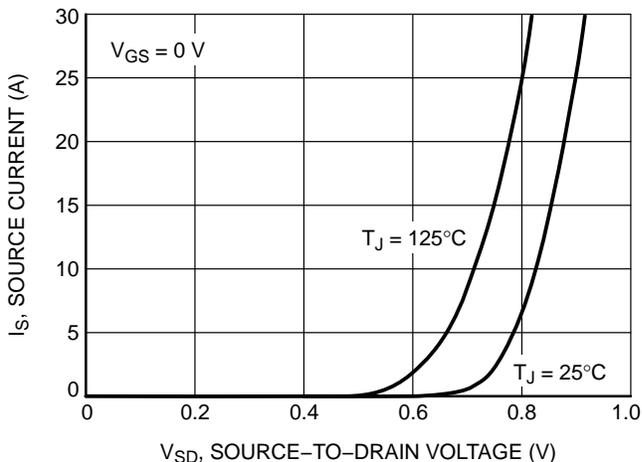


Figure 10. Diode Forward Voltage vs. Current

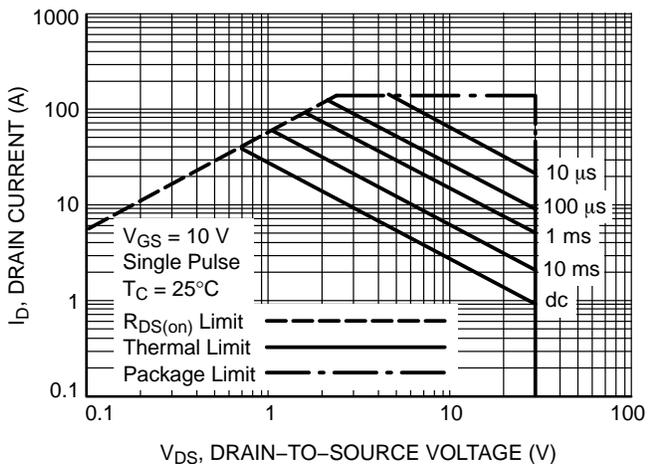


Figure 11. Maximum Rated Forward Biased Safe Operating Area

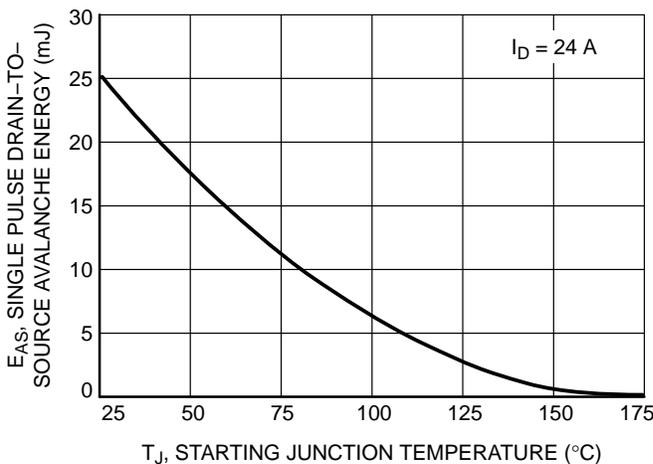


Figure 12. Maximum Avalanche Energy vs. Starting Junction Temperature

# NTD4910N

## TYPICAL CHARACTERISTICS

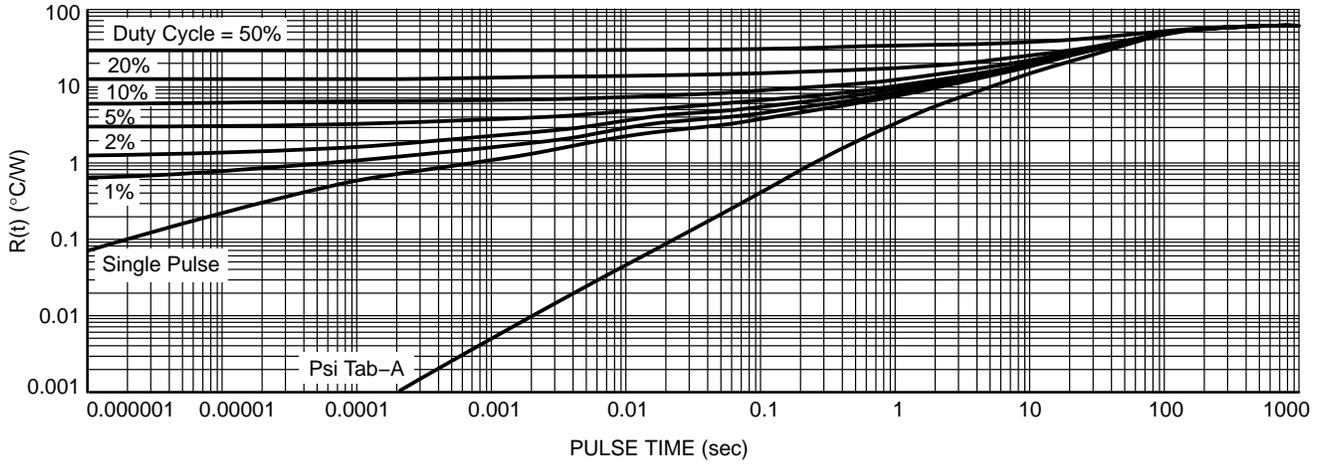


Figure 13. FET Thermal Response

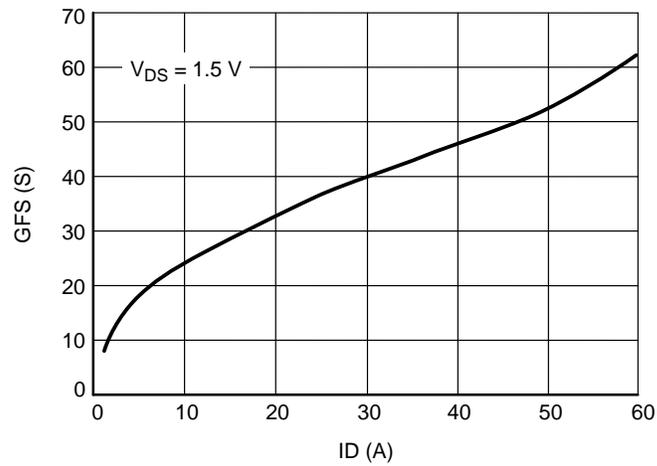
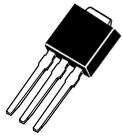


Figure 14. GFS vs.  $I_D$



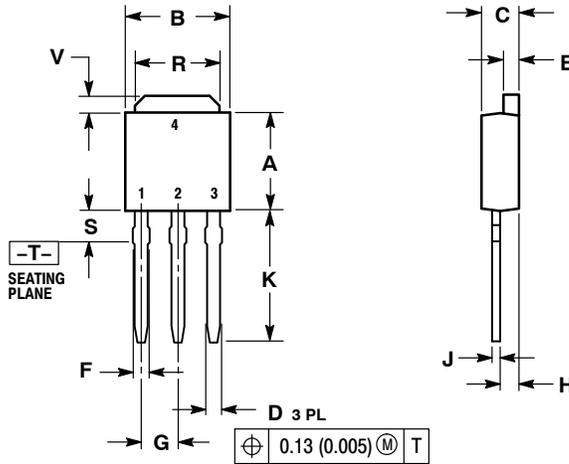
**MECHANICAL CASE OUTLINE  
PACKAGE DIMENSIONS**



**DPAK INSERTION MOUNT  
CASE 369  
ISSUE O**

DATE 02 JAN 2000

SCALE 1:1



- 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	0.090 BSC		2.29 BSC	
H	0.034	0.040	0.87	1.01
J	0.018	0.023	0.46	0.58
K	0.350	0.380	8.89	9.65
R	0.175	0.215	4.45	5.46
S	0.050	0.090	1.27	2.28
V	0.030	0.050	0.77	1.27

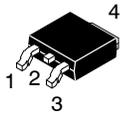
- |  |   |   |  |  |  |
|--|---|---|--|--|--|
| <p>STYLE 1:<br/>PIN 1. BASE<br/>2. COLLECTOR<br/>3. EMITTER<br/>4. COLLECTOR</p> | <p>STYLE 2:<br/>PIN 1. GATE<br/>2. DRAIN<br/>3. SOURCE<br/>4. DRAIN</p> | <p>STYLE 3:<br/>PIN 1. ANODE<br/>2. CATHODE<br/>3. ANODE<br/>4. CATHODE</p> | <p>STYLE 4:<br/>PIN 1. CATHODE<br/>2. ANODE<br/>3. GATE<br/>4. ANODE</p> | <p>STYLE 5:<br/>PIN 1. GATE<br/>2. ANODE<br/>3. CATHODE<br/>4. ANODE</p> | <p>STYLE 6:<br/>PIN 1. MT1<br/>2. MT2<br/>3. GATE<br/>4. MT2</p> |
|--|---|---|--|--|--|

<b>DOCUMENT NUMBER:</b>	<b>98ASB42319B</b>	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
<b>DESCRIPTION:</b>	<b>DPAK INSERTION MOUNT</b>	<b>PAGE 1 OF 1</b>

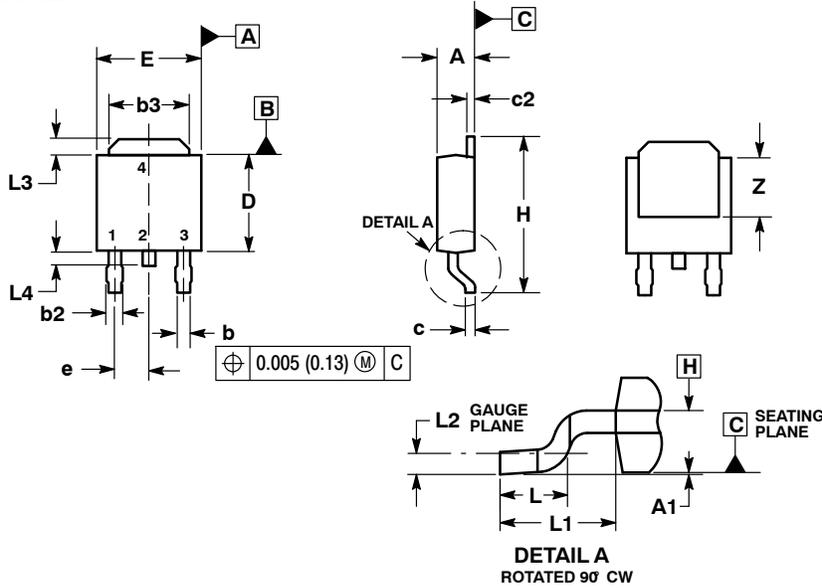
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**MECHANICAL CASE OUTLINE  
PACKAGE DIMENSIONS**



SCALE 1:1



**DPAK (SINGLE GAUGE)  
CASE 369AA  
ISSUE B**

DATE 03 JUN 2010

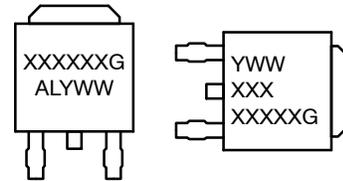
NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS b<sub>3</sub>, L<sub>3</sub> and Z.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.006 INCHES PER SIDE.
5. DIMENSIONS D AND E ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
6. DATUMS A AND B ARE DETERMINED AT DATUM PLANE H.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.086	0.094	2.18	2.38
A1	0.000	0.005	0.00	0.13
b	0.025	0.035	0.63	0.89
b <sub>2</sub>	0.030	0.045	0.76	1.14
b <sub>3</sub>	0.180	0.215	4.57	5.46
c	0.018	0.024	0.46	0.61
c <sub>2</sub>	0.018	0.024	0.46	0.61
D	0.235	0.245	5.97	6.22
E	0.250	0.265	6.35	6.73
e	0.090 BSC		2.29 BSC	
H	0.370	0.410	9.40	10.41
L	0.055	0.070	1.40	1.78
L <sub>1</sub>	0.108 REF		2.74 REF	
L <sub>2</sub>	0.020 BSC		0.51 BSC	
L <sub>3</sub>	0.035	0.050	0.89	1.27
L <sub>4</sub>	---	0.040	---	1.01
Z	0.155	---	3.93	---

- |  |   |  |  |
|--|---|--|--|
| <p>STYLE 1:<br/>PIN 1. BASE<br/>2. COLLECTOR<br/>3. EMITTER<br/>4. COLLECTOR</p> | <p>STYLE 2:<br/>PIN 1. GATE<br/>2. DRAIN<br/>3. SOURCE<br/>4. DRAIN</p> | <p>STYLE 3:<br/>PIN 1. ANODE<br/>2. CATHODE<br/>3. ANODE<br/>4. CATHODE</p>      | <p>STYLE 4:<br/>PIN 1. CATHODE<br/>2. ANODE<br/>3. GATE<br/>4. ANODE</p> |
| <p>STYLE 5:<br/>PIN 1. GATE<br/>2. ANODE<br/>3. CATHODE<br/>4. ANODE</p>         | <p>STYLE 6:<br/>PIN 1. MT1<br/>2. MT2<br/>3. GATE<br/>4. MT2</p>        | <p>STYLE 7:<br/>PIN 1. GATE<br/>2. COLLECTOR<br/>3. EMITTER<br/>4. COLLECTOR</p> |  |

**GENERIC MARKING DIAGRAM\***

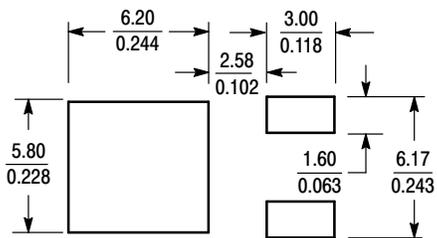


IC Discrete

- XXXXXX = Device Code
- A = Assembly Location
- L = Wafer Lot
- Y = Year
- WW = Work Week
- G = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking.

**SOLDERING FOOTPRINT\***



SCALE 3:1 (mm/inches)

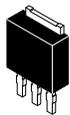
\*For additional information on our Pb-Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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<b>DESCRIPTION:</b>	<b>DPAK (SINGLE GAUGE)</b>	<b>PAGE 1 OF 1</b>

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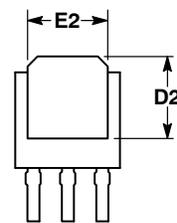
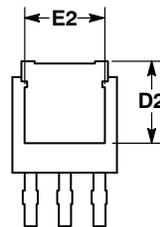
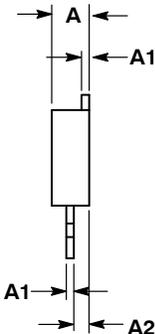
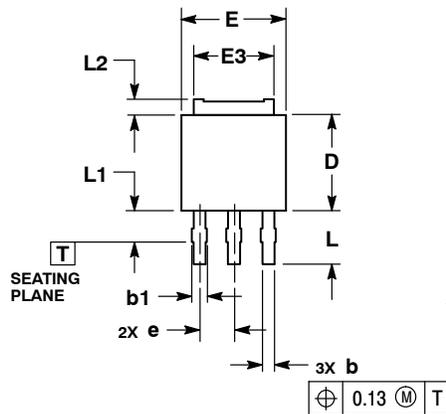
**MECHANICAL CASE OUTLINE  
PACKAGE DIMENSIONS**



**3.5 MM IPAK, STRAIGHT LEAD  
CASE 369AD  
ISSUE B**

DATE 18 APR 2013

SCALE 1:1



OPTIONAL CONSTRUCTION

NOTES:

- 1.. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
- 2.. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30mm FROM TERMINAL TIP.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD GATE OR MOLD FLASH.

DIM	MILLIMETERS	
	MIN	MAX
A	2.19	2.38
A1	0.46	0.60
A2	0.87	1.10
b	0.69	0.89
b1	0.77	1.10
D	5.97	6.22
D2	4.80	---
E	6.35	6.73
E2	4.57	5.45
E3	4.45	5.46
e	2.28 BSC	
L	3.40	3.60
L1	---	2.10
L2	0.89	1.27

**GENERIC MARKING  
DIAGRAMS\***

STYLE 1:  
PIN 1. BASE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR

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

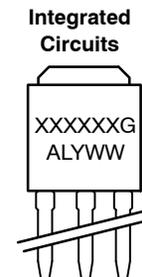
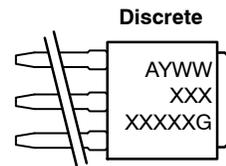
STYLE 3:  
PIN 1. ANODE  
2. CATHODE  
3. ANODE  
4. CATHODE

STYLE 4:  
PIN 1. CATHODE  
2. ANODE  
3. GATE  
4. ANODE

STYLE 5:  
PIN 1. GATE  
2. ANODE  
3. CATHODE  
4. ANODE

STYLE 6:  
PIN 1. MT1  
2. MT2  
3. GATE  
4. MT2

STYLE 7:  
PIN 1. GATE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR



- XXXXXX = Device Code
- A = Assembly Location
- L = Wafer Lot
- Y = Year
- WW = Work Week
- G = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present.

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