

NTD6415N

Product Preview

Power MOSFET

100 V, 20 A, Single N-Channel,
DPAK/IPAK

Features

- Low $R_{DS(on)}$
- High Current Capability
- Avalanche Energy Specified
- These are Pb-Free Devices

Applications

- CCFL Backlight
- DC Motor Control
- Class D Amplifier
- Power Supplies Secondary Side Synchronous Rectification

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

Parameter		Symbol	Value	Unit	
Drain-to-Source Voltage		V_{DS}	100	V	
Gate-to-Source Voltage - Continuous		V_{GS}	± 20	V	
Gate-to-Source Voltage - Nonrepetitive ($T_P < 10 \mu\text{s}$)		V_{GS}	± 30	V	
Continuous Drain Current $R_{\theta JC}$ (Note 1)	Steady State	$T_C = 25^\circ\text{C}$	I_D	20	A
			$T_C = 100^\circ\text{C}$	14.5	
Power Dissipation $R_{\theta JC}$ (Note 1)	Steady State	$T_C = 25^\circ\text{C}$	P_D	83	W
Pulsed Drain Current	$t_p = 10 \mu\text{s}$	I_{DM}	42	A	
Operating and Storage Temperature Range		T_J, T_{stg}	-55 to +175	$^\circ\text{C}$	
Source Current (Body Diode)		I_S	20	A	
Single Pulse Drain-to-Source Avalanche Energy - Starting $T_J = 25^\circ\text{C}$ ($V_{DD} = 50 V_{dc}, V_{GS} = 10 V, I_{L(pk)} = 20 A, L = 0.1 \text{ mH}, R_G = 25 \Omega, V_{DS} = 40 V_{dc}$)		E_{AS}	TBD	mJ	
Lead Temperature for Soldering Purposes, 1/8" from Case for 10 Seconds		T_L	260	$^\circ\text{C}$	

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction-to-Case (Drain) Steady State (Note 1)	$R_{\theta JC}$	1.8	$^\circ\text{C/W}$
	$R_{\theta JA}$	68	

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Surface mounted on FR4 board using 1 sq in pad size, (Cu Area 1.127 sq in [1 oz] including traces).

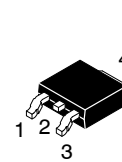
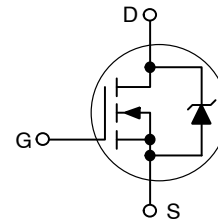
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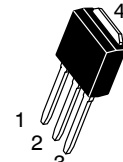
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$V_{(BR)DSS}$	$R_{DS(on)}$ MAX	I_D MAX (Note 1)
100 V	69 m Ω @ 10 V	20 A

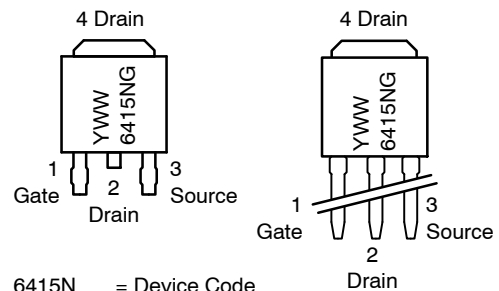


DPAK
CASE 369C
STYLE 2



IPAK
CASE 369D
STYLE 2

MARKING DIAGRAM & PIN ASSIGNMENTS



6415N = Device Code
Y = Year
WW = Work Week
G = Pb-Free Package

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

NTD6415N

ELECTRICAL CHARACTERISTICS (T_J = 25°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 V, I _D = 250 μA	100			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} /T _J			TBD		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V, V _{DS} = 100 V	T _J = 25°C		1.0	μA
			T _J = 125°C		100	
Gate-to-Source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA

ON CHARACTERISTICS (Note 3)

Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = 250 μA	2.0		4.0	V
Negative Threshold Temperature Coefficient	V _{GS(TH)} /T _J			TBD		mV/°C
Drain-to-Source On-Resistance	R _{DS(on)}	V _{GS} = 10 V, I _D = 15 A		60	69	mΩ
		V _{GS} = 10 V, I _D = 20 A		TBD	TBD	
Forward Transconductance	g _{FS}	V _{DS} = 15 V, I _D = 15 A		TBD		S

CHARGES, CAPACITANCES AND GATE RESISTANCE

Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1.0 MHz, V _{DS} = 25 V		1395	1495	pF
Output Capacitance	C _{OSS}			172		
Reverse Transfer Capacitance	C _{RSS}			TBD		
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 10 V, V _{DS} = 80 V, I _D = 20 A		33	133	nC
Threshold Gate Charge	Q _{G(TH)}			TBD		
Gate-to-Source Charge	Q _{GS}			TBD		
Gate-to-Drain Charge	Q _{GD}			TBD		

SWITCHING CHARACTERISTICS (Note 4)

Turn-On Delay Time	t _{d(on)}	V _{GS} = 10 V, V _{DD} = 80 V, I _D = 20 A, R _G = 6.1 Ω		TBD		ns
Rise Time	t _r			TBD		
Turn-Off Delay Time	t _{d(off)}			TBD		
Fall Time	t _f			TBD		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V _{SD}	V _{GS} = 0 V, I _S = 10 A	T _J = 25°C		TBD	1.2	V
			T _J = 100°C		TBD		
Reverse Recovery Time	t _{RR}	V _{GS} = 0 V, dI _S /dt = 100 A/μs, I _S = 20 A		TBD		ns	
Charge Time	T _a			TBD			
Discharge Time	T _b			TBD			
Reverse Recovery Charge	Q _{RR}			TBD			nC

2. Surface mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces).

3. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.

4. Switching characteristics are independent of operating junction temperatures.

ORDERING INFORMATION

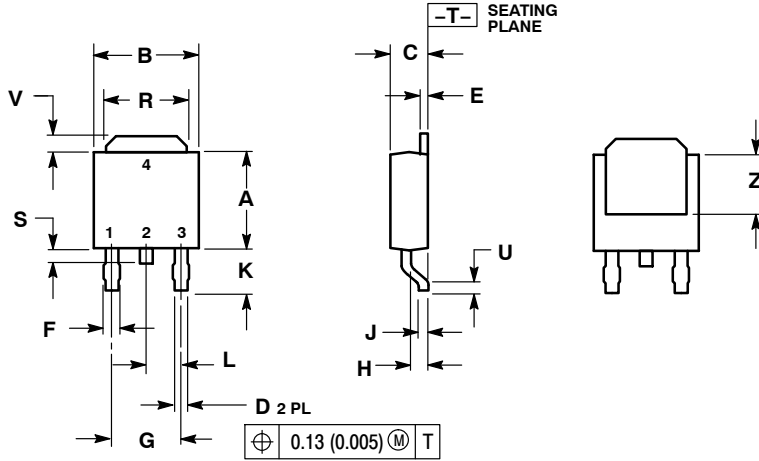
Device	Package	Shipping†
NTD6415NT4G	DPAK (Pb-Free)	2500 / Tape & Reel
NTD6415N-1G	IPAK (Pb-Free)	75 Units / Rail

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

NTD6415N

PACKAGE DIMENSIONS

DPAK
CASE 369C-01
ISSUE O



NOTES:

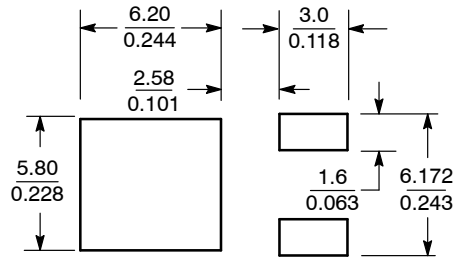
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.235	0.245	5.97	6.22
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	0.018	0.023	0.46	0.58
F	0.037	0.045	0.94	1.14
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	0.180	0.215	4.57	5.45
S	0.025	0.040	0.63	1.01
U	0.020	---	0.51	---
V	0.035	0.050	0.89	1.27
Z	0.155	---	3.93	---

STYLE 2:

- PIN 1. GATE
- DRAIN
- SOURCE
- DRAIN

SOLDERING FOOTPRINT*



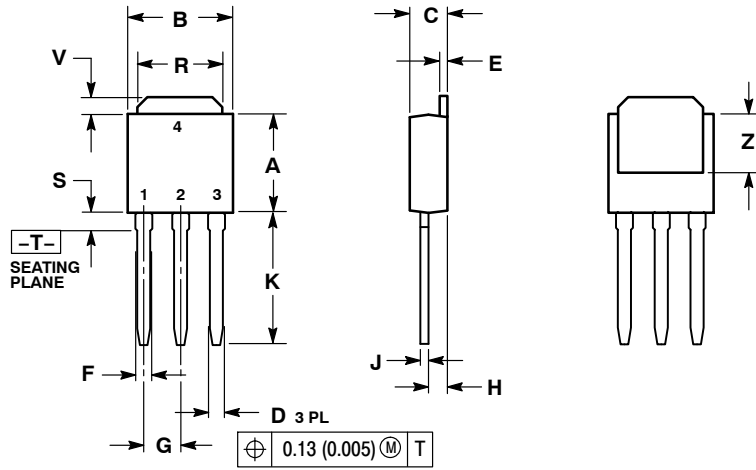
SCALE 3:1 $\left(\frac{\text{mm}}{\text{inches}}\right)$

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

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PACKAGE DIMENSIONS

DPAK CASE 369D-01 ISSUE B



NOTES:

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

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.235	0.245	5.97	6.35
B	0.250	0.265	6.35	6.73
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D	0.027	0.035	0.69	0.88
E	0.018	0.023	0.46	0.58
F	0.037	0.045	0.94	1.14
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	0.180	0.215	4.45	5.45
S	0.025	0.040	0.63	1.01
V	0.035	0.050	0.89	1.27
Z	0.155	---	3.93	---

STYLE 2:

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

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