N-Channel Power MOSFET 100 V, 23 A, 55 m Ω

Features

- Low R_{DS(on)}
- High Current Capability
- 100% Avalanche Tested
- NVD Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free and are RoHS Compliant

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

Parameter			Symbol	Value	Unit
Drain-to-Source Voltage			V_{DSS}	100	V
Gate-to-Source Voltage	ge – Conti	nuous	V_{GS}	±20	V
Continuous Drain	Steady	T _C = 25°C	I _D	23	Α
Current R _{θJC}	State	T _C = 100°C]	16	
Power Dissipation $R_{\theta JC}$	Steady T _C = 25°C		P _D	83	W
Pulsed Drain Current	tp	= 10 μs	I _{DM}	89	Α
Operating and Storage Temperature Range			T _J , T _{stg}	-55 to +175	°C
Source Current (Body Diode)			IS	23	Α
Single Pulse Drain-to-Source Avalanche Energy (V_{DD} = 50 Vdc, V_{GS} = 10 Vdc, $I_{L(pk)}$ = 23 A, L = 0.3 mH, R_G = 25 Ω)			E _{AS}	79	mJ
Lead Temperature for Soldering Purposes, 1/8" from Case for 10 Seconds			TL	260	°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.

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction-to-Case (Drain) Steady State	$R_{\theta JC}$	1.8	°C/W
Junction-to-Ambient (Note 1)	$R_{\theta JA}$	39	

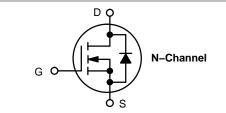
^{1.} Surface mounted on FR4 board using 1 sq in pad size, (Cu Area 1.127 sq in [2 oz] including traces).



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http://onsemi.com

V _{(BR)DS}	R _{DS(on)} MAX	I _D MAX (Note 1)
100 V	55 mΩ @ 10 V	23 A



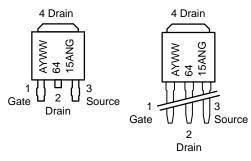






IPAK CASE 369D STYLE 2

MARKING DIAGRAM & PIN ASSIGNMENTS



A = Assembly Location*

Y = Year

WW = Work Week

6415AN = Device Code

G = Pb-Free Package

* The Assembly Location code (A) is front side optional. In cases where the Assembly Location is stamped in the package, the front side assembly code may be blank.

ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.

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

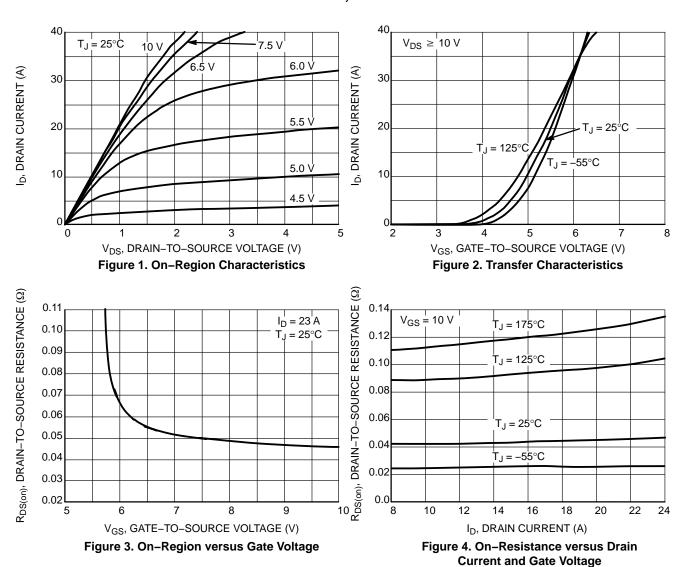
Parameter	Symbol	Test Condition		Min	Тур	Max	Unit
OFF CHARACTERISTICS			•				
Drain-to-Source Breakdown Voltage	V _{(BR)DSS}	$V_{GS} = 0 \text{ V}, I_D =$	250 μΑ	100			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} /T _J				113		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	$V_{GS} = 0 \text{ V}, V_{DS} = 100 \text{ V}$	$T_{J} = 25^{\circ}C$ $T_{J} = 125^{\circ}C$			1.0	μΑ
Gate-to-Source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} =				±100	nA
ON CHARACTERISTICS (Note 3)	000	DO 7 CO			l .	<u>.</u>	
Gate Threshold Voltage	V _{GS(TH)}	$V_{GS} = V_{DS}, I_D =$	250 μΑ	2.0		4.0	V
Negative Threshold Temperature Coefficient	V _{GS(TH)} /T _J	30 20/ 2			7.6		mV/°C
Drain-to-Source On-Resistance	R _{DS(on)}	V _{GS} = 10 V, I _D	= 23 A		47	55	mΩ
Forward Transconductance	9 _{FS}	V _{GS} = 5 V, I _D :	= 10 A		13		S
CHARGES, CAPACITANCES AND GA	TE RESISTANO	CE	•		•	•	
Input Capacitance	C _{ISS}				700		pF
Output Capacitance	Coss	V _{GS} = 0 V, f = 1.0 MH	z, V _{DS} = 25 V		110		
Reverse Transfer Capacitance	C _{RSS}		•		52		
Total Gate Charge	Q _{G(TOT)}				29		nC
Threshold Gate Charge	Q _{G(TH)}				1.2		1
Gate-to-Source Charge	Q_{GS}	$V_{GS} = 10 \text{ V}, V_{DS} = 80$) V, I _D = 23 A		5		1
Gate-to-Drain Charge	Q_{GD}		•		14.6		
Plateau Voltage	V_{GP}				5.7		V
Gate Resistance	R_{G}				2.3		Ω
SWITCHING CHARACTERISTICS (Not	e 4)						
Turn-On Delay Time	t _{d(on)}				10		ns
Rise Time	t _r	V _{GS} = 10 V, V _{DC}	a = 80 V,		37		1
Turn-Off Delay Time	t _{d(off)}	$V_{GS} = 10 \text{ V}, V_{DD}$ $I_{D} = 23 \text{ A}, R_{G} = 10 \text{ A}$	6.1 Ω		30		1
Fall Time	t _f				37		1
DRAIN-SOURCE DIODE CHARACTE	RISTICS						
Forward Diode Voltage	V _{SD}	V _{GS} = 0 V, I _S = 23 A	$T_{J} = 25^{\circ}C$ $T_{J} = 125^{\circ}C$		0.83 0.68	1.2	V
Reverse Recovery Time	t _{RR}	$V_{GS} = 0 \text{ V, } dI_S/dt = 100 \text{ A/}\mu\text{s,}$ $I_S = 23 \text{ A}$			65		ns
Charge Time	T _a				46		1
Discharge Time	T _b				19		┪
Reverse Recovery Charge	Q _{RR}				176		nC

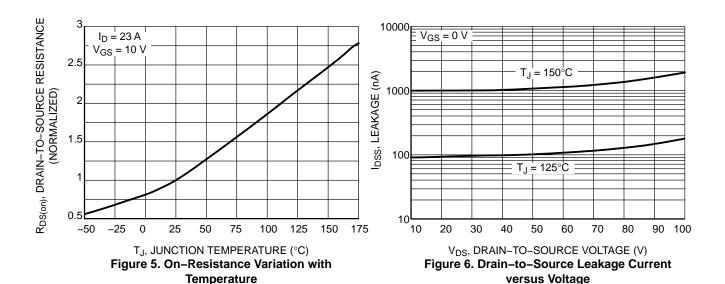
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

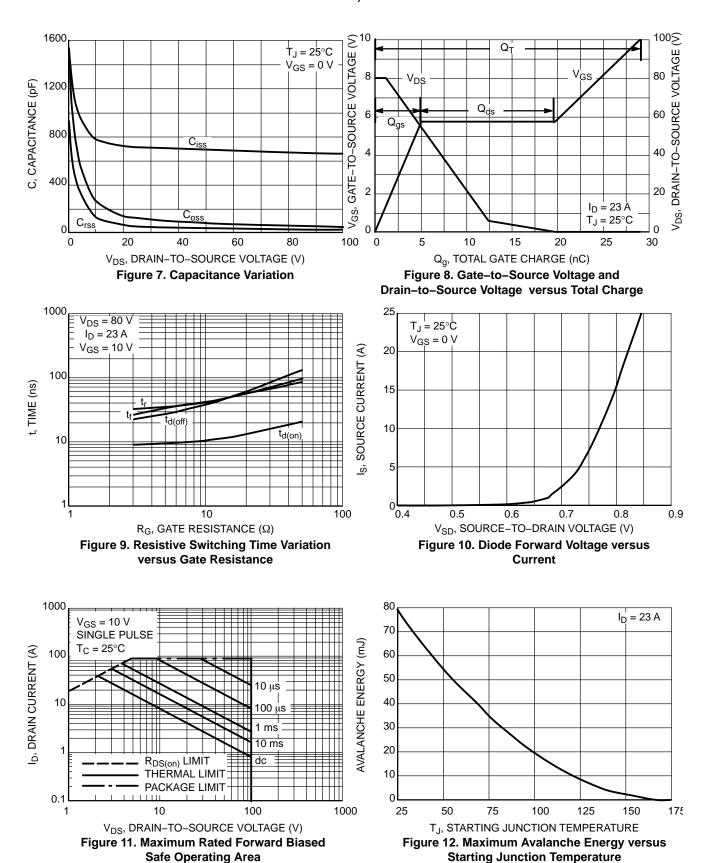
2. Surface mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces).

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

4. Switching characteristics are independent of operating junction temperatures.







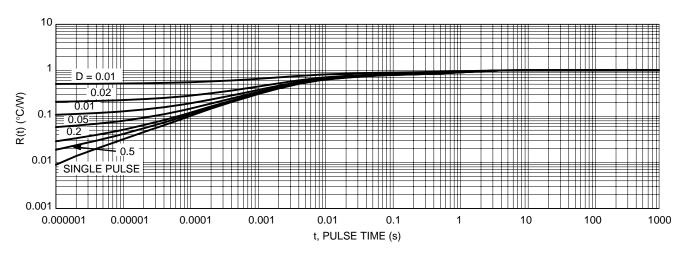


Figure 13. Thermal Response

ORDERING INFORMATION

Device	Package	Shipping†
NTD6415ANT4G	DPAK (Pb-Free)	2500 / Tape & Reel
NTD6415AN-1G	IPAK (Pb-Free)	75 Units / Rail
NVD6415ANT4G*	DPAK (Pb-Free)	2500 / Tape & Reel

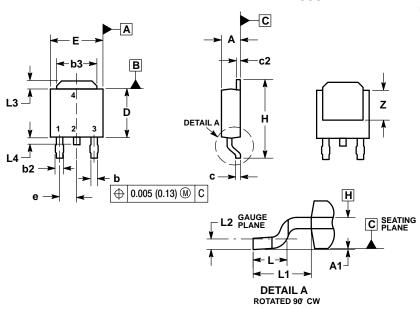
[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

^{*}NVD Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

PACKAGE DIMENSIONS

DPAK (SINGLE GUAGE)

CASE 369AA **ISSUE B**



- NOTES:

 1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.

 2. CONTROLLING DIMENSION: INCHES.

 3. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS b3, L3 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.

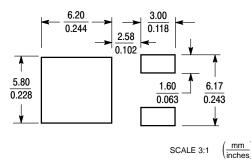
 6. DATUMS A AND B ARE DETERMINED AT DATUM PLANE H.

 - PLANE H.

	INCHES		MILLIMETERS		
DIM	MIN	MAX	MIN	MAX	
Α	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	
b2	0.030	0.045	0.76	1.14	
b3	0.180	0.215	4.57	5.46	
С	0.018	0.024	0.46	0.61	
c2	0.018	0.024	0.46	0.61	
D	0.235	0.245	5.97	6.22	
Е	0.250	0.265	6.35	6.73	
е	0.090	BSC	2.29 BSC		
Н	0.370	0.410	9.40	10.41	
L	0.055	0.070	1.40	1.78	
L1	0.108	0.108 REF		REF	
L2	0.020 BSC		0.51	BSC	
L3	0.035	0.050	0.89	1.27	
L4	-	0.040		1.01	
Z	0.155		3.93		

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

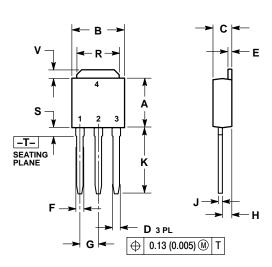
SOLDERING FOOTPRINT*

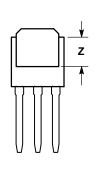


*For additional information on our Pb–Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

PACKAGE DIMENSIONS

IPAK CASE 369D **ISSUE C**





NOTES

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

	INCHES		MILLIMETERS		
DIM	MIN MAX		MIN	MAX	
Α	0.235	0.245	5.97	6.35	
В	0.250	0.265	6.35	6.73	
С	0.086	0.094	2.19	2.38	
D	0.027	0.035	0.69	0.88	
Е	0.018	0.023	0.46	0.58	
F	0.037	0.045	0.94	1.14	
G	0.090 BSC		2.29 BSC		
Н	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	
٧	0.035	0.050	0.89	1.27	
Z	0.155		3.93		

STYLE 2:

- PIN 1. GATE 2. DRAIN

 - SOURCE DRAIN

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