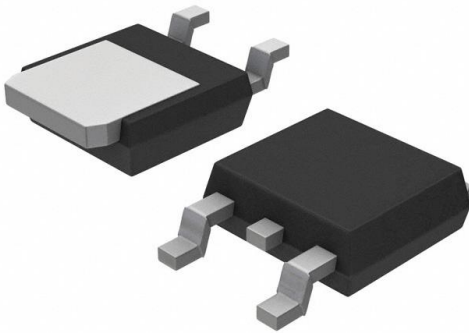


STD5407NT4G Datasheet

www.digi-electronics.com



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

DiGi Electronics Part Number	STD5407NT4G-DG
Manufacturer	onsemi
Manufacturer Product Number	STD5407NT4G
Description	MOSFET N-CH 40V 7.6A/38A DPAK
Detailed Description	N-Channel 40 V 7.6A (Ta), 38A (Tc) 2.9W (Ta), 75W (Tc) Surface Mount DPAK



Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

DiGi is a global authorized distributor of electronic components.

Purchase and inquiry

Manufacturer Product Number:

STD5407NT4G

Series:

-

FET Type:

N-Channel

Drain to Source Voltage (Vdss):

40 V

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

5V, 10V

Vgs(th) (Max) @ Id:

3.5V @ 250 μ A

Vgs (Max):

\pm 20V

FET Feature:

-

Operating Temperature:

-55°C ~ 175°C (Tj)

Supplier Device Package:

DPAK

Base Product Number:

STD54

Manufacturer:

onsemi

Product Status:

Obsolete

Technology:

MOSFET (Metal Oxide)

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

7.6A (Ta), 38A (Tc)

Rds On (Max) @ Id, Vgs:

26mOhm @ 20A, 10V

Gate Charge (Qg) (Max) @ Vgs:

20 nC @ 10 V

Input Capacitance (Ciss) (Max) @ Vds:

1000 pF @ 32 V

Power Dissipation (Max):

2.9W (Ta), 75W (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

NTD5407N, STD5407N, NVD5407N

Power MOSFET 40 V, 38 A, Single N-Channel, DPAK

Features

- Low $R_{DS(on)}$
- High Current Capability
- Low Gate Charge
- STD 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

Applications

- Electronic Brake Systems
- Electronic Power Steering
- Bridge Circuits

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

Parameter		Symbol	Value	Unit	
Drain-to-Source Voltage		V_{DSS}	40	V	
Gate-to-Source Voltage		V_{GS}	± 20	V	
Continuous Drain Current – $R_{\theta JC}$	Steady State	$T_C = 25^\circ\text{C}$	I_D	38	A
			$T_C = 100^\circ\text{C}$	27	
Power Dissipation – $R_{\theta JC}$	Steady State	$T_C = 25^\circ\text{C}$	P_D	75	W
Continuous Drain Current $R_{\theta JA}$ (Note 1)	Steady State	$T_A = 25^\circ\text{C}$	I_D	7.6	A
			$T_A = 100^\circ\text{C}$	5.3	
Power Dissipation – $R_{\theta JA}$ (Note 1)	Steady State	$T_A = 25^\circ\text{C}$	P_D	2.9	W
Pulsed Drain Current	$t_p = 10 \mu\text{s}$	I_{DM}	75	A	
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to 175	$^\circ\text{C}$	
Source Current (Body Diode)		I_S	36	A	
Single Pulse Drain-to-Source Avalanche Energy – ($V_{DD} = 50 \text{ V}, V_{GS} = 10 \text{ V}, I_{PK} = 17 \text{ A}, L = 1 \text{ mH}, R_G = 25 \Omega$)		EAS	150	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.

THERMAL RESISTANCE RATINGS (Note 1)

Parameter	Symbol	Max	Unit
Junction-to-Case (Drain)	$R_{\theta JC}$	2.0	$^\circ\text{C/W}$
Junction-to-Ambient (Note 1)	$R_{\theta JA}$	52	$^\circ\text{C/W}$

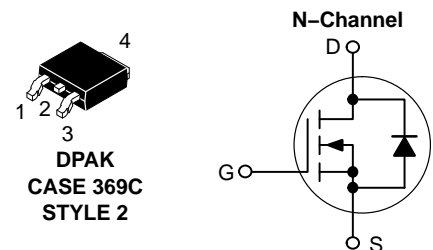
1. Surface mounted on FR4 board using 1 sq in pad size, (Cu Area 1.127 sq in [2 oz] including traces).



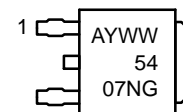
ON Semiconductor®

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$V_{(BR)DSS}$	$R_{DS(ON)}$ TYP	I_D MAX (Note 1)
40 V	21 m Ω @ 10 V	38 A



MARKING DIAGRAM



A = Assembly Location*
Y = Year
WW = Work Week
5407N = Specific Device Code
G = Pb-Free Device

* 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

Device	Package	Shipping†
NTD5407NT4G	DPAK (Pb-Free)	2500 / Tape & Reel
STD5407NT4G*	DPAK (Pb-Free)	2500 / Tape & Reel
NVD5407NT4G*	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 Specifications Brochure, BRD8011/D.

NTD5407N, STD5407N, NVD5407N**ELECTRICAL CHARACTERISTICS** ($T_J = 25^\circ\text{C}$ unless otherwise stated)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	40			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$			39		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}, V_{DS} = 40\text{ V}$	$T_J = 25^\circ\text{C}$		1.0	μA
			$T_J = 100^\circ\text{C}$		10	
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 30\text{ V}$			± 100	nA

ON CHARACTERISTICS (Note 2)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\ \mu\text{A}$	1.5		3.5	V
Gate Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$			-6.0		mV/°C
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$		21	26	m Ω
		$V_{GS} = 5.0\text{ V}, I_D = 10\text{ A}$		32	40	
Forward Transconductance	g_{FS}	$V_{GS} = 10\text{ V}, I_D = 18\text{ A}$		15		S

CHARGES AND CAPACITANCES

Input Capacitance	C_{ISS}	$V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}, V_{DS} = 32\text{ V}$		615	1000	pF
Output Capacitance	C_{OSS}			173		
Reverse Transfer Capacitance	C_{RSS}			80		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 10\text{ V}, V_{DS} = 32\text{ V}, I_D = 38\text{ A}$		20		nC
Gate-to-Source Charge	Q_{GS}			2.25		
Gate-to-Drain Charge	Q_{GD}			10.5		

SWITCHING CHARACTERISTICS, $V_{GS} = 10\text{ V}$ (Note 3)

Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = 10\text{ V}, V_{DD} = 32\text{ V}, I_D = 38\text{ A}, R_G = 2.5\ \Omega$		6.8		ns
Rise Time	t_r			17		
Turn-Off Delay Time	$t_{d(OFF)}$			66		
Fall Time	t_f			51		

SWITCHING CHARACTERISTICS, $V_{GS} = 5\text{ V}$ (Note 3)

Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = 5\text{ V}, V_{DD} = 20\text{ V}, I_D = 20\text{ A}, R_G = 2.5\ \Omega$		10		ns
Rise Time	t_r			175		
Turn-Off Delay Time	$t_{d(OFF)}$			13		
Fall Time	t_f			23		

DRAIN-SOURCE DIODE CHARACTERISTICS (Note 2)

Forward Diode Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = 5.0\text{ A}$	$T_J = 25^\circ\text{C}$		0.9	1.1	V
			$T_J = 125^\circ\text{C}$		0.75		
Reverse Recovery Time	t_{RR}	$V_{GS} = 0\text{ V}, di_S/dt = 100\text{ A}/\mu\text{s}, I_S = 15\text{ A}$		38		ns	
Charge Time	t_a			20.5			
Discharge Time	t_b			17			
Reverse Recovery Charge	Q_{RR}			40			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. Pulse Test: pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

3. Switching characteristics are independent of operating junction temperatures.

NTD5407N, STD5407N, NVD5407N

TYPICAL PERFORMANCE CURVES

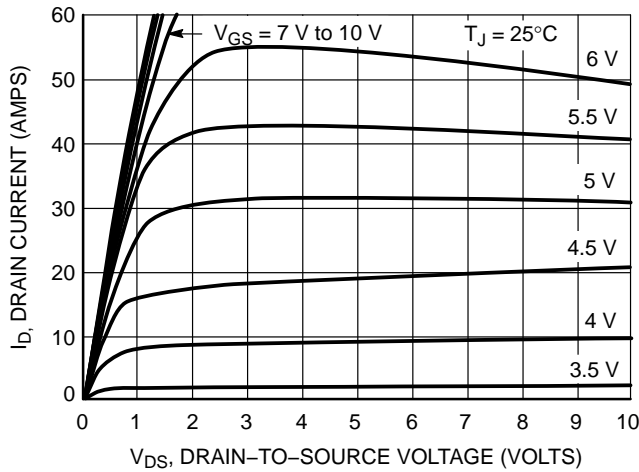


Figure 1. On-Region Characteristics

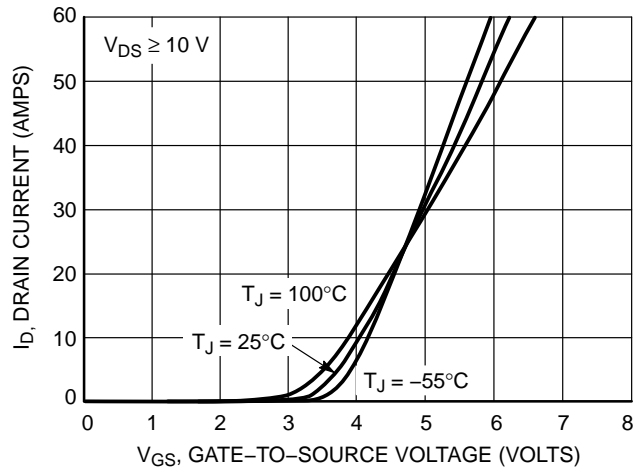


Figure 2. Transfer Characteristics

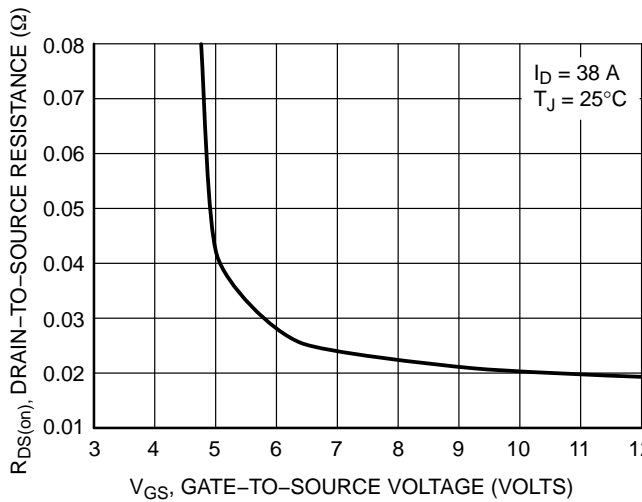


Figure 3. On-Resistance vs. Gate-to-Source Voltage

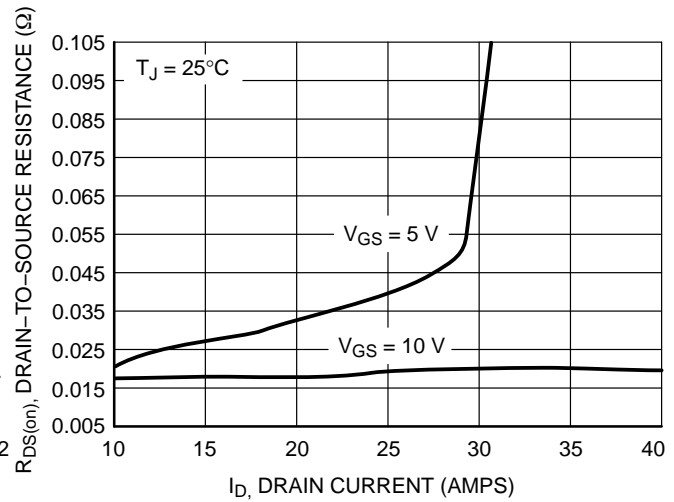


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

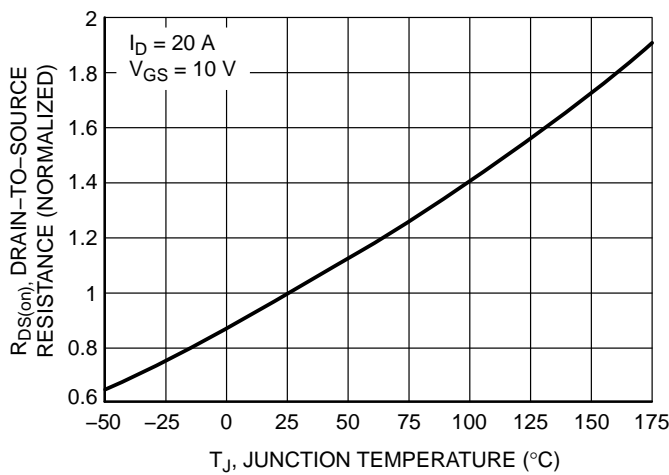


Figure 5. On-Resistance Variation with Temperature

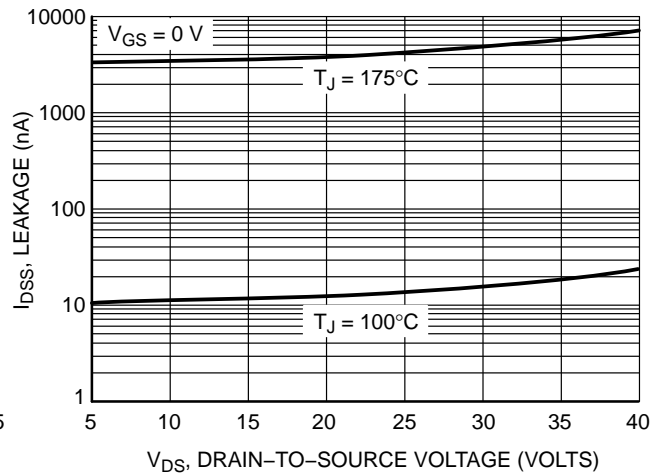
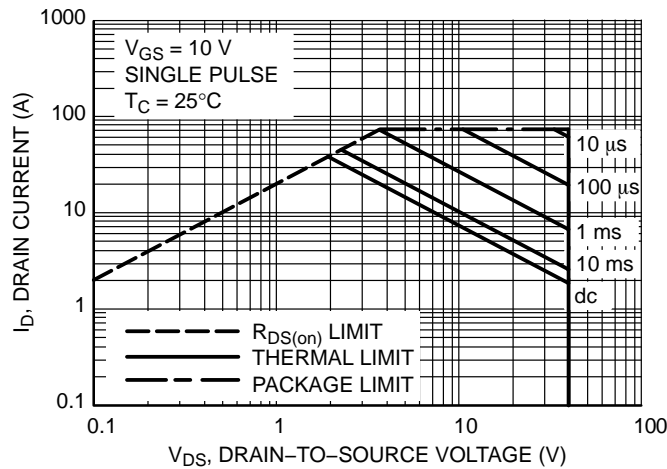
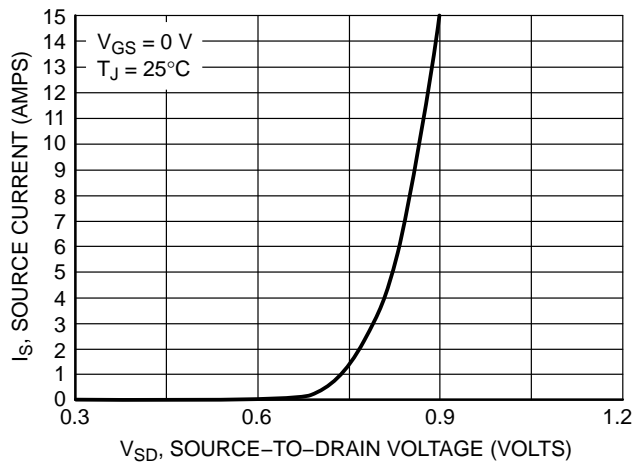
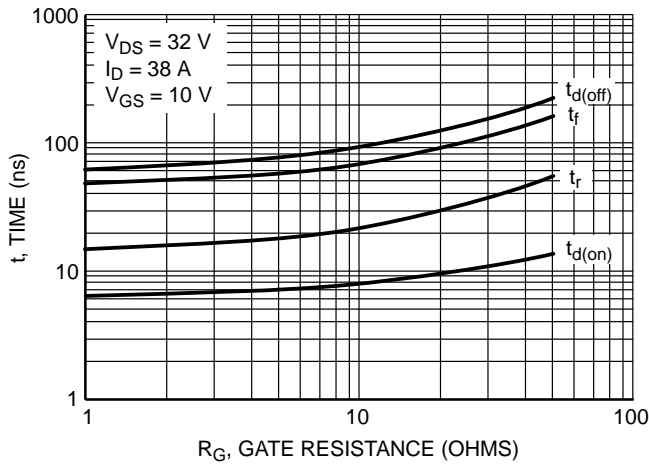
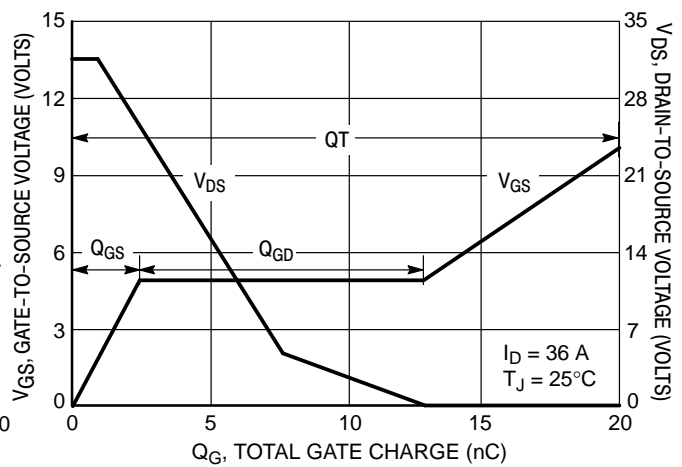
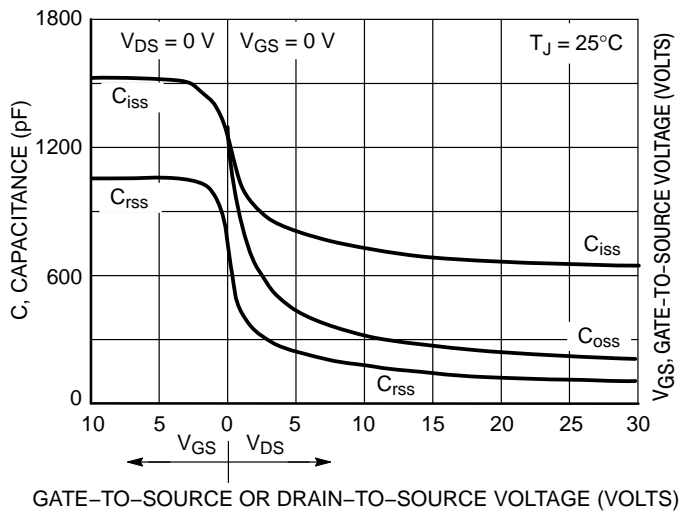


Figure 6. Drain-to-Source Leakage Current vs. Voltage

NTD5407N, STD5407N, NVD5407N

TYPICAL PERFORMANCE CURVES



NTD5407N, STD5407N, NVD5407N

TYPICAL PERFORMANCE CURVES

r(t), EFFECTIVE TRANSIENT THERMAL RESISTANCE

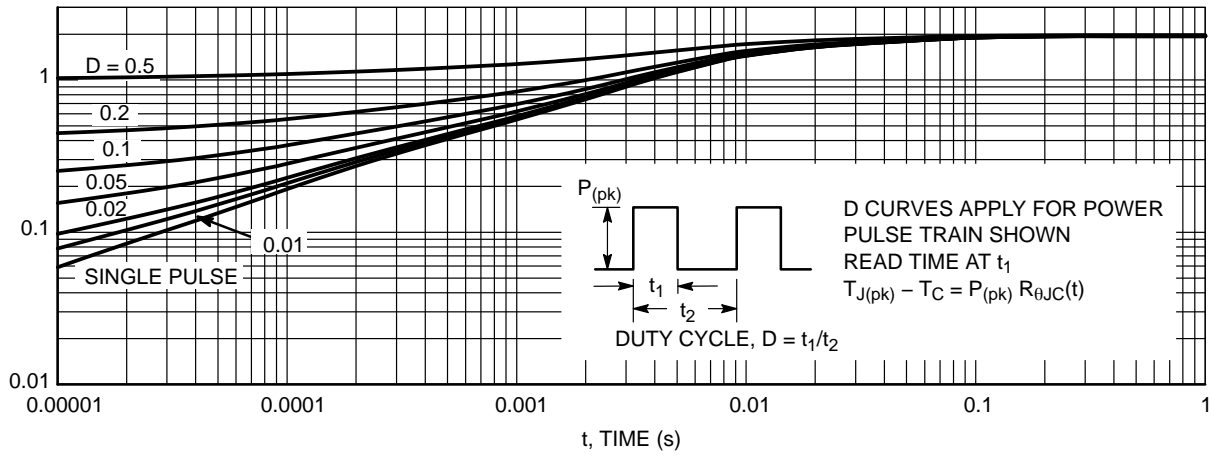
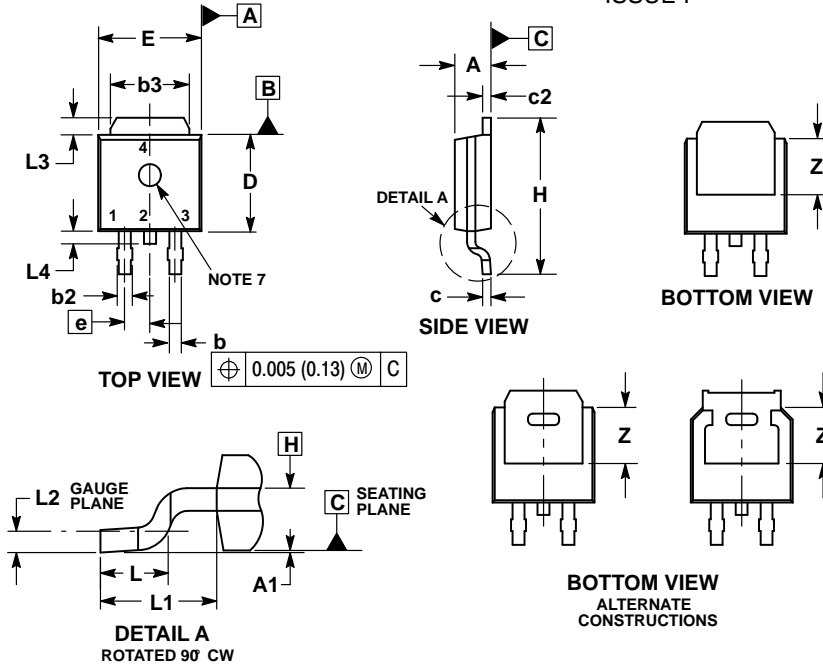


Figure 12. Thermal Response

NTD5407N, STD5407N, NVD5407N

PACKAGE DIMENSIONS

DPAK (SINGLE GAUGE) CASE 369C ISSUE F



NOTES:

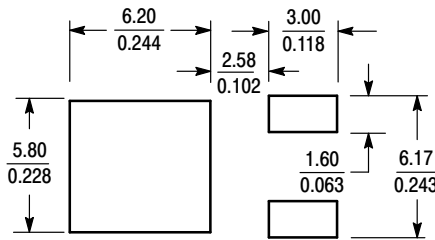
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS b3, L3 and Z.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.006 INCHES PER SIDE.
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.
7. OPTIONAL MOLD FEATURE.

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
b2	0.028	0.045	0.72	1.14
b3	0.180	0.215	4.57	5.46
c	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
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
L1	0.114	REF	2.90	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:

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

SOLDERING FOOTPRINT*



SCALE 3:1 (mm/inches)

*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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