NTD6N40

Preferred Device

Power MOSFET 6 Amps, 400 Volts

N−Channel DPAK

Designed for high voltage, high speed switching applications in power supplies, converters, power motor controls and bridge circuits.

Features

- Higher Current Rating
- Lower $R_{DS(on)}$
- Lower Capacitances
- Lower Total Gate Charge
- Tighter V_{SD} Specifications
- Avalanche Energy Specified
- Industry Standard DPAK Surface Mount Package

Typical Applications

- Switch Mode Power Supplies
- PWM Motor Controls
- Converters
- Bridge Circuits

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

Rating	Symbol	Value	Unit
Drain−Source Voltage	V_{DSS}	400	Vdc
Drain−Gate Voltage (R_{GS} = 1.0 MΩ)	V_{DGR}	400	Vdc
Gate−Source Voltage − Continuous − Non−Repetitive ($t_p \le 10$ ms)	 V_{GS} V_{GSM}	 ±20 ±40	Vdc
Drain − Continuous − Continuous @ 100°C − Single Pulse ($t_p \le 10$ μs)	I_D I_D I_{DM}	6.0 4.2 21	Adc
Total Power Dissipation Derate above 25°C Total Power Dissipation @ T_C = 25°C when mounted with the minimum recommended pad size	P_D	96 0.77 1.75	Watts W/°C W/°C
Operating and Storage Temperature Range	T_J, T_{stg}	−55 to 150	°C
Single Drain−to−Source Avalanche Energy − Starting T_J = 25°C (V_{DD} = 100 Vdc, V_{GS} = 10 Vdc, I_L = 6 A, L = 10 mH, R_G = 25 Ω)	E_{AS}	180	mJ
Thermal Resistance − Junction−to−Case − Junction−to−Ambient − Junction−to−Ambient (Note 1.)	 $R_{\theta JC}$ $R_{\theta JA}$ $R_{\theta JA}$	 1.30 100 71.4	°C/W
Maximum Lead Temperature for Soldering Purposes, 1/8″ from case for 10 seconds	T_L	260	°C

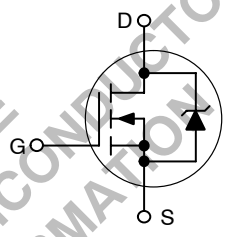
1. When surface mounted to an FR4 board using the minimum recommended pad size.

ON Semiconductor

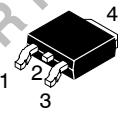
http://onsemi.com

6 AMPERES
400 VOLTS
$R_{DS(on)}$ = 1.1 Ω

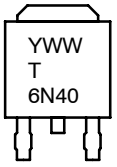
N−Channel



MARKING DIAGRAMS

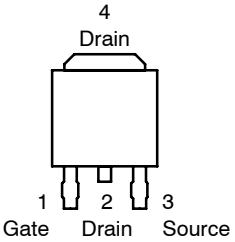


CASE 369A
DPAK
STYLE 2



Y = Year
WW = Work Week
T = MOSFET

PIN ASSIGNMENT



ORDERING INFORMATION

Device	Package	Shipping
NTD6N40	DPAK	75 Units/Rail
NTD6N40−1	DPAK	75 Units/Rail
NTD6N40T4	DPAK	2500 Tape & Reel

Preferred devices are recommended choices for future use and best overall value.

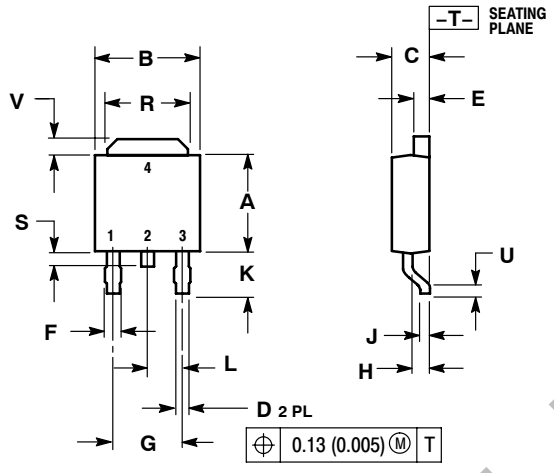
ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Drain−to−Source Breakdown Voltage (V_{GS} = 0 Vdc, I_D = 0.25 mAdc) Temperature Coefficient (Positive)	$V_{(BR)DSS}$	 400 –	 – 500	 – –	Vdc mV/°C
Zero Gate Voltage Collector Current (V_{DS} = 400 Vdc, V_{GS} = 0 Vdc) (V_{DS} = 400 Vdc, V_{GS} = 0 Vdc, T_J = 125°C)	I_{DSS}	 – –	 – –	 10 100	μAdc
Gate−Body Leakage Current (V_{GS} = ±20 Vdc, V_{DS} = 0)	$I_{GSS(f)}$ $I_{GSS(r)}$	– –	– –	100 100	nAdc
ON CHARACTERISTICS (Note 1)					
Gate Threshold Voltage I_D = 0.25 mA, V_{DS} = V_{GS} Temperature Coefficient (Negative)	$V_{GS(th)}$	 2.0 –	 2.7 6.0	 4.0 –	Vdc mV/°C
Static Drain−to−Source On−Resistance (V_{GS} = 10 Vdc, I_D = 3 Adc)	$R_{DS(on)}$	–	900	1100	mOhm
Drain−to−Source On−Voltage (V_{GS} = 10 Vdc, I_D = 6 Adc) (V_{GS} = 10 Vdc, I_D = 3 Adc, T_J = 125°C)	$V_{DS(on)}$	 – –	 – –	 7.9 6.9	Vdc
Forward Transconductance (V_{DS} = 15 Vdc, I_D = 3 Adc)	g_{FS}	2.0	4.4	–	mhos
DYNAMIC CHARACTERISTICS					
Input Capacitance	(V_{DS} = 25 Vdc, V_{GS} = 0 Vdc, f = 1.0 MHz)	C_{iss}	–	515	720	pF
Output Capacitance		C_{oss}	–	185	260	
Transfer Capacitance		C_{rss}	–	15	30	
SWITCHING CHARACTERISTICS (Note 2)					
Turn−On Delay Time	(V_{DD} = 200 Vdc, I_D = 6 Adc, V_{GS} = 10 Vdc, R_G = 9.1 Ω)	$t_{d(on)}$	–	7.0	10	ns
Rise Time		t_r	–	11	20	
Turn−Off Delay Time		$t_{d(off)}$	–	19	40	
Fall Time		t_f	–	10	20	
Gate Charge	(V_{DS} = 320 Vdc, I_D = 6 Adc, V_{GS} = 10 Vdc)	Q_T	–	9.5	19	nC
		Q_1	–	2.0	–	
		Q_2	–	3.0	–	
		Q_3	–	6.0	–	
SOURCE−DRAIN DIODE CHARACTERISTICS					
Forward On−Voltage (Note 1)	(I_S = 6 Adc, V_{GS} = 0 Vdc) (I_S = 6 Adc, V_{GS} = 0 Vdc, T_J = 125°C)	V_{SD}	 – –	 0.9 0.8	 1.0 –	Vdc
Reverse Recovery Time	(I_S = 6 Adc, V_{GS} = 0 Vdc, di_S/dt = 100 A/μs)	t_{rr}	–	270	–	ns
		t_a	–	110	–	
		t_b	–	160	–	
Reverse Recovery Stored Charge		Q_{RR}	–	1.6	–	μC

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
2. Switching characteristics are independent of operating junction temperature.

PACKAGE DIMENSIONS

DPAK
CASE 369A–13
ISSUE AA



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

	INCHES		MILLIMETERS	
DIM	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	0.180 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	0.175	0.215	4.45	5.46
S	0.020	0.050	0.51	1.27
U	0.020	---	0.51	---
V	0.030	0.050	0.77	1.27
Z	0.138	---	3.51	---

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

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
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