Power MOSFET 30 Amps, 24 Volts

N-Channel DPAK

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

Features

• Pb-Free Packages are Available

Typical Applications

- Power Supplies
- Converters
- Power Motor Controls
- Bridge Circuits

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

Rating	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DSS}	24	Vdc
Gate-to-Source Voltage - Continuous	V _{GS}	±20	Vdc
Drain Current - Continuous @ T _A = 25°C - Single Pulse (t _p ≤10 μs)	I _D I _{DM}	30 100	Adc Apk
Total Power Dissipation @ T _A = 25°C	P_{D}	75	W
Operating and Storage Temperature Range	T _J , T _{stg}	-55 to 150	°C
Single Pulse Drain-to-Source Avalanche Energy – Starting T_J = 25°C (V_{DD} = 24 Vdc, V_{GS} = 10 Vdc, L = 1.0 mH, $I_L(pk)$ = 10 A, R_G = 25 Ω)	E _{AS}	50	mJ
Thermal Resistance - Junction-to-Case - Junction-to-Ambient (Note 1) - Junction-to-Ambient (Note 2)	$egin{array}{c} R_{ heta JC} \ R_{ heta JA} \ R_{ heta JA} \end{array}$	1.65 67 120	°C/W
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds	TL	260	°C

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

- When surface mounted to an FR4 board using 1 in. pad size, (Cu Area 1.127 sq in).
- When surface mounted to an FR4 board using minimum recommended pad size, (Cu Area 0.412 sq in).



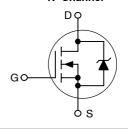
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30 AMPERES 24 VOLTS

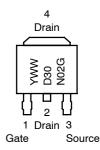
 $R_{DS(on)} = 11.2 \text{ m}\Omega \text{ (Typ.)}$

N-Channel



MARKING DIAGRAM





D30N02 = Device Code Y = Year WW = Work Week

G = Pb-Free Device

ORDERING INFORMATION

Device	Package	Shipping [†]
NTD30N02	DPAK	75 Units/Rail
NTD30N02G	DPAK (Pb-Free)	75 Units/Rail
NTD30N02T4	DPAK	2500 Tape & Reel
NTD30N02T4G	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.

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

C	Symbol	Min	Тур	Max	Unit	
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Vo $(V_{GS} = 0 \text{ Vdc}, I_D = 250 \mu\text{Adc}$ Temperature Coefficient (Positiv	V _{(BR)DSS}	24 -	26.5 25.5	- -	Vdc mV/°C	
Zero Gate Voltage Drain Current $ (V_{DS} = 20 \text{ Vdc}, V_{GS} = 0 \text{ Vdc}) $ $ (V_{DS} = 24 \text{ Vdc}, V_{GS} = 0 \text{ Vdc}) $ $ (V_{DS} = 24 \text{ Vdc}, V_{GS} = 0 \text{ Vdc}, T_{J} = 125^{\circ}\text{C}) $		I _{DSS}	- - -	- - -	0.8 1.0 10	μAdc
Gate-Body Leakage Current (V	I _{GSS}	-	-	±100	nAdc	
ON CHARACTERISTICS (Note 3	3)					
Gate Threshold Voltage (Note 3 $(V_{DS} = V_{GS}, I_D = 250 \mu Adc)$ Threshold Temperature Coefficient	V _{GS(th)}	1.0	2.1 -4.1	3.0	Vdc mV/°C	
Static Drain-to-Source On-Res (V_{GS} = 10 Vdc, I_D = 30 Adc) (V_{GS} = 10 Vdc, I_D = 20 Adc) (V_{GS} = 4.5 Vdc, I_D = 15 Adc)	R _{DS(on)}	- - -	- 11.2 20	14.5 14.5 24	mΩ	
Forward Transconductance (No	te 3) (V _{DS} = 10 Vdc, I _D = 15 Adc)	9 _{FS}	-	20	-	mhos
DYNAMIC CHARACTERISTICS						
Input Capacitance		C _{iss}	-	1000	-	pF
Output Capacitance	$(V_{DS} = 20 \text{ Vdc}, V_{GS} = 0 \text{ Vdc}, f = 1.0 \text{ MHz})$	C _{oss}	-	425	-	
Transfer Capacitance		C _{rss}	-	175	-	
SWITCHING CHARACTERISTIC	CS (Note 4)	ı	,	1		ı
Turn-On Delay Time		t _{d(on)}	-	7.0	15	ns
Rise Time	(V _{DD} = 20 Vdc, I _D = 30 Adc,	t _r	-	28	55	
Turn-Off Delay Time	V_{GS} = 10 Vdc, R_G = 2.5 Ω)	t _{d(off)}	-	22	35	
Fall Time		t _f	-	12	20	
Turn-On Delay Time		t _{d(on)}	-	12.5	-	ns
Rise Time	(V _{DD} = 20 Vdc, I _D = 15 Adc,	t _r	-	115	-	
Turn-Off Delay Time	V_{GS} = 4.5 Vdc, R_{G} = 2.5 Ω)	t _{d(off)}	-	15	-	
Fall Time		t _f	-	17	-	
Gate Charge	$(V_{DS} = 20 \text{ Vdc}, I_{D} = 30 \text{ Adc}, V_{GS} = 4.5 \text{ Vdc}) \text{ (Note 3)}$	Q _T	-	14.4	20	nC
		Q ₁	-	4.0	-	
		Q_2	-	8.5	-	
SOURCE-DRAIN DIODE CHAR			,	, ,		T
Forward On-Voltage	$ \begin{array}{c} (I_S = 15 \; \text{Adc}, V_{GS} = 0 \; \text{Vdc}) \\ (I_S = 30 \; \text{Adc}, V_{GS} = 0 \; \text{Vdc}) \; (\text{Note 3}) \\ (I_S = 15 \; \text{Adc}, V_{GS} = 0 \; \text{Vdc}, T_J = 125^{\circ}\text{C}) \end{array} $	V _{SD}	- - -	0.95 1.10 0.80	1.2 - -	Vdc
Reverse Recovery Time		t _{rr}	-	30	_	ns
	$(I_S = 30 \text{ Adc}, V_{GS} = 0 \text{ Vdc}, \\ dI_S/dt = 100 \text{ A/}\mu\text{s}) \text{ (Note 3)}$	t _a	_	14.5	_	
	αις, αι = 100 /1/μο) (14010 0)	t _b	-	15.5	-	
Reverse Recovery Stored Charg	Q _{RR}	-	0.013	_	μС	

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

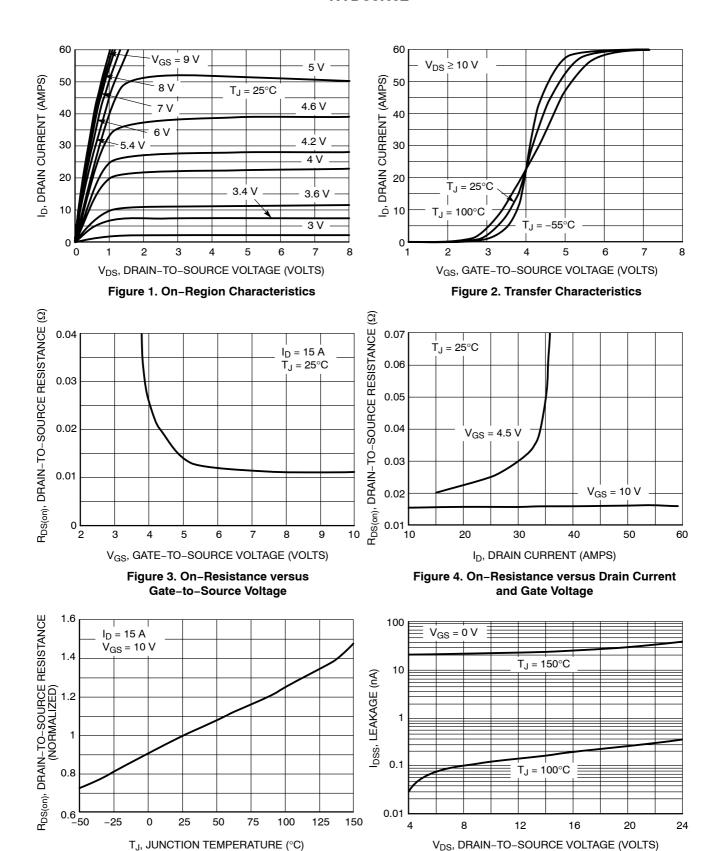
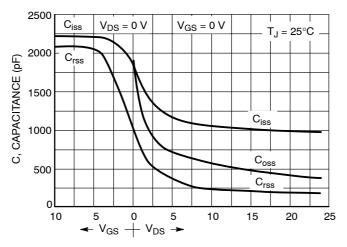


Figure 5. On–Resistance Variation with Temperature

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



GATE-TO-SOURCE OR DRAIN-TO-SOURCE VOLTAGE (VOLTS)

Figure 7. Capacitance Variation

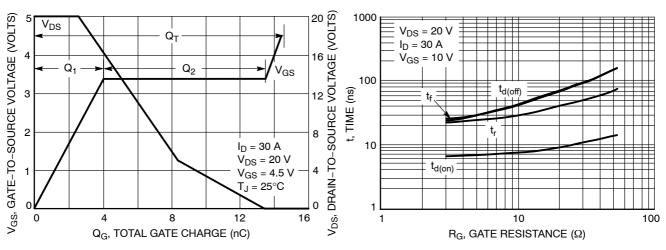


Figure 8. Gate-to-Source and Drain-to-Source Voltage versus Total Charge

Figure 9. Resistive Switching Time Variation versus Gate Resistance

DRAIN-TO-SOURCE DIODE CHARACTERISTICS

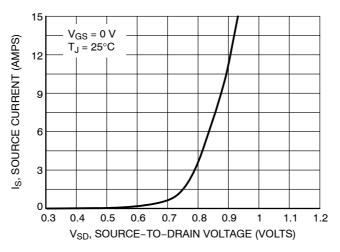
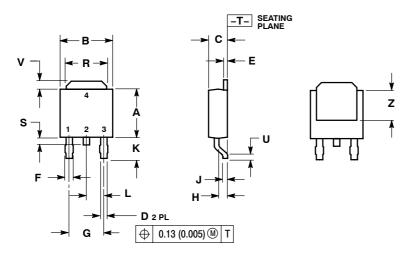


Figure 10. Diode Forward Voltage versus Current

PACKAGE DIMENSIONS

DPAK CASE 369C-01 **ISSUE O**

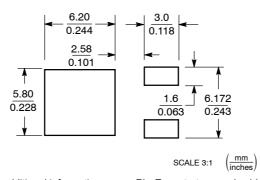


	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
Α	0.235	0.245	5.97	6.22
В	0.250	0.265	6.35	6.73
С	0.086	0.094	2.19	2.38
D	0.027	0.035	0.69	0.88
E	0.018	0.023	0.46	0.58
F	0.037	0.045	0.94	1.14
G	0.180 BSC		4.58 BSC	
Н	0.034	0.040	0.87	1.01
J	0.018	0.023	0.46	0.58
K	0.102	0.114	2.60	2.89
L	0.090 BSC		2.29 BSC	
R	0.180	0.215	4.57	5.45
S	0.025	0.040	0.63	1.01
U	0.020		0.51	
٧	0.035	0.050	0.89	1.27
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.

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