

NTD3055L104



ON Semiconductor

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Advance Information

Power MOSFET 12 Amps, 60 Volts, Logic Level N-Channel DPAK

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

Features

- Lower $R_{DS(on)}$
- Lower $V_{DS(on)}$
- Tighter V_{SD} Specification
- Lower Diode Reverse Recovery Time
- Lower Reverse Recovery Stored Charge

Typical Applications

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

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

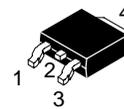
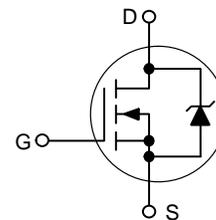
Rating	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DSS}	60	Vdc
Drain-to-Gate Voltage ($R_{GS} = 10\ \text{M}\Omega$)	V_{DGR}	60	Vdc
Gate-to-Source Voltage	V_{GS}	± 15	Vdc
– Continuous	V_{GS}	± 20	
– Non-Repetitive ($t_p \leq 10\ \text{ms}$)			
Drain Current	I_D	12	A dc
– Continuous @ $T_A = 25^\circ\text{C}$	I_D	10	
– Continuous @ $T_A = 100^\circ\text{C}$	I_{DM}	45	A pk
– Single Pulse ($t_p \leq 10\ \mu\text{s}$)			
Total Power Dissipation @ $T_A = 25^\circ\text{C}$	P_D	48	W
Derate above 25°C		0.32	W/ $^\circ\text{C}$
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 1.)		2.1	W
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 2.)		1.5	W
Operating and Storage Temperature Range	T_J, T_{stg}	-55 to +175	$^\circ\text{C}$
Single Pulse Drain-to-Source Avalanche Energy – Starting $T_J = 25^\circ\text{C}$ ($V_{DD} = 25\ \text{Vdc}$, $V_{GS} = 5.0\ \text{Vdc}$, $L = 1.0\ \text{mH}$ $I_L(\text{pk}) = 11\ \text{A}$, $V_{DS} = 60\ \text{Vdc}$)	E_{AS}	61	mJ
Thermal Resistance	$R_{\theta JC}$	3.13	$^\circ\text{C/W}$
– Junction-to-Case	$R_{\theta JA}$	71.4	
– Junction-to-Ambient (Note 1.)	$R_{\theta JA}$	100	
– Junction-to-Ambient (Note 2.)			
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds	T_L	260	$^\circ\text{C}$

1. When surface mounted to an FR4 board using 1" pad size, (Cu Area 1.127 in²).
2. When surface mounted to an FR4 board using the minimum recommended pad size, (Cu Area 0.412 in²).

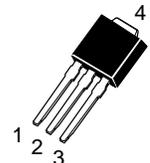
This document contains information on a new product. Specifications and information herein are subject to change without notice.

**12 AMPERES
60 VOLTS
 $R_{DS(on)} = 104\ \text{m}\Omega$**

N-Channel



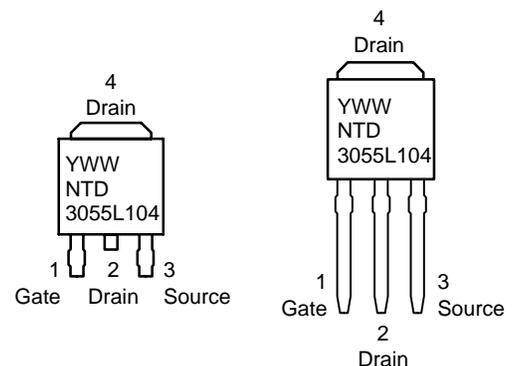
**CASE 369A
DPAK
(Bent Lead)
STYLE 2**



**CASE 369
DPAK
(Straight Lead)
STYLE 2**

NTD3055L104 = Device Code
Y = Year
WW = Work Week

MARKING DIAGRAMS & PIN ASSIGNMENTS



ORDERING INFORMATION

Device	Package	Shipping
NTD3055L104	DPAK	75 Units/Rail
NTD3055L104-1	DPAK Straight Lead	75 Units/Rail
NTD3055L104T4	DPAK	2500 Tape & Reel

NTD3055L104

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

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage (Note 3.) (V _{GS} = 0 Vdc, I _D = 250 μAdc) Temperature Coefficient (Positive)	V _{(BR)DSS}	60 –	70 62.9	– –	Vdc mV/°C
Zero Gate Voltage Drain Current (V _{DS} = 60 Vdc, V _{GS} = 0 Vdc) (V _{DS} = 60 Vdc, V _{GS} = 0 Vdc, T _J = 150°C)	I _{DSS}	– –	– –	1.0 10	μAdc
Gate-Body Leakage Current (V _{GS} = ±15 Vdc, V _{DS} = 0 Vdc)	I _{GSS}	–	–	±100	nAdc

ON CHARACTERISTICS (Note 3.)

Gate Threshold Voltage (Note 3.) (V _{DS} = V _{GS} , I _D = 250 μAdc) Threshold Temperature Coefficient (Negative)	V _{GS(th)}	1.0 –	1.6 4.2	2.0 –	Vdc mV/°C
Static Drain-to-Source On-Resistance (Note 3.) (V _{GS} = 5.0 Vdc, I _D = 6.0 Adc)	R _{DS(on)}	–	89	104	mOhm
Static Drain-to-Source On-Voltage (Note 3.) (V _{GS} = 5.0 Vdc, I _D = 12 Adc) (V _{GS} = 5.0 Vdc, I _D = 6.0 Adc, T _J = 150°C)	V _{DS(on)}	– –	0.98 0.86	1.50 –	Vdc
Forward Transconductance (Note 3.) (V _{DS} = 8.0 Vdc, I _D = 6.0 Adc)	g _{FS}	–	9.1	–	mhos

DYNAMIC CHARACTERISTICS

Input Capacitance	(V _{DS} = 25 Vdc, V _{GS} = 0 Vdc, f = 1.0 MHz)	C _{iss}	–	316	440	pF
Output Capacitance		C _{oss}	–	105	150	
Transfer Capacitance		C _{rss}	–	35	70	

SWITCHING CHARACTERISTICS (Note 4.)

Turn-On Delay Time	(V _{DD} = 30 Vdc, I _D = 12 Adc, V _{GS} = 5.0 Vdc, R _G = 9.1 Ω) (Note 3.)	t _{d(on)}	–	9.2	20	ns
Rise Time		t _r	–	104	210	
Turn-Off Delay Time		t _{d(off)}	–	19	40	
Fall Time		t _f	–	40.5	80	
Gate Charge	(V _{DS} = 48 Vdc, I _D = 12 Adc, V _{GS} = 5.0 Vdc) (Note 3.)	Q _T	–	7.4	20	nC
		Q ₁	–	2.0	–	
		Q ₂	–	4.0	–	

SOURCE-DRAIN DIODE CHARACTERISTICS

Forward On-Voltage	(I _S = 12 Adc, V _{GS} = 0 Vdc) (Note 3.) (I _S = 12 Adc, V _{GS} = 0 Vdc, T _J = 150°C)	V _{SD}	– –	0.95 0.82	1.2 –	Vdc
Reverse Recovery Time	(I _S = 12 Adc, V _{GS} = 0 Vdc, di _S /dt = 100 A/μs) (Note 3.)	t _{rr}	–	35	–	ns
		t _a	–	21	–	
		t _b	–	14	–	
Reverse Recovery Stored Charge		Q _{RR}	–	0.04	–	μC

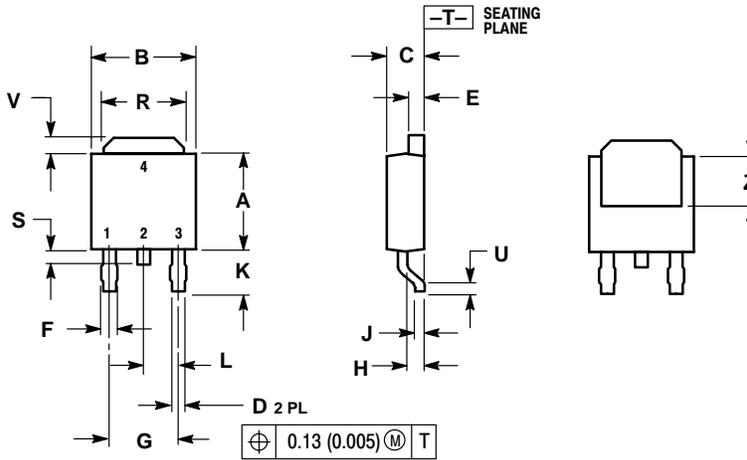
3. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.

4. Switching characteristics are independent of operating junction temperatures.

NTD3055L104

PACKAGE DIMENSIONS

DPAK CASE 369A-13 ISSUE AA

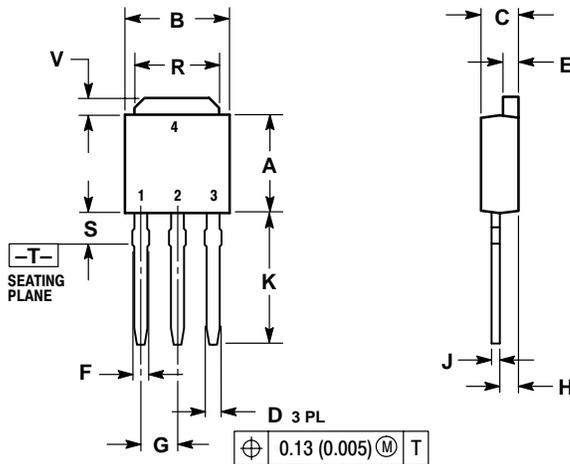


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.235	0.250	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

DPAK CASE 369-07 ISSUE M



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

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.235	0.250	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	0.090 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	0.175	0.215	4.45	5.46
S	0.050	0.090	1.27	2.28
V	0.030	0.050	0.77	1.27

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

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