NTF3055-100

Preferred Device

Power MOSFET
3.0 Amps, 60 Volts
N–Channel SOT–223

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

Applications

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

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

| Rating	Symbol	Value	Unit
Drain–to–Source Voltage	V_{DSS}	60	Vdc
Drain–to–Gate Voltage (R_{GS} = 10 MΩ)	V_{DGR}	60	Vdc
Gate–to–Source Voltage – Continuous – Non–repetitive ($t_p \leq$ 10 ms)	V_{GS}	± 20 ± 30	Vdc Vpk
Drain Current – Continuous @ T_A = 25°C – Continuous @ T_A = 100°C – Single Pulse ($t_p \leq$ 10 μs)	I_D I_D I_{DM}	3.0 1.4 9.0	Adc Apk
Total Power Dissipation @ T_A = 25°C (Note 1.) Total Power Dissipation @ T_A = 25°C (Note 2.) Derate above 25°C	P_D	2.1 1.3 0.014	W W W/°C
Operating and Storage Temperature Range	T_J, T_{stg}	−55 to 175	°C
Single Pulse Drain–to–Source Avalanche Energy – Starting T_J = 25°C (V_{DD} = 25 Vdc, V_{GS} = 10 Vdc, I_L(pk) = 7.0 Apk, L = 3.0 mH, V_{DS} = 60 Vdc)	E_{AS}	74	mJ
Thermal Resistance – Junction to Ambient (Note 1.) – Junction to Ambient (Note 2.)	$R_{\theta JA}$ $R_{\theta JA}$	72.3 114	°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 1″ pad size, 1 oz. (Cu. Area 1.127 in^2).
2. When surface mounted to an FR4 board using minimum recommended pad size, 2–2.4 oz. (Cu. Area 0.272 in^2).
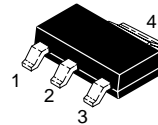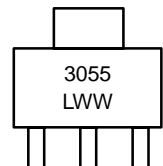
ON Semiconductor™

http://onsemi.com

3.0 AMPERES
60 VOLTS
$R_{DS(on)}$ = 100 mΩ

N–Channel
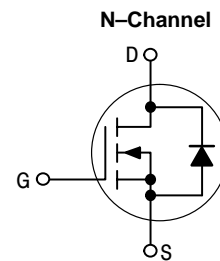
MARKING DIAGRAM

**SOT–223
CASE 318E
STYLE 3**

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3055
LWW
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3055 = Device Code
L = Location Code
WW = Work Week

PIN ASSIGNMENT

4 Drain

1 Gate 2 Drain 3 Source
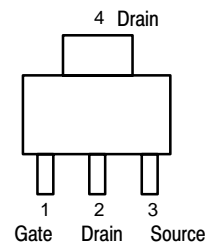
ORDERING INFORMATION

Device	Package	Shipping
NTF3055–100T1	SOT–223	1000 Tape & Reel
NTF3055–100T3	SOT–223	4000 Tape & Reel
NTF3055–100T3LF	SOT–223	4000 Tape & Reel

July, 2001 – Rev. 0

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Publication Order Number:
NTF3055–100/D

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

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Drain–to–Source Breakdown Voltage (Note 3.) (V_{GS} = 0 Vdc, I_D = 250 µAdc) Temperature Coefficient (Positive)	$V_{(BR)DSS}$	60 –	68 66	– –	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} = ± 20 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)	$V_{GS(th)}$	2.0 –	3.0 6.6	4.0 –	Vdc mV/°C
Static Drain–to–Source On–Resistance (Note 3.) (V_{GS} = 10 Vdc, I_D = 1.5 Adc)	$R_{DS(on)}$	–	88	100	mΩ
Static Drain–to–Source On–Resistance (Note 3.) (V_{GS} = 10 Vdc, I_D = 3.0 Adc) (V_{GS} = 10 Vdc, I_D = 1.5 Adc, T_J = 150°C)	$V_{DS(on)}$	–	0.27 0.24	0.36 –	Vdc
Forward Transconductance (Note 3.) (V_{DS} = 8.0 Vdc, I_D = 1.7 Adc)	g_{fs}	–	3.2	–	Mhos
DYNAMIC CHARACTERISTICS					
Input Capacitance	C_{iss}	–	324	455	pF
Output Capacitance (V_{DS} = 25 Vdc, V_{GS} = 0 V, f = 1.0 MHz)	C_{oss}	–	35	50	
Transfer Capacitance	C_{rss}	–	110	155	
SWITCHING CHARACTERISTICS (Note 4.)					
Turn–On Delay Time	$t_{d(on)}$	–	9.4	20	ns
Rise Time (V_{DD} = 30 Vdc, I_D = 3.0 Adc, V_{GS} = 10 Vdc, R_G = 9.1 Ω) (Note 3.)	t_r	–	14	30	
Turn–Off Delay Time	$t_{d(off)}$	–	21	45	
Fall Time	t_f	–	13	30	
Gate Charge (V_{DS} = 48 Vdc, I_D = 3.0 Adc, V_{GS} = 10 Vdc) (Note 3.)	Q_T	–	10.6	22	nC
	Q_1	–	1.9	–	
	Q_2	–	4.2	–	
SOURCE–DRAIN DIODE CHARACTERISTICS					
Forward On–Voltage (I_S = 3.0 Adc, V_{GS} = 0 Vdc) (I_S = 3.0 Adc, V_{GS} = 0 Vdc, T_J = 150°C) (Note 3.)	V_{SD}	– –	0.89 0.74	1.0 –	Vdc
Reverse Recovery Time	t_{rr}	–	30	–	ns
(I_S = 3.0 Adc, V_{GS} = 0 Vdc, dI_S/dt = 100 A/µs) (Note 3.)	t_a	–	22	–	
	t_b	–	8.6	–	
Reverse Recovery Stored Charge	Q_{RR}	–	0.04	–	µC

3. Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2.0%.
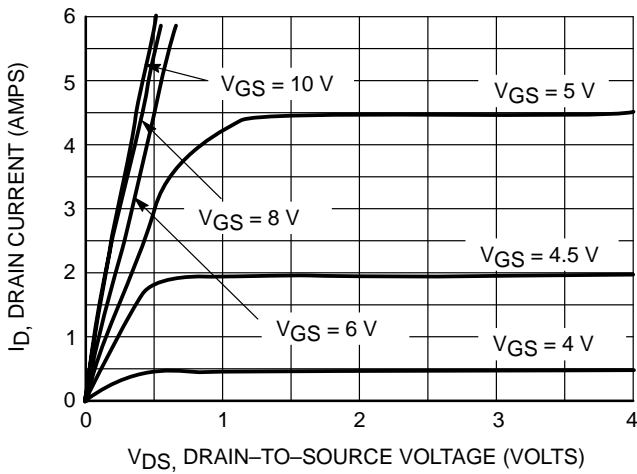4. Switching characteristics are independent of operating junction temperatures.
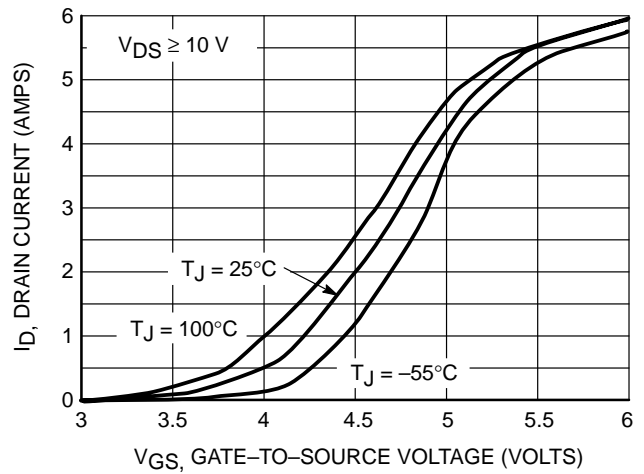
Figure 1. On–Region Characteristics
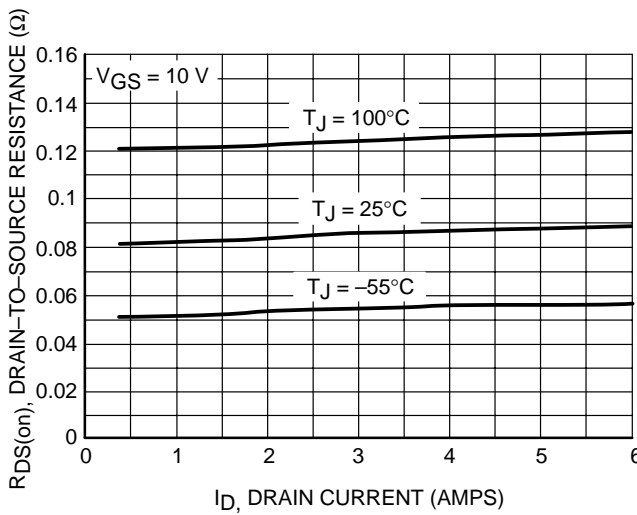
Figure 2. Transfer Characteristics

**Figure 3. On–Resistance versus
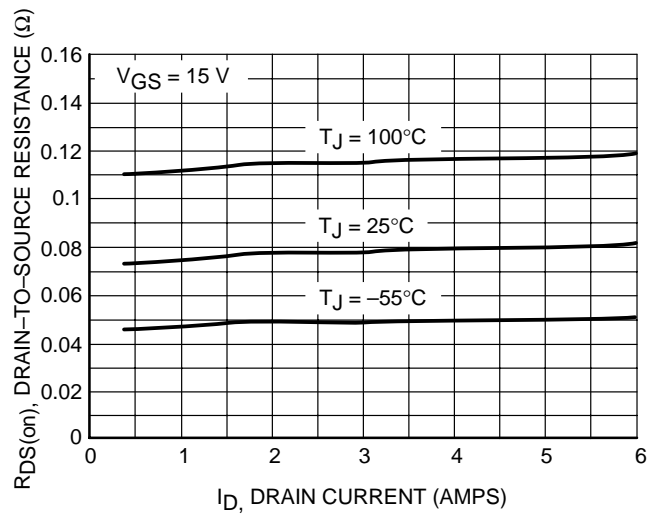Gate–to–Source Voltage**

**Figure 4. On–Resistance versus Drain Current
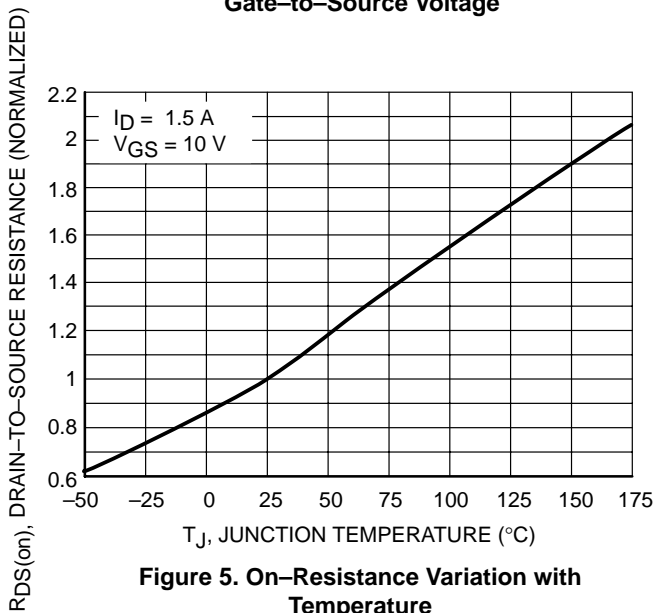and Gate Voltage**
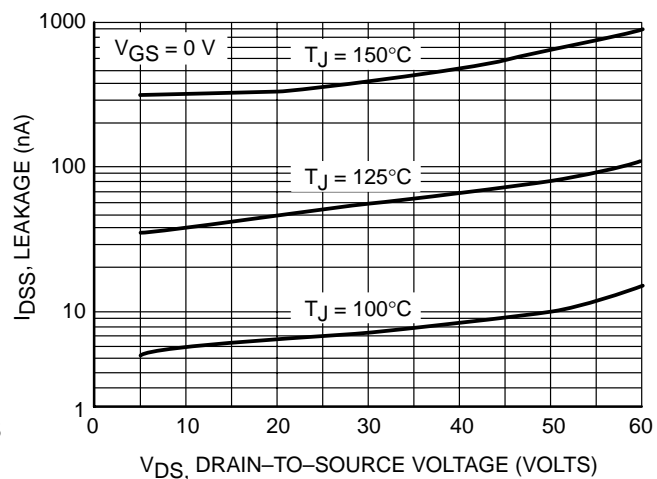
**Figure 5. On–Resistance Variation with
Temperature**
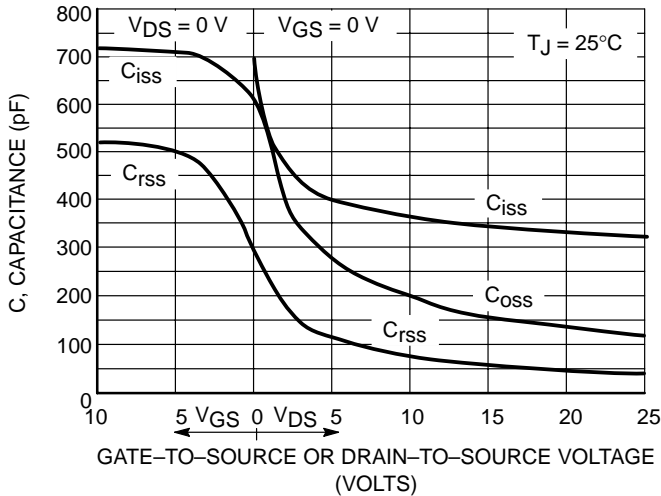
**Figure 6. Drain–to–Source Leakage Current
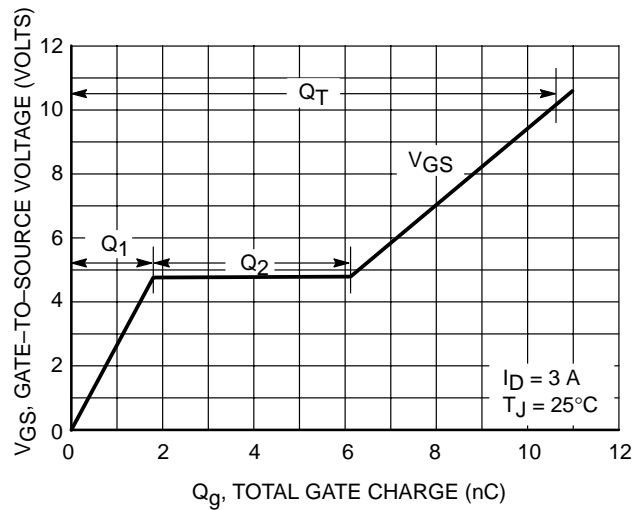versus Voltage**

Figure 7. Capacitance Variation

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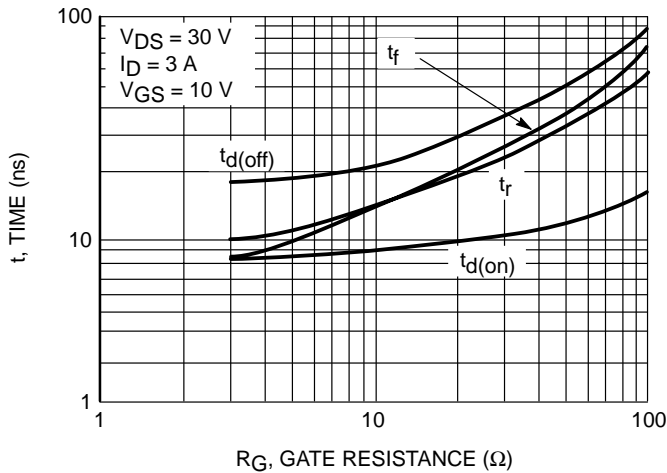Drain–to–Source Voltage versus Total Charge**

**Figure 9. Resistive Switching Time Variation
versus Gate Resistance**
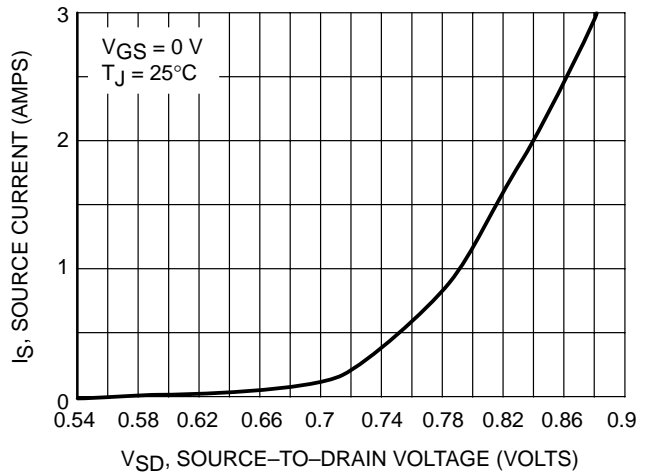
Figure 10. Diode Forward Voltage versus Current
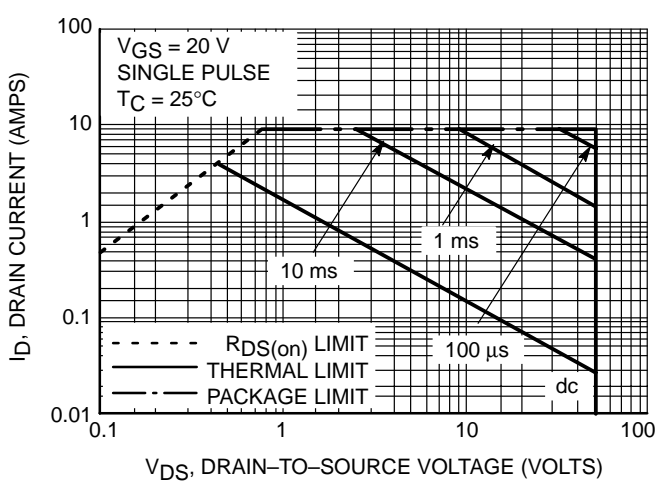
**Figure 11. Maximum Rated Forward Biased
Safe Operating Area**
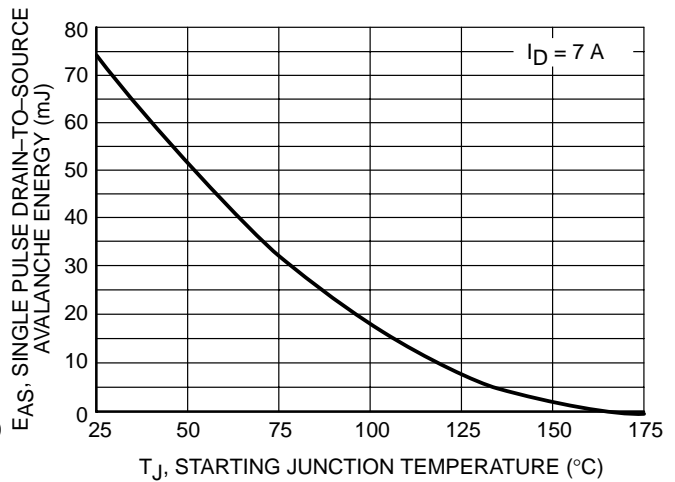
**Figure 12. Maximum Avalanche Energy versus
Starting Junction Temperature**
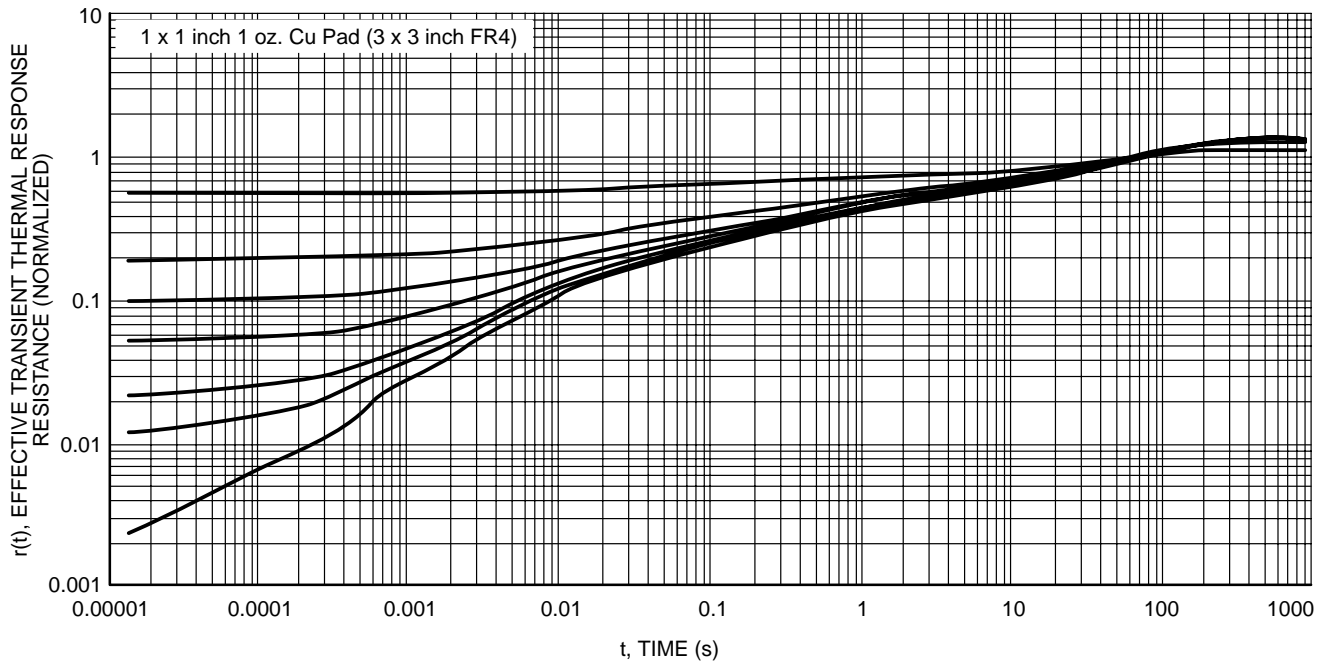
Figure 13. Thermal Response

NTF3055–100

PACKAGE DIMENSIONS

SOT–223 (TO–261)
CASE 318E–04
ISSUE K
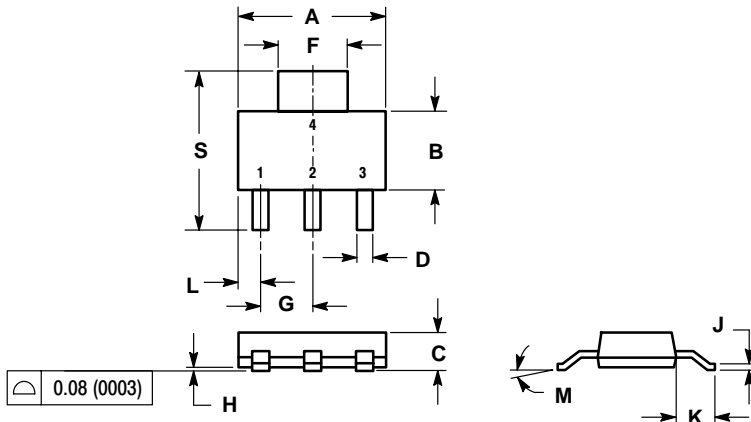
NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.249	0.263	6.30	6.70
B	0.130	0.145	3.30	3.70
C	0.060	0.068	1.50	1.75
D	0.024	0.035	0.60	0.89
F	0.115	0.126	2.90	3.20
G	0.087	0.094	2.20	2.40
H	0.0008	0.0040	0.020	0.100
J	0.009	0.014	0.24	0.35
K	0.060	0.078	1.50	2.00
L	0.033	0.041	0.85	1.05
M	0 °	10 °	0 °	10 °
S	0.264	0.287	6.70	7.30

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

<u>Notes</u>

NTF3055–100