NTF3055L108

Preferred Device

Power MOSFET
3.0 Amps, 60 Volts, Logic Level
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} = 1.0 MΩ)	V_{DGR}	60	Vdc
Gate–to–Source Voltage – Continuous – Non–repetitive ($t_p \le 10$ ms)	V_{GS}	 ± 15 ± 20	 Vdc Vpk
Drain Current – Continuous @ T_A = 25°C – Continuous @ T_A = 100°C – Single Pulse ($t_p \le 10$ 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	Watts Watts 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} = 5.0 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

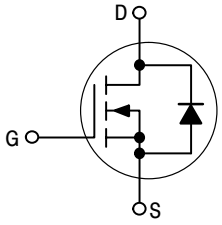
1. When surface mounted to an FR4 board using 1″ pad size, 1 oz. (Cu. Area 0.0995 in^2).
2. When surface mounted to an FR4 board using minimum recommended pad size, 2–2.4 oz. (Cu. Area 0.272 in^2).

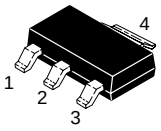
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3.0 AMPERES
60 VOLTS
$R_{DS(on)}$ = 120 mΩ

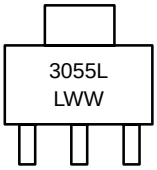
N–Channel





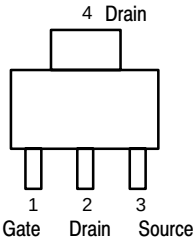
SOT–223
CASE 318E
STYLE 3

MARKING DIAGRAM



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

PIN ASSIGNMENT



ORDERING INFORMATION

Device	Package	Shipping
NTF3055L108T1	SOT–223	1000/Tape & Reel
NTF3055L108T3	SOT–223	4000/Tape & Reel
NTF3055L108T3LF	SOT–223	4000/Tape & Reel

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

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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 68	 – –	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 –	 1.68 4.6	 2.0 –	Vdc mV/°C
Static Drain–to–Source On–Resistance (Note 3) (V_{GS} = 5.0 Vdc, I_D = 1.5 Adc)		$R_{DS(on)}$	 –	 92	 120	mΩ
Static Drain–to–Source On–Resistance (Note 3) (V_{GS} = 5.0 Vdc, I_D = 3.0 Adc) (V_{GS} = 5.0 Vdc, I_D = 1.5 Adc, T_J = 150°C)		$V_{DS(on)}$	 –	 0.290 0.250	 0.43 –	Vdc
Forward Transconductance (Note 3)	(V_{DS} = 7.0 Vdc, I_D = 3.0 Adc)	g_{fs}	–	5.7	–	Mhos
DYNAMIC CHARACTERISTICS						
Input Capacitance	(V_{DS} = 25 Vdc, V_{GS} = 0 V, f = 1.0 MHz)	C_{iss}	–	313	440	pF
Output Capacitance		C_{oss}	–	112	160	
Transfer Capacitance		C_{rss}	–	40	60	
SWITCHING CHARACTERISTICS (Note 4)						
Turn–On Delay Time	(V_{DD} = 30 Vdc, I_D = 3.0 Adc, V_{GS} = 5.0 Vdc, R_G = 9.1 Ω) (Note 3)	$t_{d(on)}$	–	11	25	ns
Rise Time		t_r	–	35	70	
Turn–Off Delay Time		$t_{d(off)}$	–	22	45	
Fall Time		t_f	–	27	60	
Gate Charge	(V_{DS} = 48 Vdc, I_D = 3.0 Adc, V_{GS} = 5.0 Vdc) (Note 3)	Q_T	–	7.6	15	nC
		Q_1	–	1.4	–	
		Q_2	–	4.0	–	
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}	 – –	 0.87 0.72	 1.0 –	Vdc
Reverse Recovery Time	(I_S = 3.0 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}	–	0.044	–	μC

3. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.
4. Switching characteristics are independent of operating junction temperatures.

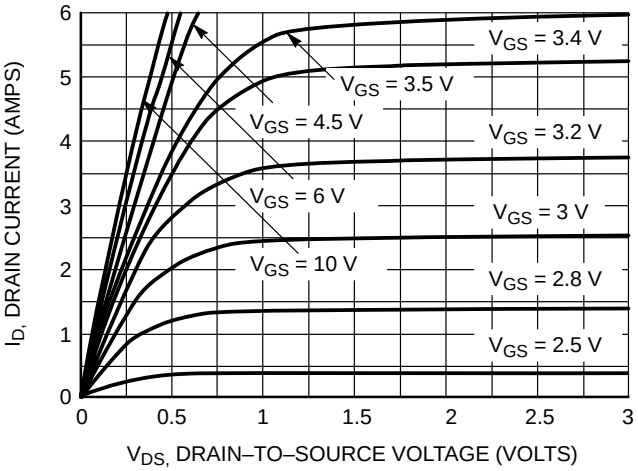


Figure 1. On–Region Characteristics

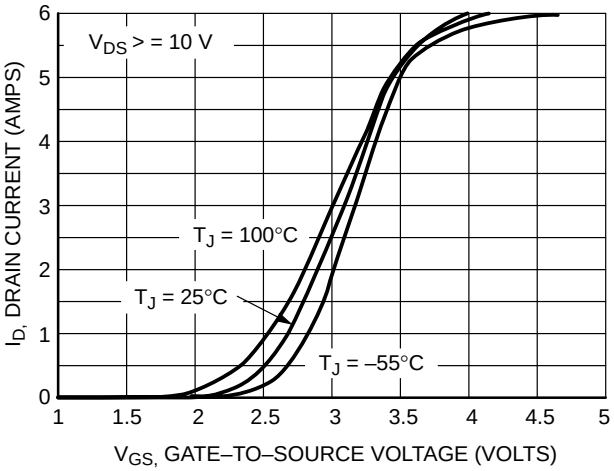


Figure 2. Transfer Characteristics

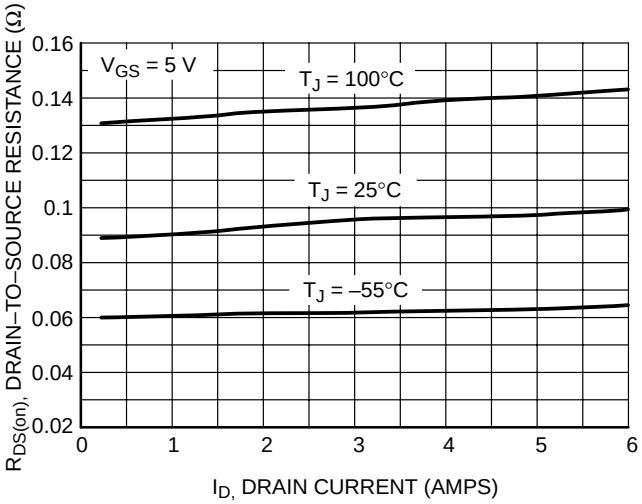


Figure 3. On–Resistance vs. Gate–to–Source Voltage

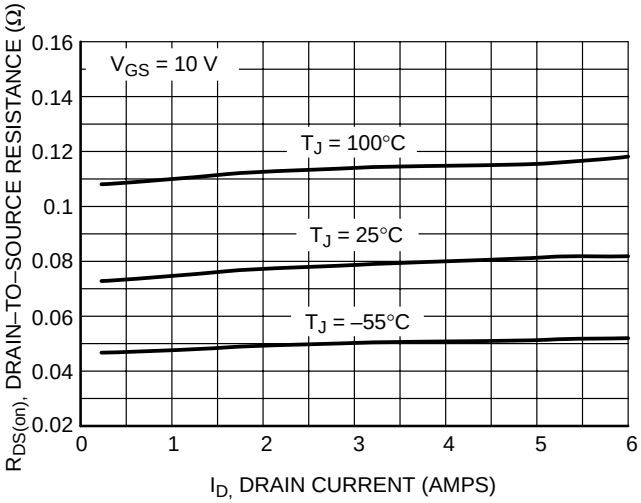


Figure 4. On–Resistance vs. Drain Current and Gate Voltage

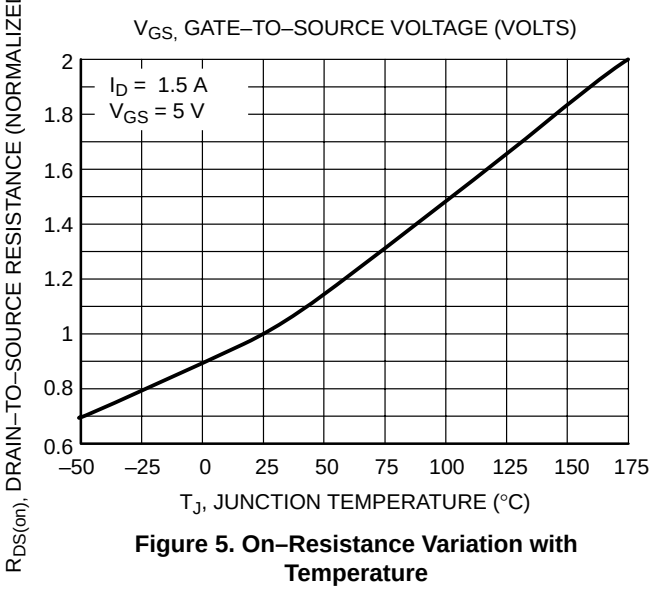


Figure 5. On–Resistance Variation with Temperature

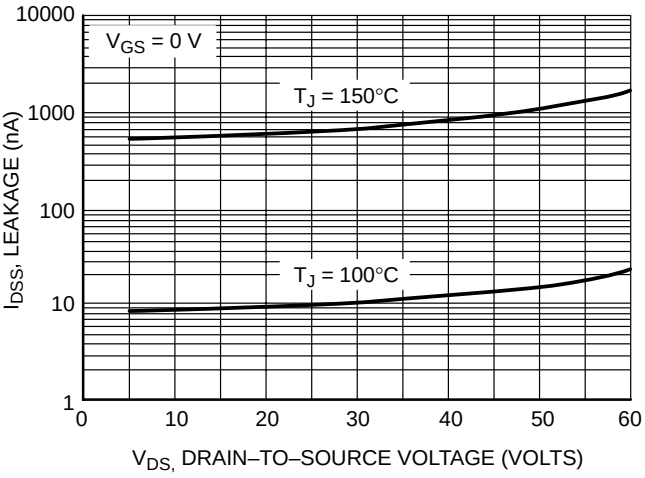


Figure 6. Drain–to–Source Leakage Current vs. Voltage

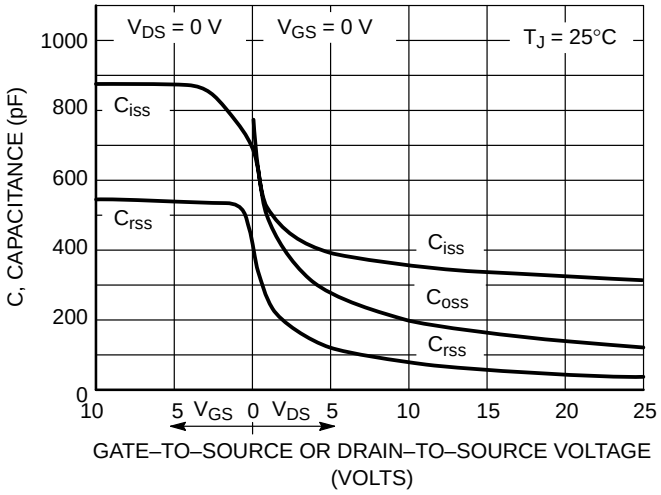


Figure 7. Capacitance Variation

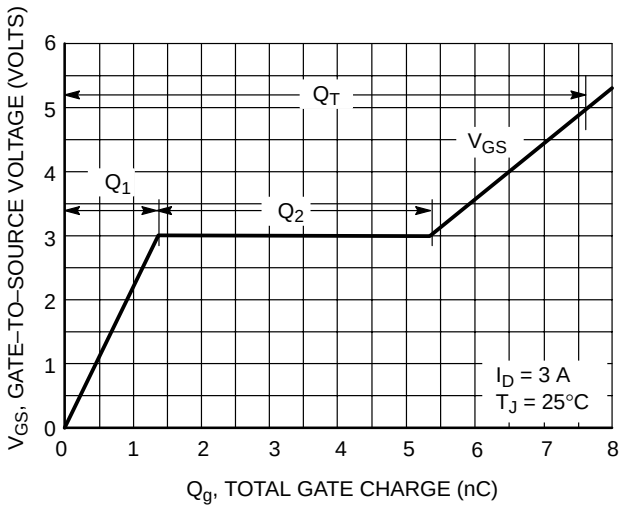


Figure 8. Gate–to–Source and Drain–to–Source Voltage vs. Total Charge

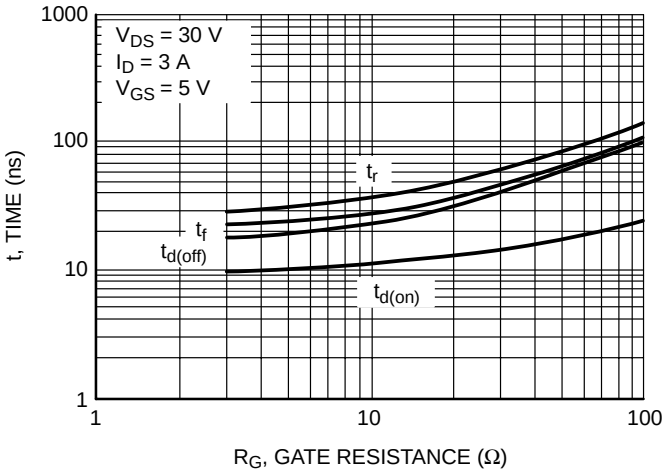


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

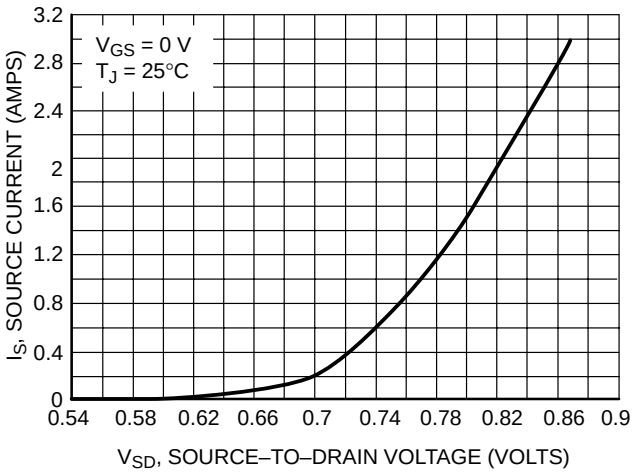


Figure 10. Diode Forward Voltage vs. Current

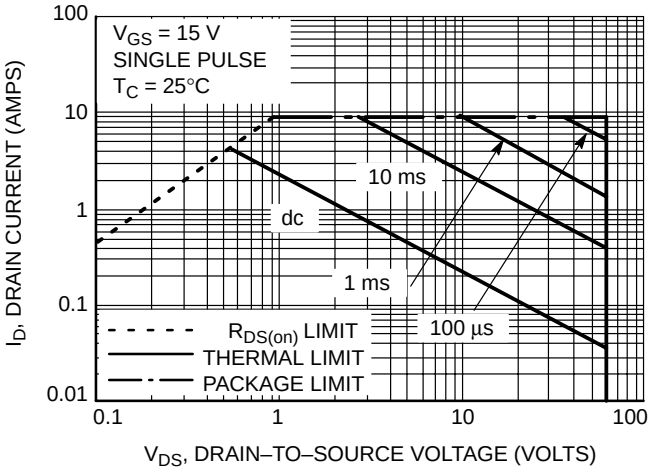


Figure 11. Maximum Rated Forward Biased Safe Operating Area

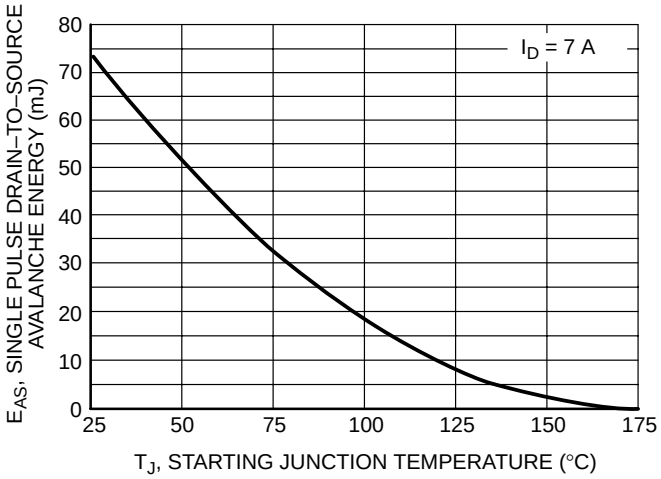


Figure 12. Maximum Avalanche Energy vs. Starting Junction Temperature

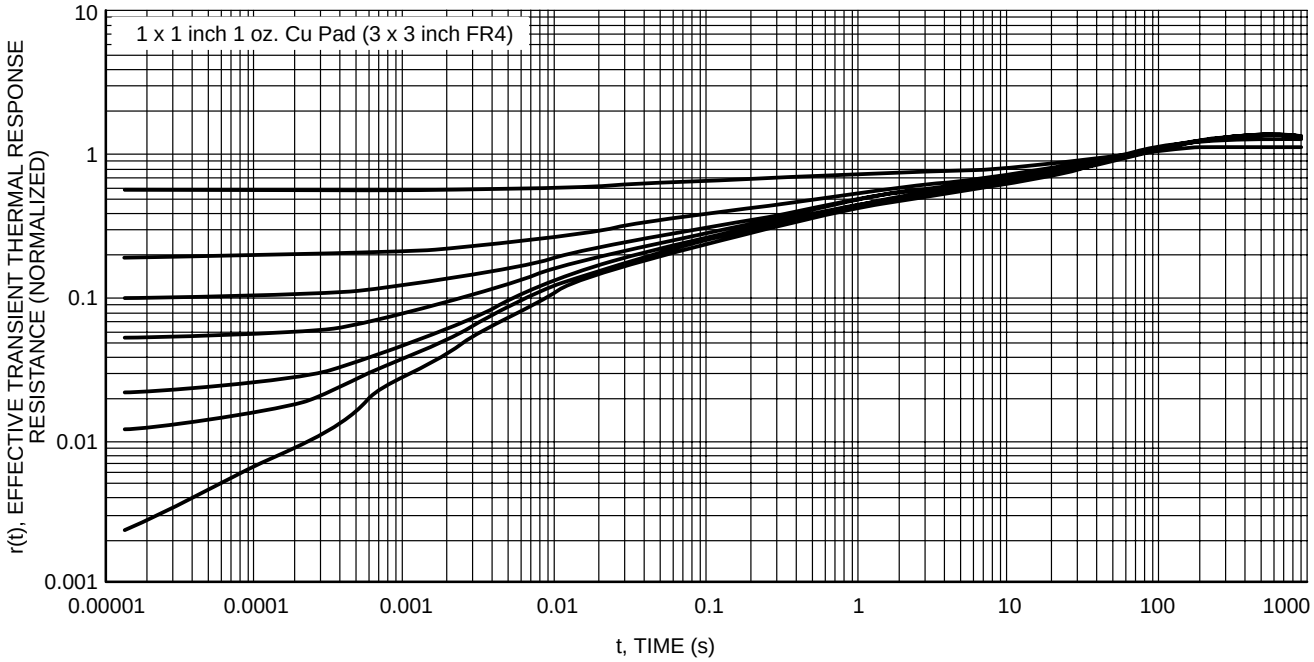
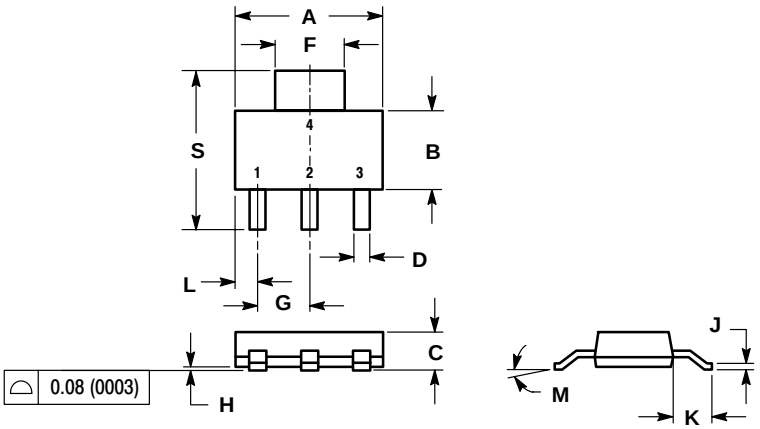


Figure 13. Thermal Response

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.

	INCHES		MILLIMETERS	
DIM	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

Notes

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