NTF3055-160

Preferred Device

Power MOSFET
2.0 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} = 1.0 MΩ)	V_{DGR}	60	Vdc
Gate–to–Source Voltage – Continuous – Non–repetitive ($t_p \le 10$ ms)	V_{GS}	 ± 20 ± 30	 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}	 2.0 1.2 6.0	 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) = 6.0 Apk, L = 10 mH, V_{DS} = 60 Vdc)	E_{AS}	65	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

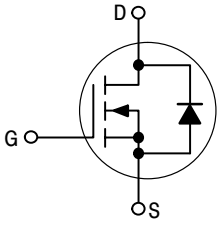
1. When surface mounted to an FR4 board using 1″ pad size, (Cu. Area 1.127 in^2).
2. When surface mounted to an FR4 board using minimum recommended pad size, 2–2.4 oz. (Cu. Area 0.272 in^2).

ON Semiconductor™

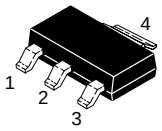
http://onsemi.com

2.0 AMPERES
60 VOLTS
$R_{DS(on)}$ = 160 mΩ

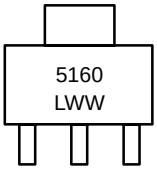
N–Channel



MARKING DIAGRAM

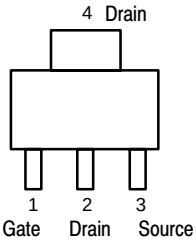


SOT–223
CASE 318E
STYLE 3



5160 = Device Code
L = Location Code
WW = Work Week

PIN ASSIGNMENT



ORDERING INFORMATION

Device	Package	Shipping
NTF3055–160T1	SOT–223	1000 Tape & Reel
NTF3055–160T3	SOT–223	4000 Tape & Reel
NTF3055–160T3LF	SOT–223	4000 Tape & Reel

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 –	 72 72	 – –	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 –	 3.1 6.6	 4.0 –	Vdc mV/°C
Static Drain–to–Source On–Resistance (Note 3.) (V_{GS} = 10 Vdc, I_D = 1.0 Adc)		$R_{DS(on)}$	 –	 142	 160	mΩ
Static Drain–to–Source On–Resistance (Note 3.) (V_{GS} = 10 Vdc, I_D = 2.0 Adc) (V_{GS} = 10 Vdc, I_D = 1.0 Adc, T_J = 150°C)		$V_{DS(on)}$	 –	 0.142 0.270	 0.384 –	Vdc
Forward Transconductance (Note 3.)	(V_{DS} = 8.0 Vdc, I_D = 1.5 Adc)	g_{fs}	–	1.8	–	Mhos
DYNAMIC CHARACTERISTICS						
Input Capacitance	(V_{DS} = 25 Vdc, V_{GS} = 0 V, f = 1.0 MHz)	C_{iss}	–	200	280	pF
Output Capacitance		C_{oss}	–	68	100	
Transfer Capacitance		C_{rss}	–	26	40	
SWITCHING CHARACTERISTICS (Note 4.)						
Turn–On Delay Time	(V_{DD} = 30 Vdc, I_D = 2.0 Adc, V_{GS} = 10 Vdc, R_G = 9.1 Ω) (Note 3.)	$t_{d(on)}$	–	9.2	20	ns
Rise Time		t_r	–	9.2	20	
Turn–Off Delay Time		$t_{d(off)}$	–	16	40	
Fall Time		t_f	–	9.2	20	
Gate Charge	(V_{DS} = 48 Vdc, I_D = 2.0 Adc, V_{GS} = 10 Vdc) (Note 3.)	Q_T	–	6.9	14	nC
		Q_1	–	1.4	–	
		Q_2	–	3.0	–	
SOURCE–DRAIN DIODE CHARACTERISTICS						
Forward On–Voltage	(I_S = 2.0 Adc, V_{GS} = 0 Vdc) (I_S = 2.0 Adc, V_{GS} = 0 Vdc, T_J = 150°C) (Note 3.)	V_{SD}	 – –	 0.86 0.70	 1.0 –	Vdc
Reverse Recovery Time	(I_S = 2.0 Adc, V_{GS} = 0 Vdc, dI_S/dt = 100 A/μs) (Note 3.)	t_{rr}	–	28.9	–	ns
		t_a	–	19.1	–	
		t_b	–	9.8	–	
Reverse Recovery Stored Charge		Q_{RR}	–	0.030	–	μC

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

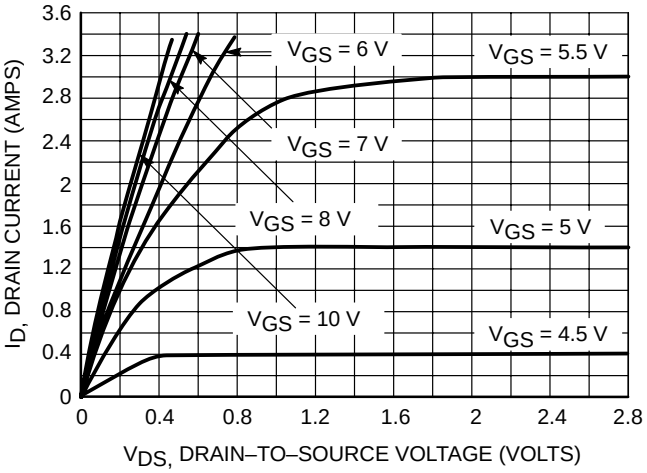


Figure 1. On–Region Characteristics

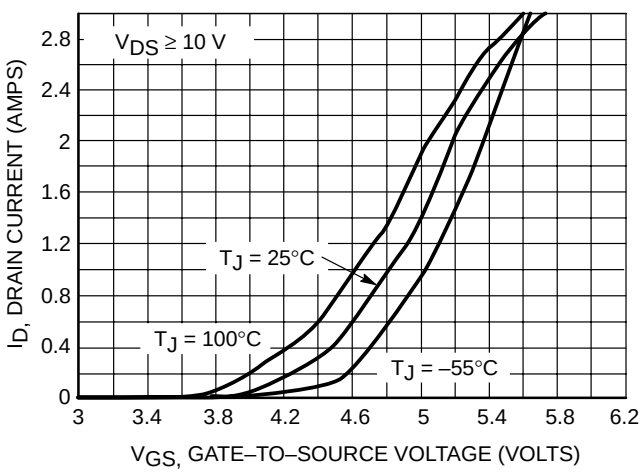


Figure 2. Transfer Characteristics

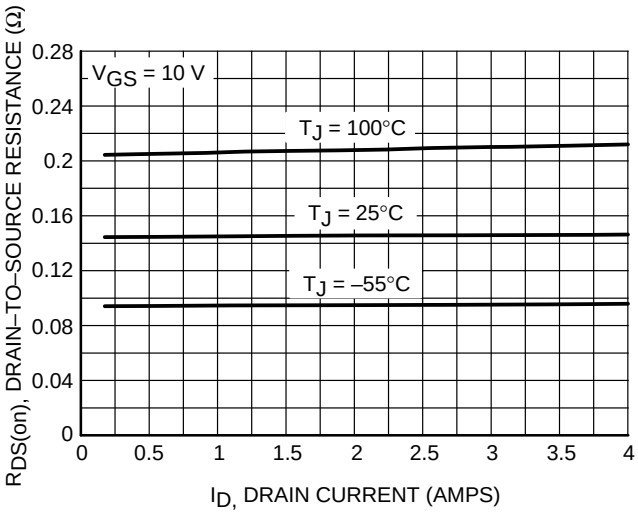


Figure 3. On–Resistance versus Gate–to–Source Voltage

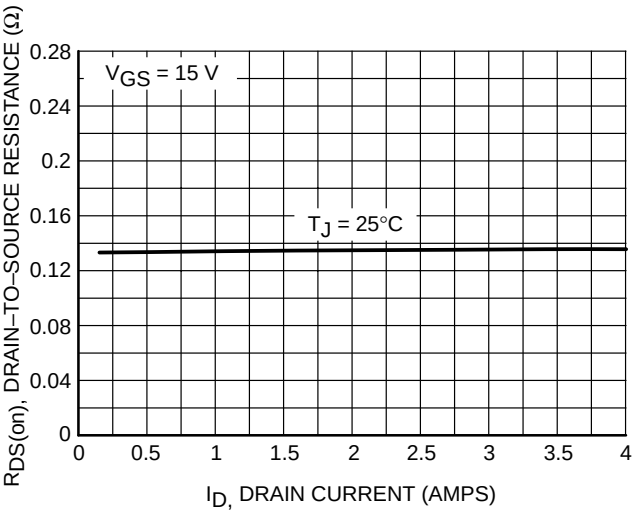


Figure 4. On–Resistance versus Drain Current and Gate Voltage

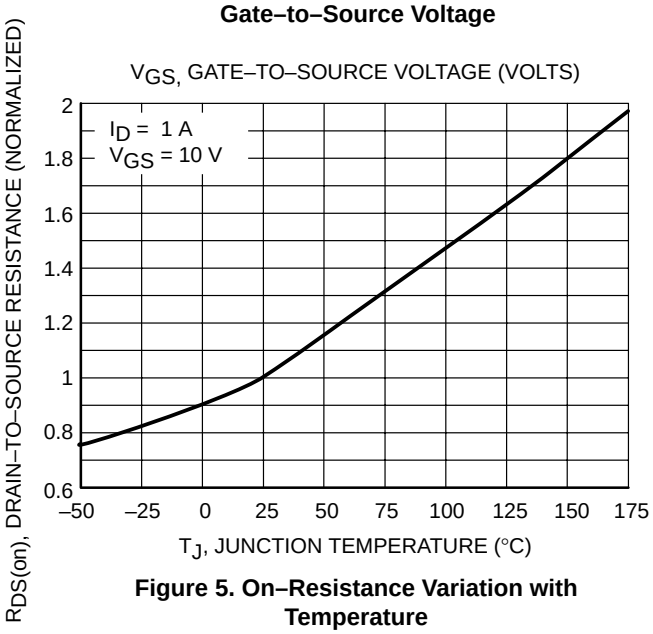


Figure 5. On–Resistance Variation with Temperature

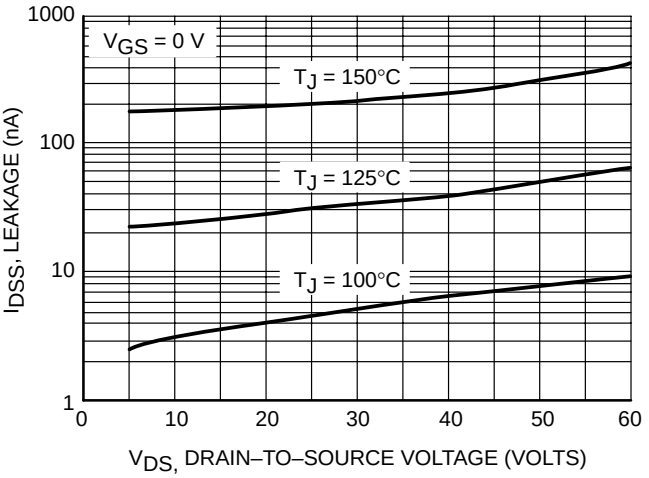


Figure 6. Drain–to–Source Leakage Current versus Voltage

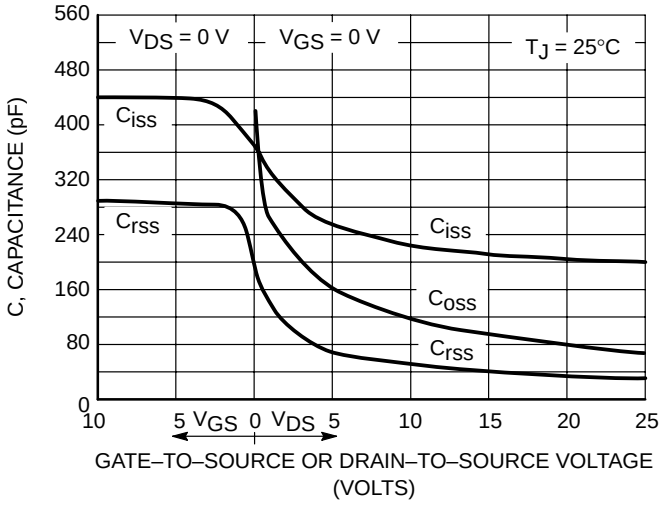


Figure 7. Capacitance Variation

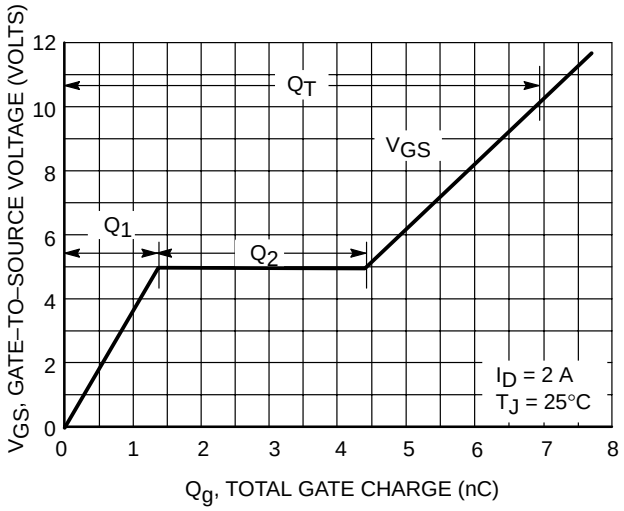


Figure 8. Gate–to–Source and Drain–to–Source Voltage versus Total Charge

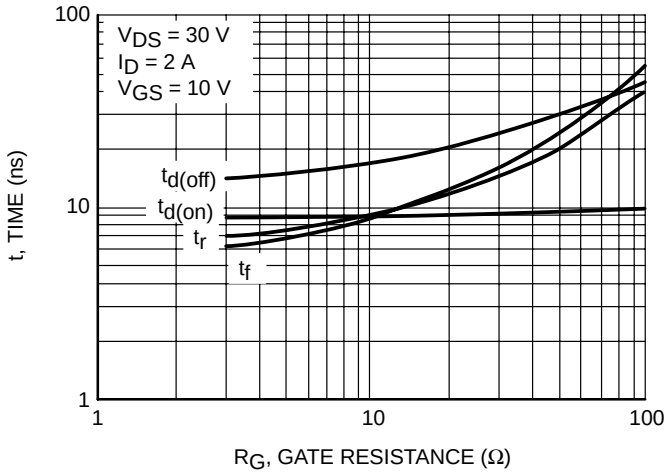


Figure 9. Resistive Switching Time Variation versus Gate Resistance

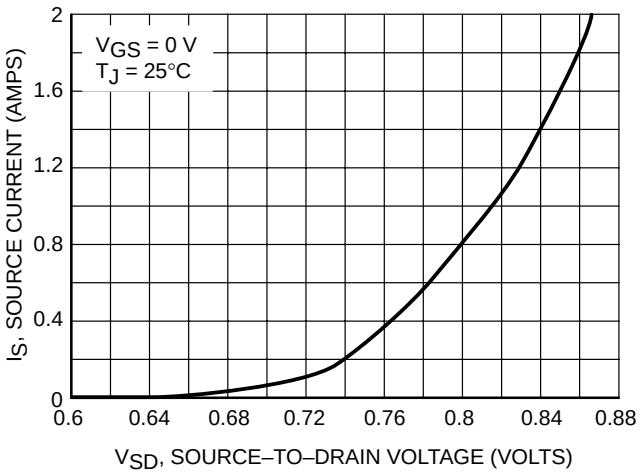


Figure 10. Diode Forward Voltage versus Current

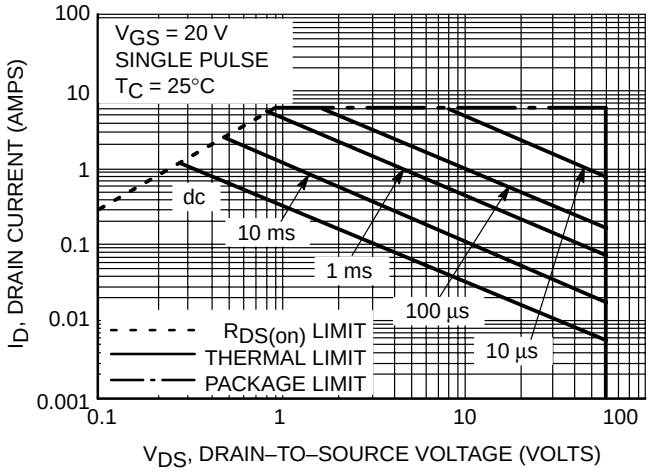


Figure 11. Maximum Rated Forward Biased Safe Operating Area

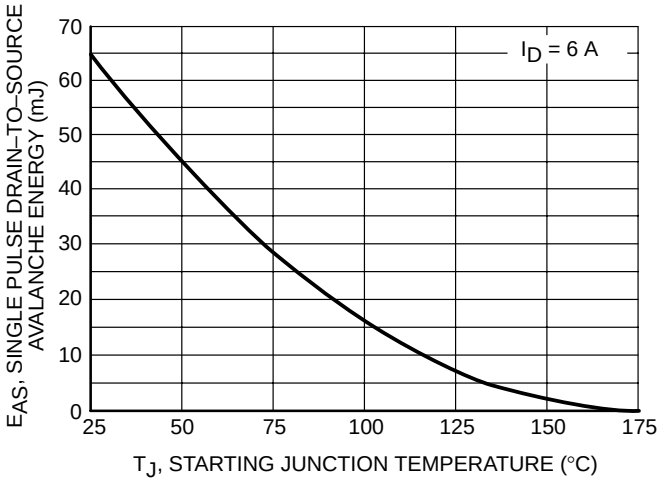


Figure 12. Maximum Avalanche Energy versus Starting Junction Temperature

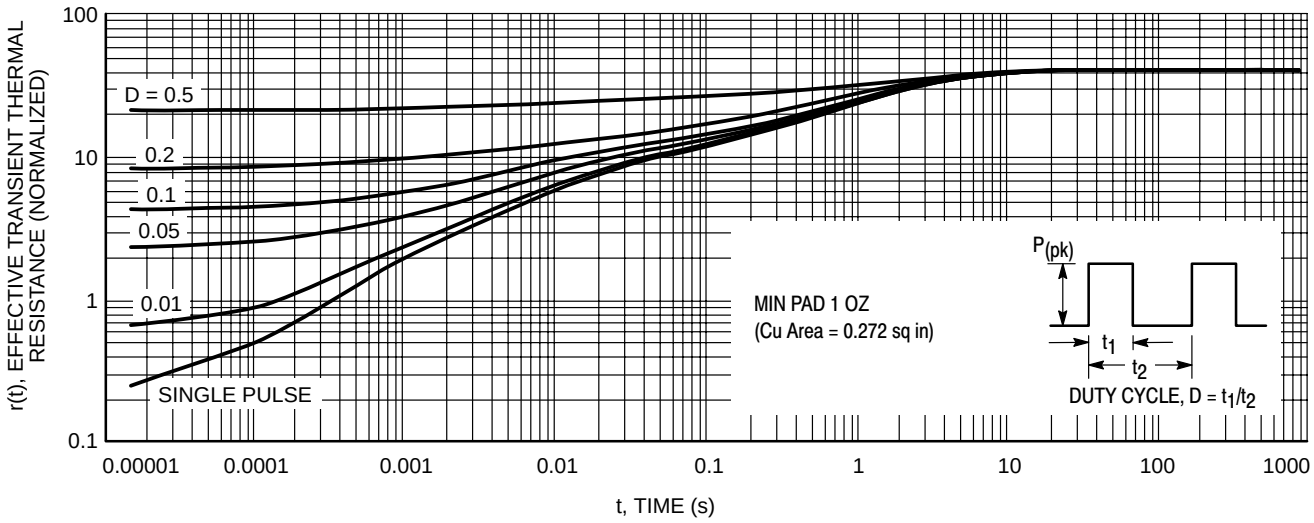
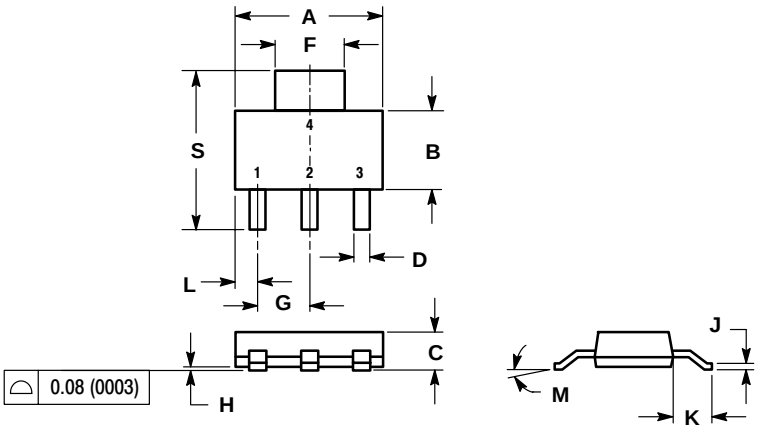


Figure 13. Thermal Response

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

PUBLICATION ORDERING INFORMATION

Literature Fulfillment:
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