

MOSFET – Power, Single, N-Channel, SO-8FL

30 V, 1.7 mΩ, 136 A

NTMFS4C022N

Features

- Small Footprint (5x6 mm) for Compact Design
- Low R_{DS(on)} to Minimize Conduction Losses
- Low Q_G and Capacitance to Minimize Driver Losses
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

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

Parameter		Symbol	Value	Unit	
Drain-to-Source Voltage		V_{DSS}	30	V	
Gate-to-Source Voltage		V _{GS}	±20	٧	
Continuous Drain Current $R_{\theta JC}$ (Notes 1, 3)	Steady	T _C = 25°C	I _D	136	Α
Power Dissipation $R_{\theta JC}$ (Notes 1, 3)	State	T _C = 25°C	P _D	64	W
Continuous Drain Current $R_{\theta JA}$ (Notes 1, 2, 3)	Steady	T _A = 25°C	I _D	30	Α
Power Dissipation $R_{\theta JA}$ (Notes 1, 2, 3)	State	T _A = 25°C	P _D	3.1	W
Pulsed Drain Current	$T_A = 25^{\circ}C, t_p = 10 \ \mu s$		I _{DM}	900	Α
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55 to 150	ô	
Source Current (Body Diode)		Is	53	Α	
Single Pulse Drain-to-Source Avalanche Energy (I _{L(pk)} = 11 A)		E _{AS}	549	mJ	
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)		T _L	260	°C	

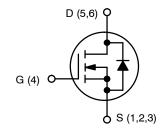
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL RESISTANCE MAXIMUM RATINGS (Note 1)

Parameter	Symbol	Value	Unit
Junction-to-Case - Steady State (Note 2)	$R_{\theta JC}$	1.95	°C/W
Junction-to-Ambient - Steady State (Note 2)	$R_{\theta JA}$	40	

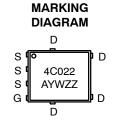
- The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
- 2. Surface-mounted on FR4 board using a 650 mm², 2 oz. Cu pad.
- Maximum current for pulses as long as 1 second is higher but is dependent on pulse duration and duty cycle.

V _{(BR)DSS}	R _{DS(ON)} MAX	I _D MAX
30 V	1.7 mΩ @ 10 V	136 A
	2.6 mΩ @ 4.5 V	130 A



N-CHANNEL MOSFET





A = Assembly Location Y = Year

Y = Year
W = Work Week
ZZ = Lot Traceability

ORDERING INFORMATION

Device	Package	Shipping [†]
NTMFS4C022NT1G	SO-8FL (Pb-Free)	1500 / Tape & Reel
NTMFS4C022NT3G	SO-8FL (Pb-Free)	5000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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

Parameter	Symbol	Test Condition		Min	Тур	Max	Unit
OFF CHARACTERISTICS	-			-	-	-	-
Drain-to-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 250 μA		30			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} /				18.2		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V,	T _J = 25 °C			1	
		V _{DS} = 24 V	T _J = 125°C			10	μΑ
Gate-to-Source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = 20 V				100	nA
ON CHARACTERISTICS (Note 4)				•			•
Gate Threshold Voltage	V _{GS(TH)}	$V_{GS} = V_{DS}, I_D = 250 \mu A$		1.3		2.2	V
Negative Threshold Temperature Coefficient	V _{GS(TH)} /T _J				4.8		mV/°C
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = 10 V	I _D = 30 A		1.4	1.7	_
		V _{GS} = 4.5 V	I _D = 30 A		2.0	2.6	mΩ
Forward Transconductance	9FS	$V_{DS} = 3 \text{ V}, I_{D}$	₀ = 30 A		136		S
Gate Resistance	R_{G}	T _A = 25	°C		1.0		Ω
CHARGES AND CAPACITANCES							
Input Capacitance	C _{ISS}				3071		pF
Output Capacitance	Coss	V _{GS} = 0 V, f = 1 MH	Hz, V _{DS} = 15 V		1673		
Reverse Transfer Capacitance	C _{RSS}				67		1
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 4.5 V, V _{DS} = 15 V; I _D = 30 A			20.8		nC
Threshold Gate Charge	Q _{G(TH)}				4.9		
Gate-to-Source Charge	Q _{GS}				8.5		
Gate-to-Drain Charge	Q_{GD}				4.7		
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 10 V, V _{DS} = 15 V, I _D = 30 A			45.2		nC
SWITCHING CHARACTERISTICS (Note 5)							
Turn-On Delay Time	t _{d(ON)}				14		
Rise Time	t _r	V _{GS} = 4.5 V, V _{DS} = -	15 V, I _D = 15 A,		32		1
Turn-Off Delay Time	t _{d(OFF)}	$R_{\rm G} = 3.0 \Omega$			27		ns
Fall Time	t _f				17		
DRAIN-SOURCE DIODE CHARACTERISTIC	s			•			
Forward Diode Voltage	V _{SD}	V _{GS} = 0 V, I _S = 10 A	T _J = 25°C		0.75	1.1	V
			T _J = 125°C		0.6		
Reverse Recovery Time	t _{RR}	$V_{GS} = 0 \text{ V, } dI_{S}/dt = 100 \text{ A/}\mu\text{s,}$ $I_{S} = 30 \text{ A}$			47		
Charge Time	ta				23		ns
Discharge Time	t _b				24		1
Reverse Recovery Charge	Q_{RR}				39		nC

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

4. Pulse Test: pulse width $\leq 300~\mu s$, duty cycle $\leq 2\%$.

5. Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS

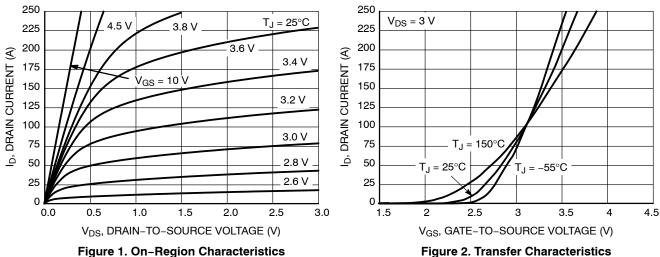


Figure 2. Transfer Characteristics

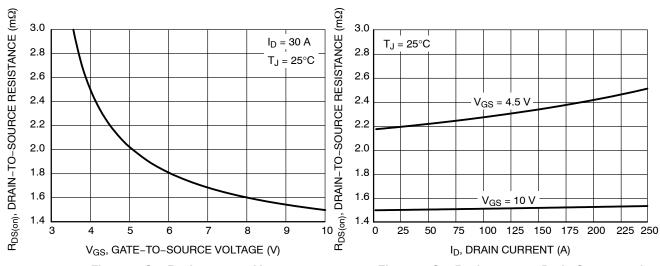


Figure 3. On-Resistance vs. V_{GS}

Figure 4. On-Resistance vs. Drain Current and **Gate Voltage**

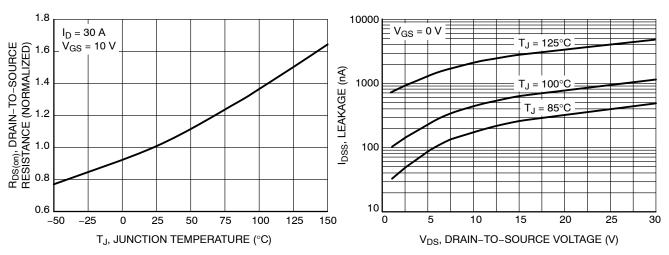


Figure 5. On-Resistance Variation with **Temperature**

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

TYPICAL CHARACTERISTICS

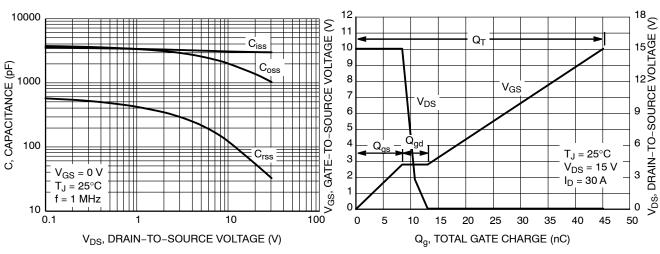


Figure 7. Capacitance Variation

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

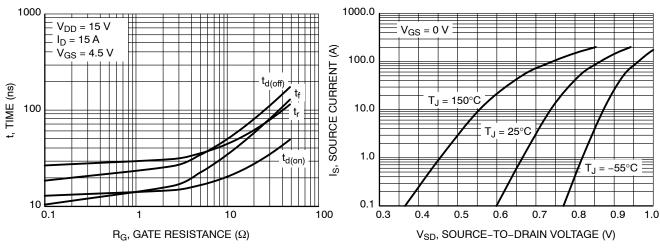


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

Figure 10. Diode Forward Voltage vs. Current

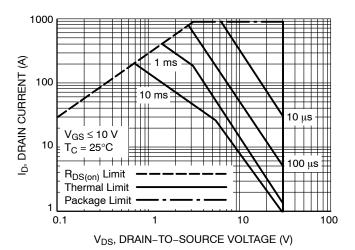


Figure 11. Maximum Rated Forward Biased Safe Operating Area

TYPICAL CHARACTERISTICS

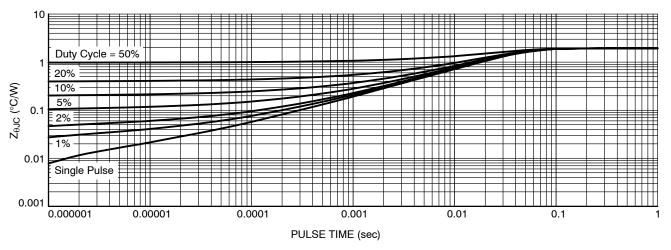


Figure 12. Thermal Impedance (Junction-to-Case)

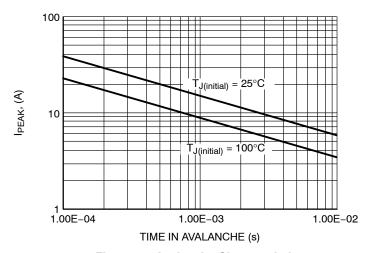


Figure 13. Avalanche Characteristics





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SIDE VIEW

DFN5 5x6, 1.27P (SO-8FL) CASE 488AA ISSUE N

DATE 25 JUN 2018

NOTES:

- DIMENSIONING AND TOLERANCING PER
- ASME Y14.5M, 1994. CONTROLLING DIMENSION: MILLIMETER. DIMENSION D1 AND E1 DO NOT INCLUDE
- MOLD FLASH PROTRUSIONS OR GATE BURRS

	MILLIMETERS				
DIM	MIN	NOM	MAX		
Α	0.90	1.00	1.10		
A1	0.00	-	0.05		
b	0.33	0.41	0.51		
С	0.23	0.28	0.33		
D	5.00	5.15	5.30		
D1	4.70	4.90	5.10		
D2	3.80	4.00	4.20		
E	6.00	6.15	6.30		
E1	5.70	5.90	6.10		
E2	3.45	3.65	3.85		
е		1.27 BSC			
G	0.51	0.575	0.71		
K	1.20	1.35	1.50		
L	0.51	0.575	0.71		
L1	0.125 REF				
M	3.00	3.40	3.80		
θ	0 °		12 °		

GENERIC MARKING DIAGRAM*



XXXXXX = Specific Device Code

= Lot Traceability

= Assembly Location Α

Υ = Year W = Work Week

ZZ

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot " ", may or may not be present. Some products may not follow the Generic Marking.





DETAIL A

*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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