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MOSFET - Power, Single N-Channel, PQFN8 80 V, 32 A

NTMFS006N08MC

Features

- Advanced Package (5x6mm) with Excellent Thermal Conduction
- Ultra Low $R_{DS(on)}$ to Improve System Efficiency
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

Applications

- Hot Swap Application
- Power Load Switch
- Battery Management and Protection

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

Parameter		Symbol	Value	Unit
Drain-to-Source Voltage		V_{DS}	80	V
Gate-to-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current $R_{\theta JC}$ (Note 3)	Steady State	I_D	$T_C = 25^\circ\text{C}$	A
			$T_C = 85^\circ\text{C}$	
Power Dissipation $R_{\theta JC}$ (Note 3)	Steady State	P_D	$T_C = 25^\circ\text{C}$	W
			$T_C = 85^\circ\text{C}$	
Continuous Drain Current $R_{\theta JA}$ (Notes 1, 3)	Steady State	I_D	$T_A = 25^\circ\text{C}$	A
			$T_A = 85^\circ\text{C}$	
Power Dissipation $R_{\theta JA}$ (Notes 1, 3)	Steady State	P_D	$T_A = 25^\circ\text{C}$	W
			$T_A = 85^\circ\text{C}$	
Continuous Drain Current $R_{\theta JA}$ (Notes 2, 3)	Steady State	I_D	$T_A = 25^\circ\text{C}$	A
			$T_A = 85^\circ\text{C}$	
Power Dissipation $R_{\theta JA}$ (Notes 2, 3)	Steady State	P_D	$T_A = 25^\circ\text{C}$	W
			$T_A = 85^\circ\text{C}$	
Pulsed Drain Current	$T_A = 25^\circ\text{C}, t_p = 10 \mu\text{s}$	I_{DM}	216	A
Single Pulse Drain-to-Source Avalanche Energy ($I_L = 32 \text{ A}_{pk}$)		E_{AS}	51	mJ
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)		T_L	260	$^\circ\text{C}$

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.

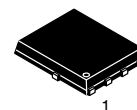
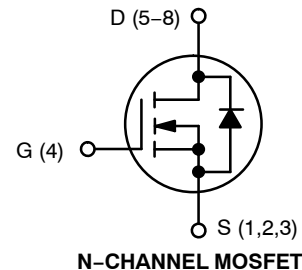
1. Surface-mounted on FR4 board using 1 in² pad, 2 oz Cu pad.
2. Surface-mounted on FR4 board using minimum pad size, 2 oz Cu pad.
3. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.



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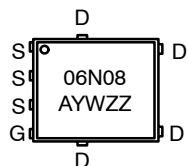
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$V_{(BR)DSS}$	$R_{DS(on)} \text{ MAX}$	$I_D \text{ MAX}$
80 V	6.0 m Ω @ 10 V	32 A
80 V	17 m Ω @ 6 V	16 A



PQFN8
T1 SUFFIX
CASE 483AE

MARKING DIAGRAMS



A = Assembly Location
Y = Year
W = Work Week
ZZ = Lot Traceability

ORDERING INFORMATION

See detailed ordering, marking and shipping information in the package dimensions section on page 5 of this data sheet.

THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction-to-Case – Steady State	$R_{\theta JC}$	1.61	°C/W
Junction-to-Ambient – Steady State (Note 4)	$R_{\theta JA}$	50	
Junction-to-Ambient – Steady State (Note 5)	$R_{\theta JA}$	125	

4. Surface-mounted on FR4 board using 1 in² pad, 2 oz Cu pad.

5. Surface-mounted on FR4 board using minimum pad size, 2 oz Cu pad.

ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	80			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	$I_D = 250\text{ }\mu\text{A}$, ref to 25°C		96.6		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}, V_{DS} = 64\text{ V}$			1.0	μA
		$T_J = 125^\circ\text{C}$			100	
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = 20\text{ V}$			100	nA

ON CHARACTERISTICS (Note 6)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\text{ }\mu\text{A}$	2.0		4.0	V
Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$	$I_D = 200\text{ }\mu\text{A}$, ref to 25°C		-5		mV/°C
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 32\text{ A}$		4.9	6.0	m Ω
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 6\text{ V}, I_D = 16\text{ A}$		10.2	17	m Ω
Gate Resistance	R_G	$T_A = 25^\circ\text{C}$		0.3		Ω

CHARGES AND CAPACITANCES

Input Capacitance	C_{ISS}	$V_{GS} = 0\text{ V}, V_{DS} = 40\text{ V}, f = 1\text{ MHz}$		2300		pF
Output Capacitance	C_{OSS}			710		
Reverse Transfer Capacitance	C_{RSS}			31		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 10\text{ V}, V_{DS} = 40\text{ V}; I_D = 32\text{ A}$		30		nC
Threshold Gate Charge	$Q_{G(TH)}$			3.3		
Gate-to-Source Charge	Q_{GS}			10		
Gate-to-Drain Charge	Q_{GD}			6.0		

SWITCHING CHARACTERISTICS (Note 7)

Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = 10\text{ V}, V_{DS} = 15\text{ V}, I_D = 32\text{ A}, R_G = 2.5\text{ }\Omega$		13		ns
Rise Time	t_r			4		
Turn-Off Delay Time	$t_{d(OFF)}$			18		
Fall Time	t_f			4		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = 32\text{ A}$	$T_J = 25^\circ\text{C}$		0.84	1.2	V
			$T_J = 125^\circ\text{C}$		0.78		
Reverse Recovery Time	t_{RR}	$V_{GS} = 0\text{ V}, dI_S/dt = 100\text{ A}/\mu\text{s}, I_S = 32\text{ A}$			49.58		ns
Reverse Recovery Charge	Q_{RR}				51.4		nC

6. Pulse Test: pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

7. Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS

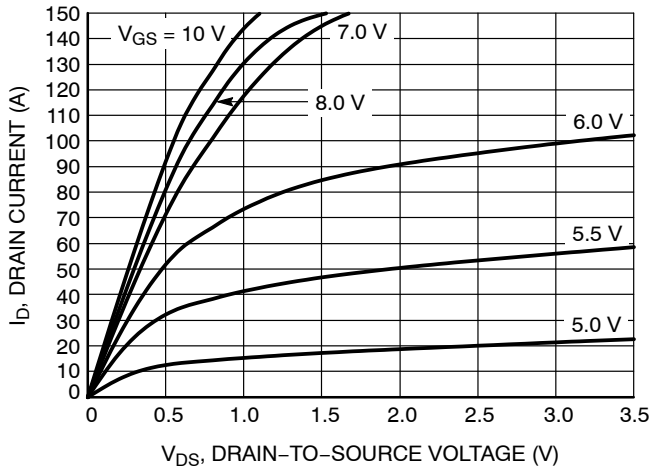


Figure 1. On-Region Characteristics

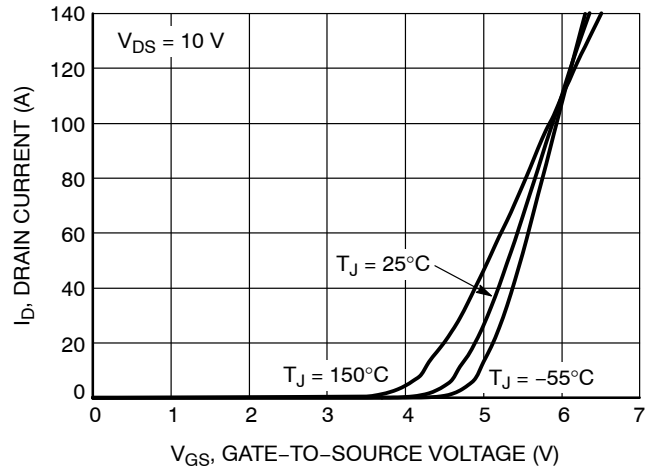


Figure 2. Transfer Characteristics

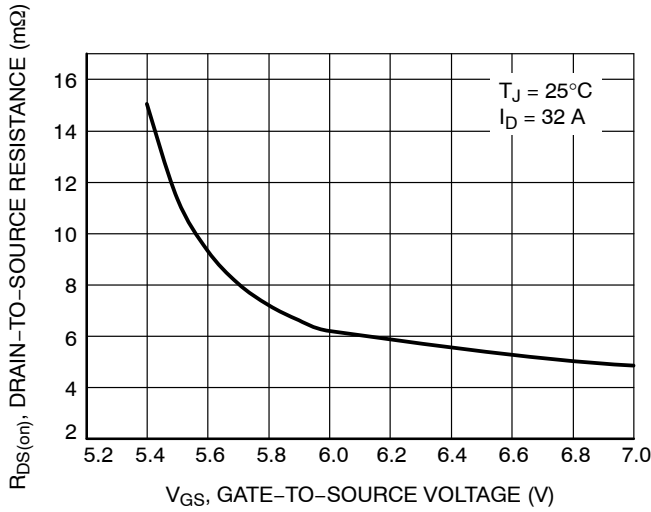


Figure 3. On-Resistance vs. Gate-to-Source Voltage

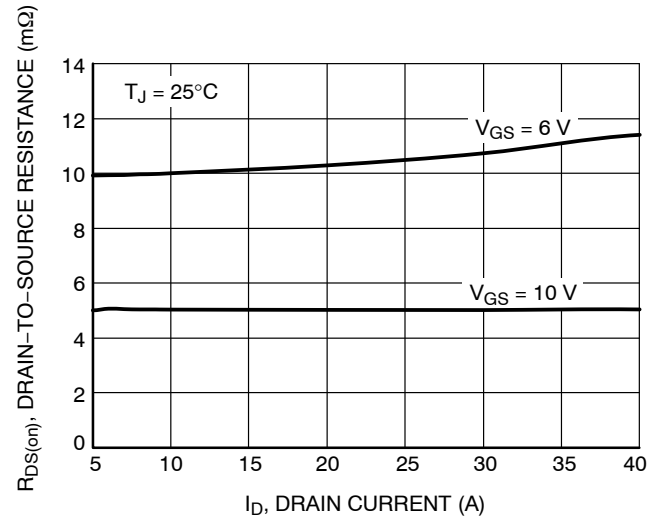


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

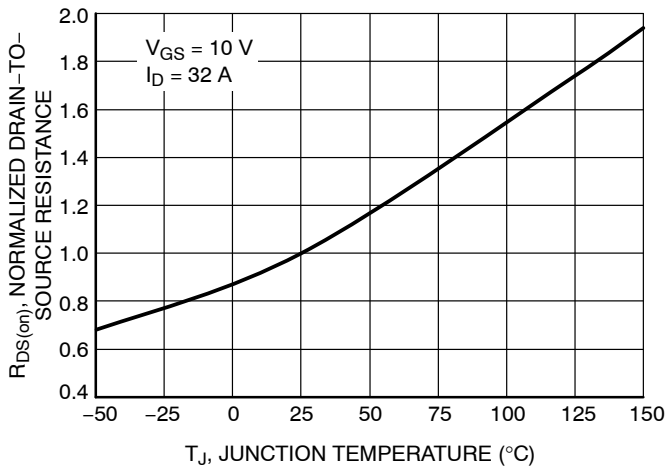


Figure 5. On-Resistance Variation with Temperature

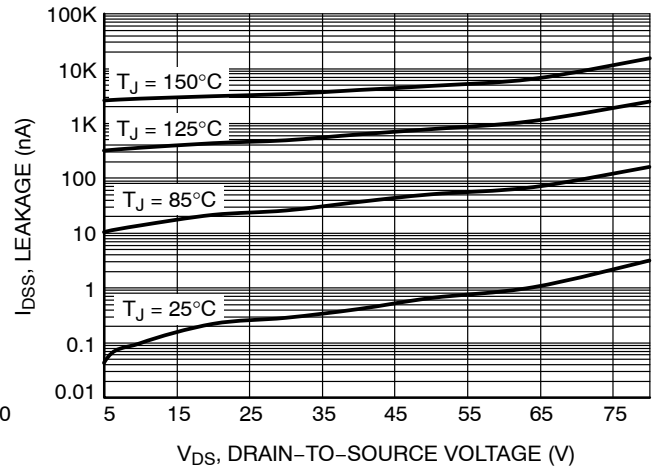


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

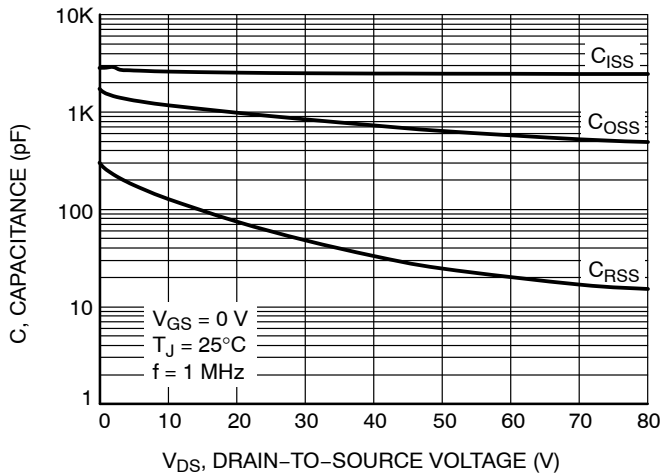


Figure 7. Capacitance Variation

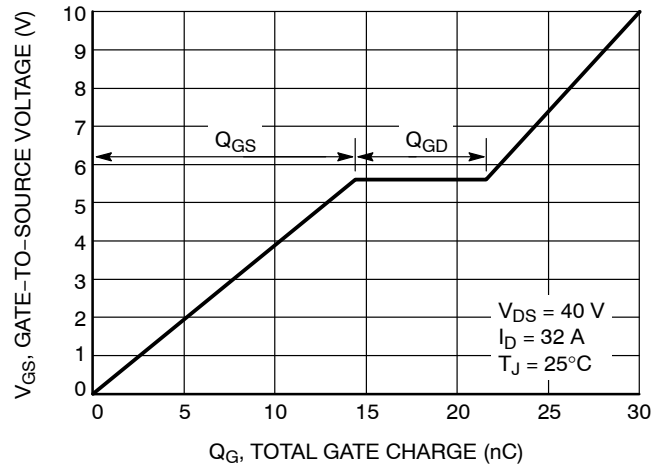


Figure 8. Gate-to-Source Voltage vs. Total Charge

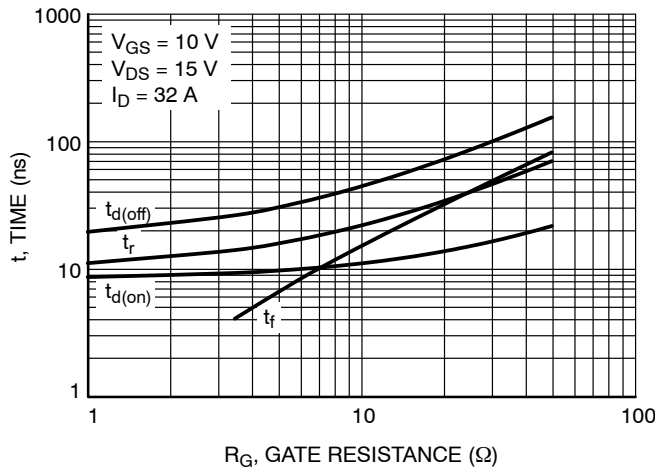


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

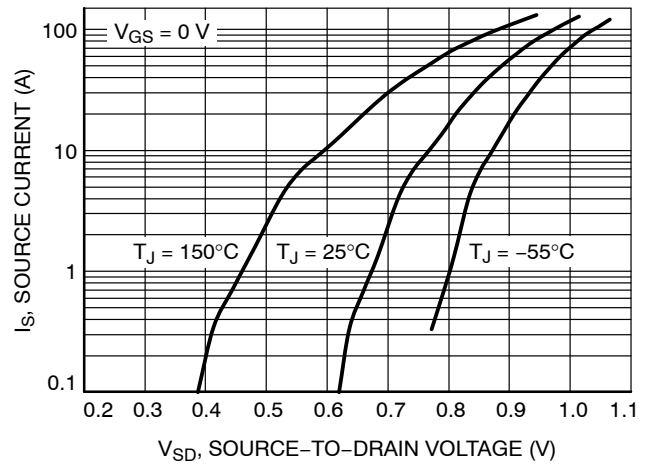


Figure 10. Diode Forward Voltage vs. Current

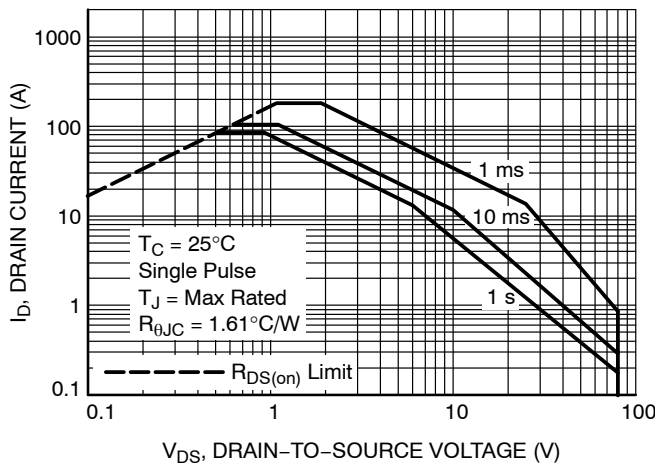


Figure 11. Safe Operating Area

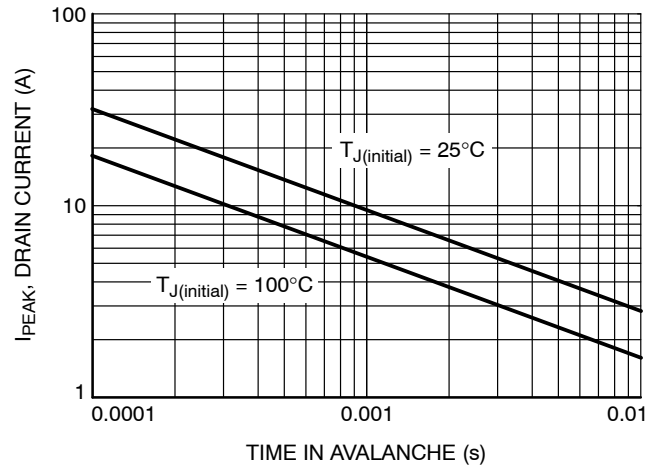


Figure 12. Maximum Drain Current vs. Time in Avalanche

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TYPICAL CHARACTERISTICS

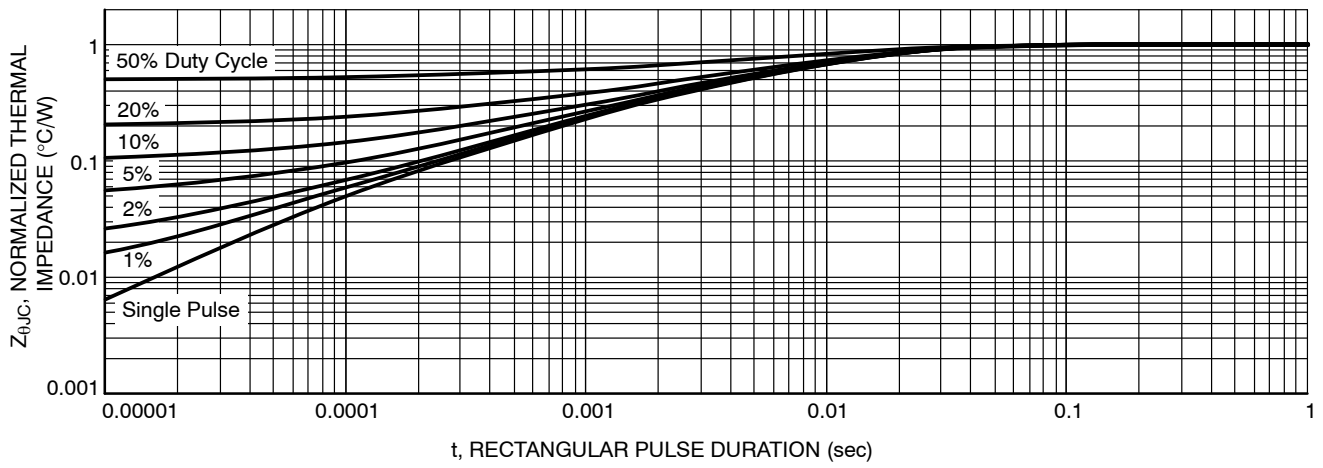


Figure 13. Transient Thermal Response

DEVICE ORDERING INFORMATION

Device	Marking	Package	Shipping [†]
NTMFS006N08MC	06N08	PQFN8 (Pb-Free)	3000 / 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.

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