

NTMFS4897NF

Power MOSFET

30 V, 171 A, Single N-Channel, SO-8 FL

Features

- Low $R_{DS(on)}$ to Minimize Conduction Losses
- Low Capacitance to Minimize Driver Losses
- Includes Schottky Diode
- Optimized Gate Charge to Minimize Switching Losses
- These are Pb-Free Device

Applications

- CPU Power Delivery
- DC-DC Converters
- Low Side Switching

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

Parameter			Symbol	Value	Unit
Drain-to-Source Voltage			V_{DSS}	30	V
Gate-to-Source Voltage			V_{GS}	± 20	V
Continuous Drain Current $R_{\theta JA}$ (Note 1)	Steady State	$T_A = 25^{\circ}\text{C}$	I_D	29	A
		$T_A = 85^{\circ}\text{C}$		21	
Power Dissipation $R_{\theta JA}$ (Note 1)		$T_A = 25^{\circ}\text{C}$	P_D	2.74	W
Continuous Drain Current $R_{\theta JA} \leq 10$ sec		$T_A = 25^{\circ}\text{C}$	I_D	47	A
		$T_A = 85^{\circ}\text{C}$		34	
Power Dissipation $R_{\theta JA}, t \leq 10$ sec		$T_A = 25^{\circ}\text{C}$	P_D	7.3	W
Continuous Drain Current $R_{\theta JA}$ (Note 2)		$T_A = 25^{\circ}\text{C}$	I_D	17	A
		$T_A = 85^{\circ}\text{C}$		12	
Power Dissipation $R_{\theta JA}$ (Note 2)		$T_A = 25^{\circ}\text{C}$	P_D	0.95	W
Continuous Drain Current $R_{\theta JC}$ (Note 1)		$T_C = 25^{\circ}\text{C}$	I_D	171	A
		$T_C = 85^{\circ}\text{C}$		123	
Power Dissipation $R_{\theta JC}$ (Note 1)		$T_C = 25^{\circ}\text{C}$	P_D	96.2	W
Pulsed Drain Current	$t_p=10\mu\text{s}$	$T_A = 25^{\circ}\text{C}$	I_{DM}	288	A
Current limited by package		$T_A = 25^{\circ}\text{C}$	$I_{Dmaxpkg}$	100	A
Operating Junction and Storage Temperature			T_J, T_{STG}	-55 to +150	$^{\circ}\text{C}$
Source Current (Body Diode)			I_S	120	A
Drain to Source dV/dt			dV/dt	6	V/ns
Single Pulse Drain-to-Source Avalanche Energy ($V_{DD} = 50$ V, $V_{GS} = 10$ V, $I_L = 50$ A _{pk} , $L = 0.3$ mH, $R_G = 25$ Ω)			EAS	375	mJ
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			T_L	260	$^{\circ}\text{C}$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

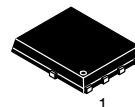
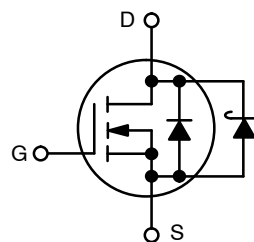


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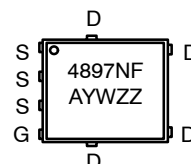
$V_{(BR)DSS}$	$R_{DS(ON)} \text{ MAX}$	$I_D \text{ MAX}$
30 V	2.0 m Ω @ 10 V	171 A
	3.0 m Ω @ 4.5 V	

N-CHANNEL MOSFET



SO-8 FLAT LEAD
CASE 488AA
STYLE 1

MARKING DIAGRAM



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

ORDERING INFORMATION

Device	Package	Shipping†
NTMFS4897NFT1G	SO-8FL (Pb-Free)	1500 / Tape & Reel
NTMFS4897NFT3G	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.

THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction-to-Case (Drain)	$R_{\theta JC}$	1.3	°C/W
Junction-to-Ambient – Steady State (Note 1)	$R_{\theta JA}$	45.7	
Junction-to-Ambient – Steady State (Note 2)	$R_{\theta JA}$	132.1	
Junction-to-Ambient – $t \leq 10$ sec	$R_{\theta JA}$	17.2	

1. Surface-mounted on FR4 board using 1 sq-in pad, 1 oz Cu.
2. Surface-mounted on FR4 board using the minimum recommended pad size.

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	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 1.0\text{ mA}$	30			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$			28.5		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}, V_{DS} = 24\text{ V}$		60	500	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			±100	nA

ON CHARACTERISTICS (Note 3)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 1.0\text{ mA}$	1.5	2.0	2.5	V
Negative Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$			4		mV/°C
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$	$I_D = 22\text{ A}$	1.3	2.0	mΩ
			$I_D = 20\text{ A}$	1.3		
		$V_{GS} = 4.5\text{ V}$	$I_D = 20\text{ A}$	2.0	3.0	
			$I_D = 18\text{ A}$	2.0		
Forward Transconductance	g_{FS}	$V_{DS} = 15\text{ V}, I_D = 15\text{ A}$		90		S

CHARGES AND CAPACITANCES

Input Capacitance	C_{ISS}	$V_{GS} = 0\text{ V}, f = 1\text{ MHz}, V_{DS} = 15\text{ V}$		5660		pF
Output Capacitance	C_{OSS}			1150		
Reverse Transfer Capacitance	C_{RSS}			495		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 15\text{ V}; I_D = 23\text{ A}$		40.2		nC
Threshold Gate Charge	$Q_{G(TH)}$			6.4		
Gate-to-Source Charge	Q_{GS}			15.3		
Gate-to-Drain Charge	Q_{GD}			13.4		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 10\text{ V}, V_{DS} = 15\text{ V}, I_D = 23\text{ A}$		83.6		nC

SWITCHING CHARACTERISTICS (Note 4)

Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 15\text{ V}, I_D = 15\text{ A}, R_G = 3.0\text{ }\Omega$		26		ns
Rise Time	t_r			24		
Turn-Off Delay Time	$t_{d(OFF)}$			36		
Fall Time	t_f			13		

3. Pulse Test: pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
4. Switching characteristics are independent of operating junction temperatures.

NTMFS4897NF

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
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SWITCHING CHARACTERISTICS (Note 4)

Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = 10\text{ V}, V_{DS} = 15\text{ V},$ $I_D = 15\text{ A}, R_G = 3.0\ \Omega$		15.7		ns
Rise Time	t_r			21.2		
Turn-Off Delay Time	$t_{d(OFF)}$			44.6		
Fall Time	t_f			14.5		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V_{SD}	$V_{GS} = 0\text{ V},$ $I_S = 2.0\text{ A}$	$T_J = 25^\circ\text{C}$		0.35	0.70	V
			$T_J = 125^\circ\text{C}$		0.26		
Reverse Recovery Time	t_{RR}	$V_{GS} = 0\text{ V}, dI_S/dt = 100\text{ A}/\mu\text{s},$ $I_S = 23\text{ A}$			39.1		ns
Charge Time	t_a				20.1		
Discharge Time	t_b				19		
Reverse Recovery Charge	Q_{RR}				34		nC

PACKAGE PARASITIC VALUES

Source Inductance	L_S	$T_A = 25^\circ\text{C}$		0.66		nH
Drain Inductance	L_D			0.20		
Gate Inductance	L_G			1.5		
Gate Resistance	R_G			0.7	2.0	Ω

- Pulse Test: pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.
- Switching characteristics are independent of operating junction temperatures.

TYPICAL PERFORMANCE CURVES

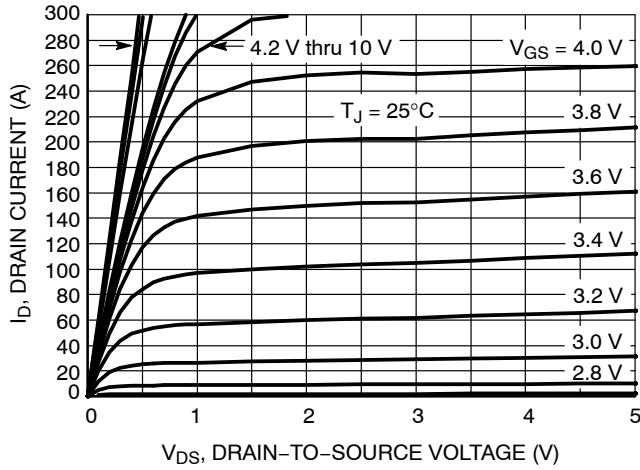


Figure 1. On-Region Characteristics

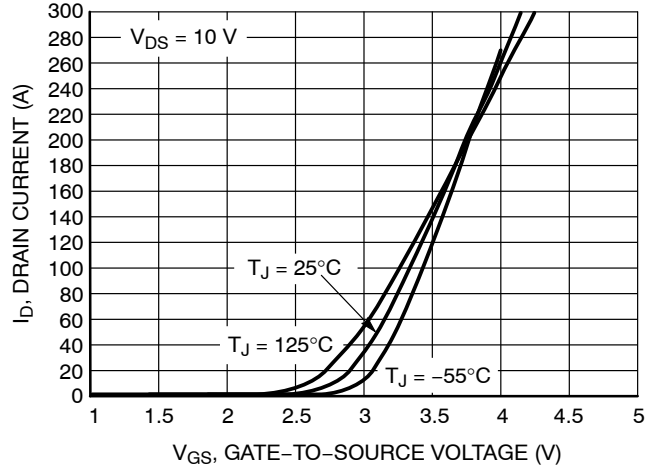


Figure 2. Transfer Characteristics

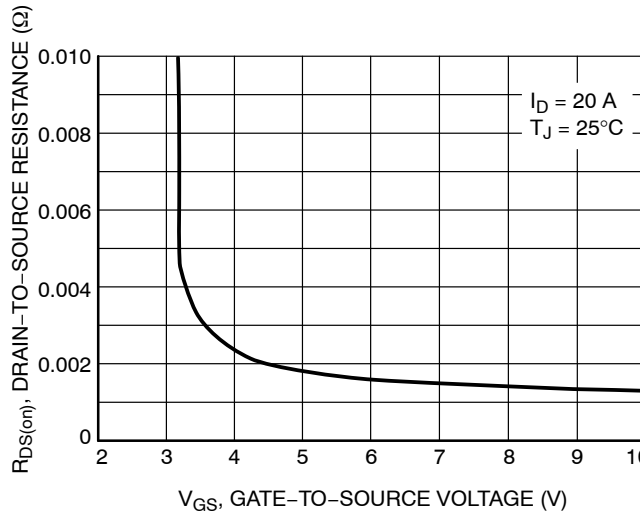


Figure 3. On-Resistance vs. Gate-to-Source Voltage

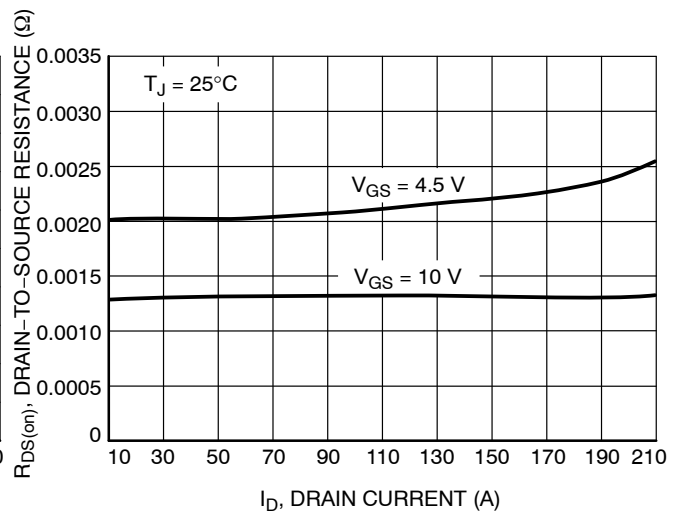


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

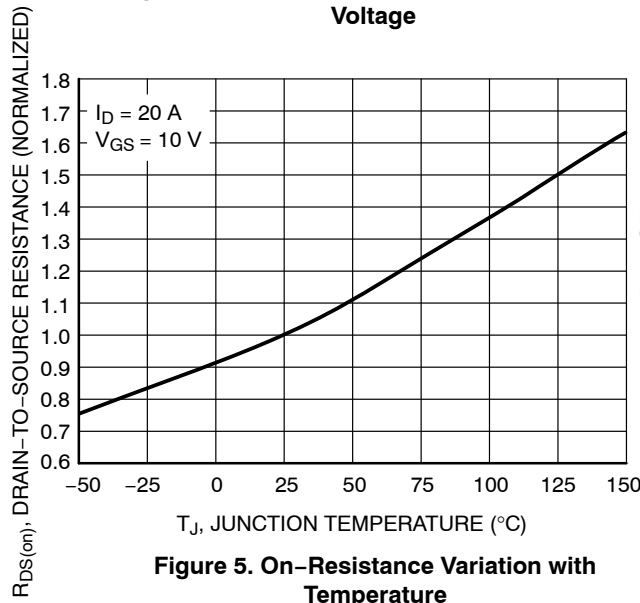


Figure 5. On-Resistance Variation with Temperature

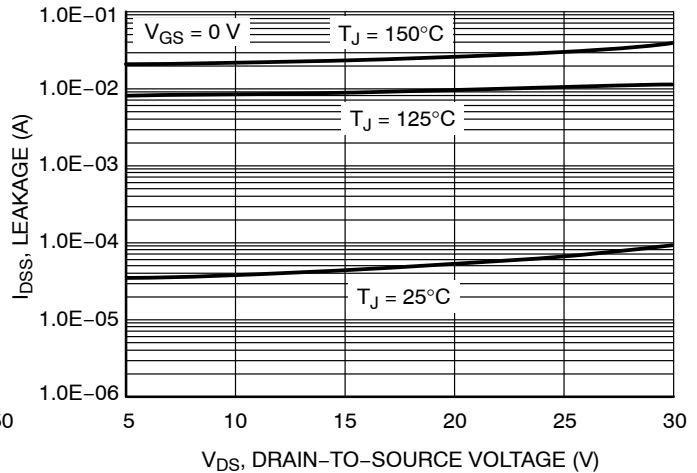


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL PERFORMANCE CURVES

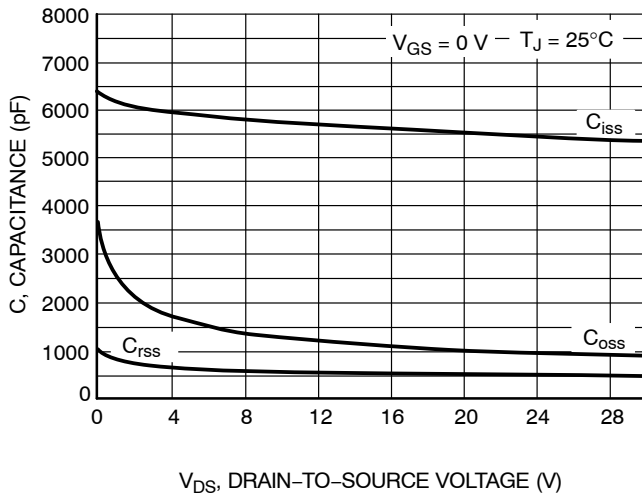


Figure 7. Capacitance Variation

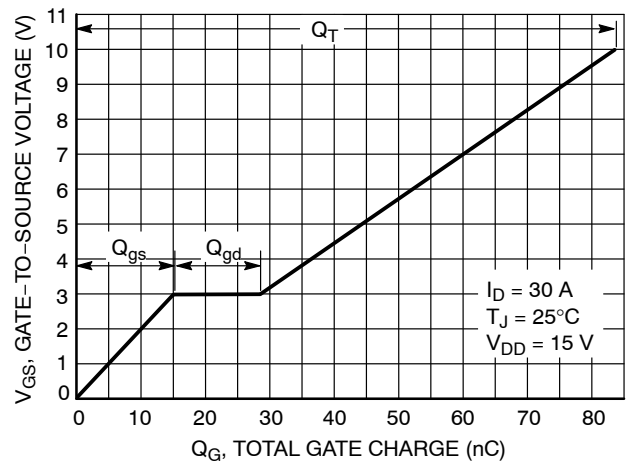


Figure 8. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

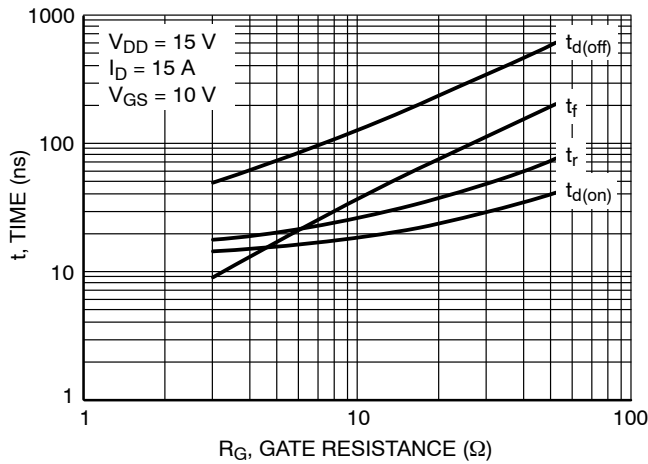


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

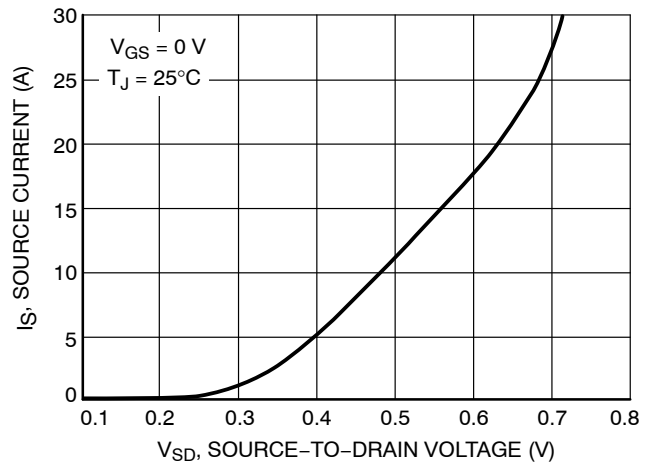


Figure 10. Diode Forward Voltage vs. Current

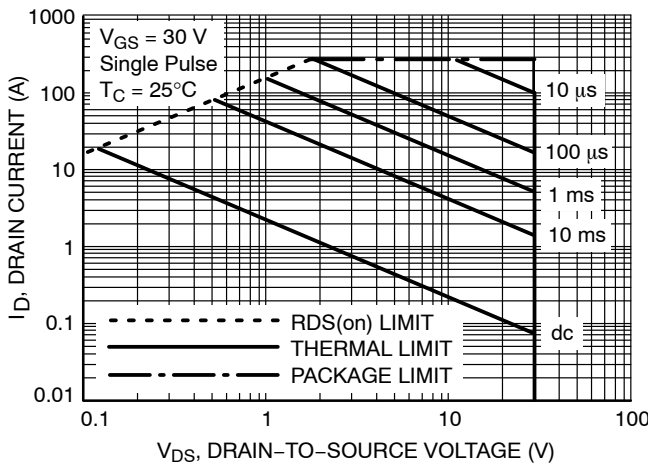


Figure 11. Maximum Rated Forward Biased Safe Operating Area

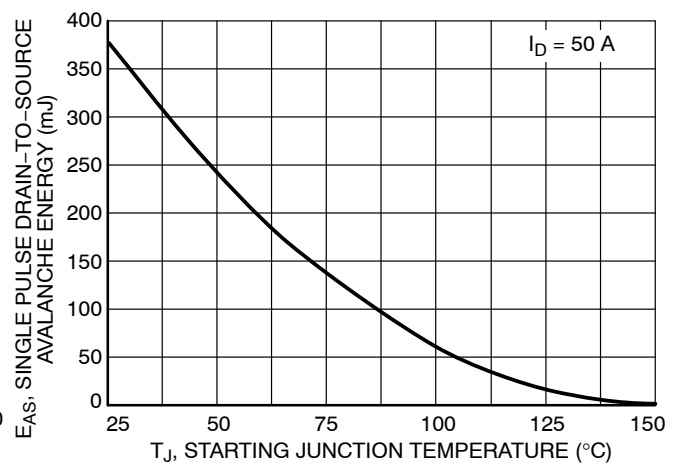


Figure 12. Maximum Avalanche Energy vs. Starting Junction Temperature

AMEYA360

Components Supply Platform

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Website :

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Contact Us :

➤ Address :

401 Building No.5, JiuGe Business Center, Lane 2301, Yishan Rd
Minhang District, Shanghai , China

➤ Sales :

Direct +86 (21) 6401-6692
Email amall@ameya360.com
QQ 800077892
Skype ameyasales1 ameyasales2

➤ Customer Service :

Email service@ameya360.com

➤ Partnership :

Tel +86 (21) 64016692-8333
Email mkt@ameya360.com