Power MOSFET

30 V, 17 A, Single N-Channel, SO-8 Flat Lead

Features

- Fast Switching Times
- Low Gate Charge
- Low R_{DS(on)}
- Low Inductance SO-8 Package

Applications

- Notebooks, Graphics Cards
- DC-DC Converters
- Synchronous Rectification

MAXIMUM RATINGS (T_J = 25°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	Steady T _A = 25°C		I _D	10.2	Α	
Current (Note 1)	State	State $T_A = 85^{\circ}C$		7.4		
	t ≤ 10 s	$T_A = 25^{\circ}C$		17		
Power Dissipation (Note 1)	Steady State	T _A = 25°C	P _D	2.3	W	
	t ≤ 10 s			6.25		
Continuous Drain	Steady State $T_A = 25^{\circ}C$ $T_A = 85^{\circ}C$		I _D	6.9	Α	
Current (Note 2)				4.9		
Power Dissipation (Note 2)		T _A = 25°C	P_{D}	1.0	W	
Pulsed Drain Current	t _p ≤	10 μs	I _{DM}	51	Α	
Operating Junction and Storage Temperature			T _J , T _{STG}	–55 to 150	ç	
Source Current (Body Diode)			I _S	6.25	Α	
Single Pulse Drain–to–Source Avalanche Energy (V _{DD} = 25 V, V _{GS} = 10 V, I _{PK} = 7.0 A, L = 10 mH, R _G = 25 Ω)			E _{AS}	245	mJ	
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			T_L	260	°C	

THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction-to-Ambient - Steady State (Note 1)	$R_{\theta JA}$	55	°C/W
Junction-to-Ambient - t ≤ 10 s (Note 1)	$R_{\theta JA}$	20	
Junction-to-Ambient - Steady State (Note 2)	$R_{\theta JA}$	122.5	

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

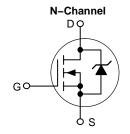
- 1. Surface-mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces).
- Surface-mounted on FR4 board using the minimum recommended pad size (Cu area = 0.412 in sq).

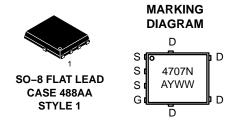


ON Semiconductor®

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V _{(BR)DSS}	R _{DS(on)} TYP	I _D MAX	
30 V	10 mΩ @ 10 V	17 A	
	13.5 mΩ @ 4.5 V	17.7	





4707N = Specific Device Code A = Assembly Location

Y = Year WW = Work Week

ORDERING INFORMATION

Device	Package	Shipping [†]
NTMFS4707NT1G	SO-8 FL (Pb-Free)	1500 Tape & Reel
NTMFS4707NT3G	SO-8 FL (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.

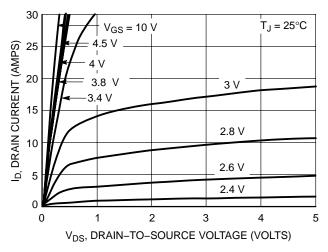
ELECTRICAL CHARACTERISTICS (T_{.1} = 25°C unless otherwise specified)

Parameter	Symbol	Test Condition		Min	Тур	Max ^{∨.D}	at ash eet4l
OFF CHARACTERISTICS			•		•	•	
Drain-to-Source Breakdown Voltage	V _{(BR)DSS}	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$		30			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} /T _J				6.5		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	T _J = 2				1.0	μΑ
		$V_{GS} = 0 \text{ V}, V_{DS} = 24 \text{ V}$	T _J = 125°C			50	
Gate-to-Source Leakage Current	I _{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} =$	±20V			±100	nA
ON CHARACTERISTICS (Note 3)					•		
Gate Threshold Voltage	V _{GS(TH)}	$V_{GS} = V_{DS}, I_{D} = 250 \mu A$		1.0		2.5	V
Negative Threshold Temperature Coefficient	V _{GS(TH)} /T _J				5.0		mV/°C
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = 10 V, I _D =	10 A		10	13	mΩ
		$V_{GS} = 4.5 \text{ V}, I_D = 8.0 \text{ A}$			13.5	17	
Forward Transconductance	9FS	$V_{DS} = 15 \text{ V}, I_{D} = 10 \text{ A}$			20		S
CHARGES, CAPACITANCES AND GA	TE RESISTAN	NCE					
Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1.0 MHz, V _{DS} = 24 V			735		pF
Output Capacitance	C _{OSS}				295		
Reverse Transfer Capacitance	C _{RSS}				80		
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 4.5 V, V _{DS} = 15 V; I _D = 10 A			7.5	15	nC
Threshold Gate Charge	Q _{G(TH)}				1.1		
Gate-to-Source Charge	Q _{GS}				2.0		
Gate-to-Drain Charge	Q_{GD}				3.6		
Gate Resistance	R_{G}				2.4		Ω
SWITCHING CHARACTERISTICS (No	ote 4)		•		•	•	
Turn-On Delay Time	t _{d(on)}				6.0		ns
Rise Time	t _r	Vge = 10 V, Vpp = 15 \	/. ln = 1.0 A.		5.0		1
Turn-Off Delay Time	t _{d(off)}	$V_{GS} = 10 \text{ V}, V_{DD} = 15 \text{ V}$ $R_{G} = 3.0 \Omega$, 5,		19		1
Fall Time	t _f	1			11		1
DRAIN-SOURCE DIODE CHARACTE	RISTICS		•		•	•	
Forward Diode Voltage	V _{SD}	$T_{J} = 25^{\circ}$	T _J = 25°C		0.79	1.0	V
		$V_{GS} = 0 \text{ V}, I_{S} = 6.25 \text{ A}$	T _J = 125°C		0.59		1
Reverse Recovery Time	t _{RR}	$V_{GS} = 0 \text{ V, } d_{IS}/d_t = 100 \text{ A/}\mu\text{s,}$ $I_S = 6.25 \text{ A}$			26		ns
Charge Time	t _a				14]
Discharge Time	t _b				12		1
Reverse Recovery Charge	Q _{RR}				19		nC

Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.
 Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERIZATIONS

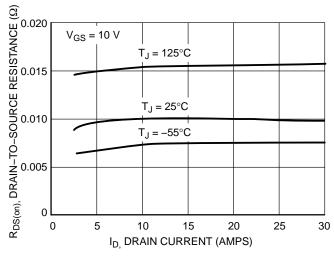
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36 V_{DS} ≥ 10 V 30 V_{DS} ≥ 10 V T_J = 125°C T_J = 25°C 0 0 12 3 T_J = -55°C 0 0 1 2 3 4 5 V_{GS}, GATE-TO-SOURCE VOLTAGE (VOLTS)

Figure 1. On-Region Characteristics

Figure 2. Transfer Characteristics



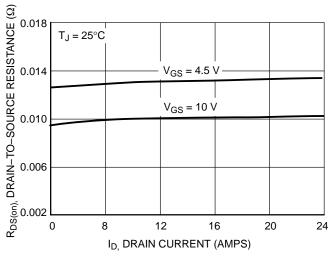
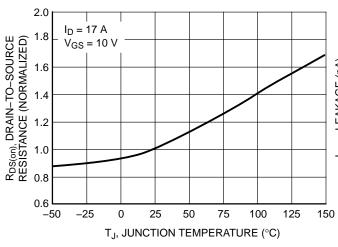


Figure 3. On–Resistance vs. Drain Current and Temperature

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



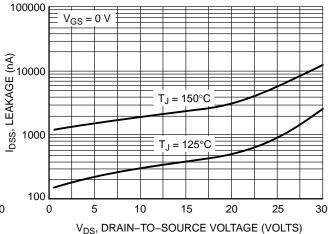
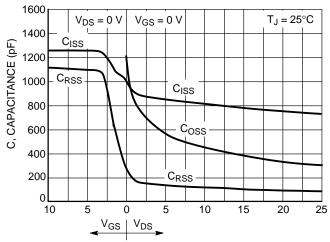


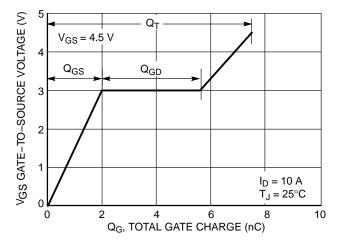
Figure 5. On–Resistance Variation with Temperature

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

TYPICAL CHARACTERIZATIONS

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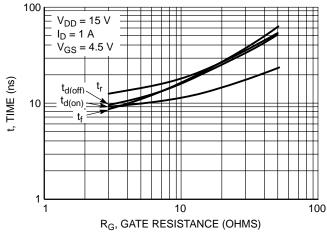




GATE-TO-SOURCE OR DRAIN-TO-SOURCE VOLTAGE (VOLTS)

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





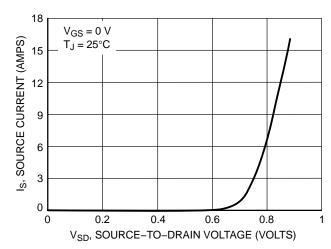
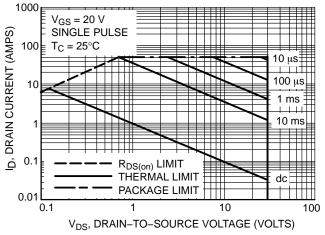


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

Figure 10. Diode Forward Voltage vs. Current



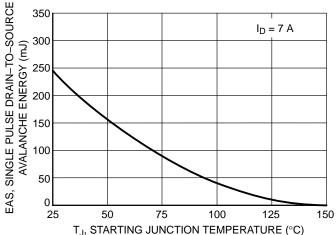


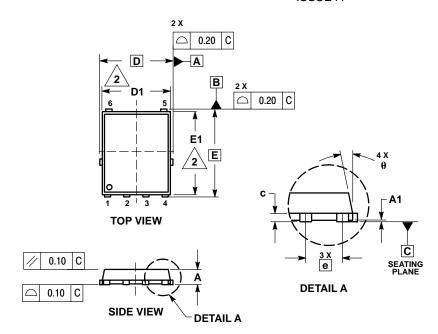
Figure 11. Maximum Rated Forward Biased Safe Operating Area

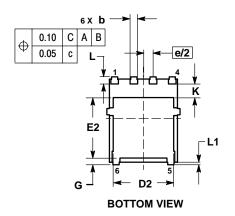
Figure 12. Maximum Avalanche Energy vs. Starting Junction Temperature

PACKAGE DIMENSIONS

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SO-8 FLAT LEAD CASE 488AA-01 **ISSUE A**





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

	MILLIMETERS					
DIM	MIN	NOM	MAX			
Α	0.90	0.99	1.20			
A1	0.00	-	0.05			
b	0.33	0.41	0.51			
С	0.23	0.28	0.33			
D	5.15 BSC					
D1	4.50	4.90	5.10			
D2	3.50		4.22			
E	6.15 BSC					
E1	5.50	5.80	6.10			
E2	3.45	-	4.30			
е	1.27 BSC					
G	0.51	0.61	0.71			
K	0.51					
L	0.51	0.61	0.71			
L1	0.05	0.17	0.20			
θ	0 °		12 °			

- STYLE 1: PIN 1. SOURCE 2. SOURCE 3. SOURCE 4. GATE 5. DRAIN 6. DRAIN

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