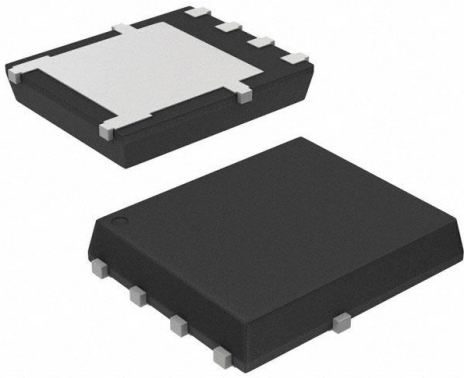


# NTMFS4839NHT1G Datasheet

[www.digi-electronics.com](http://www.digi-electronics.com)



<https://www.DiGi-Electronics.com>

DiGi Electronics Part Number	NTMFS4839NHT1G-DG
Manufacturer	<a href="#">onsemi</a>
Manufacturer Product Number	NTMFS4839NHT1G
Description	MOSFET N-CH 30V 9.5A/64A 5DFN
Detailed Description	N-Channel 30 V 9.5A (Ta), 64A (Tc) 870mW (Ta), 42 .4W (Tc) Surface Mount 5-DFN (5x6) (8-SOFL)



Tel: +00 852-30501935

RFQ Email: [Info@DiGi-Electronics.com](mailto:Info@DiGi-Electronics.com)

DiGi is a global authorized distributor of electronic components.

## Purchase and inquiry

Manufacturer Product Number:

NTMFS4839NHT1G

Series:

-

FET Type:

N-Channel

Drain to Source Voltage (Vdss):

30 V

Drive Voltage (Max Rds On, Min Rds On):

4.5V, 11.5V

Vgs(th) (Max) @ Id:

2.5V @ 250 $\mu$ A

Vgs (Max):

$\pm$ 20V

FET Feature:

-

Operating Temperature:

-55°C ~ 150°C (Tj)

Supplier Device Package:

5-DFN (5x6) (8-SOFL)

Base Product Number:

NTMFS4

Manufacturer:

onsemi

Product Status:

Obsolete

Technology:

MOSFET (Metal Oxide)

Current - Continuous Drain (Id) @ 25°C:

9.5A (Ta), 64A (Tc)

Rds On (Max) @ Id, Vgs:

5.5mOhm @ 30A, 10V

Gate Charge (Qg) (Max) @ Vgs:

43.5 nC @ 11.5 V

Input Capacitance (Ciss) (Max) @ Vds:

2354 pF @ 12 V

Power Dissipation (Max):

870mW (Ta), 42.4W (Tc)

Mounting Type:

Surface Mount

Package / Case:

8-PowerTDFN, 5 Leads

## Environmental & Export classification

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

REACH Status:

REACH Unaffected

HTSUS:

8541.29.0095

# NTMFS4839NH

## Power MOSFET

### 30 V, 64 A, Single N-Channel, SO-8FL

#### Features

- Low  $R_{DS(ON)}$  to Minimize Conduction Losses
- Low Capacitance to Minimize Driver Losses
- Optimized Gate Charge to Minimize Switching Losses
- Low  $R_G$
- These are Pb-Free Devices\*

#### Applications

- Refer to Application Note AND8195/D
- CPU Power Delivery
- DC-DC Converters

#### 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	$V_{GS}$	$\pm 20$	V
Continuous Drain Current $R_{\theta JA}$ (Note 1)	$I_D$	$T_A = 25^\circ\text{C}$	15
		$T_A = 85^\circ\text{C}$	11
Power Dissipation $R_{\theta JA}$ (Note 1)	$P_D$	$T_A = 25^\circ\text{C}$	2.17
		$T_A = 85^\circ\text{C}$	1.13
Continuous Drain Current $R_{\theta JA}$ - $t \leq 10$ sec	$I_D$	$T_A = 25^\circ\text{C}$	24
		$T_A = 85^\circ\text{C}$	17
Power Dissipation $R_{\theta JA}$ $t \leq 10$ sec	$P_D$	$T_A = 25^\circ\text{C}$	5.7
		$T_A = 85^\circ\text{C}$	2.9
Continuous Drain Current $R_{\theta JA}$ (Note 2)	$I_D$	$T_A = 25^\circ\text{C}$	9.5
		$T_A = 85^\circ\text{C}$	7.0
Power Dissipation $R_{\theta JA}$ (Note 2)	$P_D$	$T_A = 25^\circ\text{C}$	0.87
		$T_A = 85^\circ\text{C}$	0.45
Continuous Drain Current $R_{\theta JC}$ (Note 1)	$I_D$	$T_C = 25^\circ\text{C}$	64
		$T_C = 85^\circ\text{C}$	46
Power Dissipation $R_{\theta JC}$ (Note 1)	$P_D$	$T_C = 25^\circ\text{C}$	42.4
		$T_C = 25^\circ\text{C}$	22
Pulsed Drain Current	$T_A = 25^\circ\text{C}$ , $t_p = 10 \mu\text{s}$	$I_{DM}$	192
Operating Junction and Storage Temperature	$T_J$ , $T_{STG}$	-55 to	$^\circ\text{C}$
		+150	
Source Current (Body Diode)	$I_S$	35	A
Drain to Source $dV/dt$	$dV/dt$	6	V/ns
Single Pulse Drain-to-Source Avalanche Energy ( $T_J = 25^\circ\text{C}$ , $V_{DD} = 24$ V, $V_{GS} = 10$ V, $I_L = 27$ A, $L = 0.3$ mH, $R_G = 25 \Omega$ )	EAS	109	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.

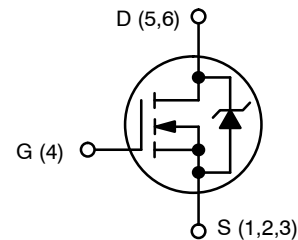
1. Surface-mounted on FR4 board using 1 sq-in pad, 1 oz Cu.
  2. Surface-mounted on FR4 board using the minimum recommended pad size.
- \*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



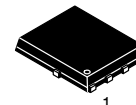
ON Semiconductor®

<http://onsemi.com>

$V_{(BR)DSS}$	$R_{DS(ON)}$ MAX	$I_D$ MAX
30 V	5.5 m $\Omega$ @ 10 V	64 A
	10.3 m $\Omega$ @ 4.5 V	

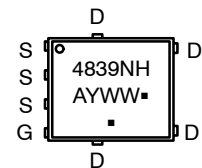


N-CHANNEL MOSFET



SO-8 FLAT LEAD  
CASE 488AA  
STYLE 1

#### MARKING DIAGRAM



- A = Assembly Location  
 Y = Year  
 WW = Work Week  
 ■ = Pb-Free Package  
 (Note: Microdot may be in either location)

#### ORDERING INFORMATION

Device	Package	Shipping†
NTMFS4839NHT1G	SO-8FL (Pb-Free)	1500 / Tape & Reel
NTMFS4839NHT3G	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.

**NTMFS4839NH****THERMAL RESISTANCE MAXIMUM RATINGS**

Parameter	Symbol	Value	Unit
Junction-to-Case (Drain)	$R_{\theta JC}$	2.95	°C/W
Junction-to-Ambient – Steady State (Note 3)	$R_{\theta JA}$	57.6	
Junction-to-Ambient – Steady State (Note 4)	$R_{\theta JA}$	143.3	
Junction-to-Ambient ( $t \leq 10$ sec)	$R_{\theta JA}$	22	

3. Surface-mounted on FR4 board using 1 sq-in pad, 1 oz Cu.

4. 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
-----------	--------	----------------	-----	-----	-----	------

**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	$V_{(BR)DSS}/T_J$			27.5		mV/°C
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS} = 0\text{ V}, V_{DS} = 24\text{ V}$	$T_J = 25^\circ\text{C}$		1	$\mu\text{A}$
			$T_J = 125^\circ\text{C}$		10	
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA

**ON CHARACTERISTICS** (Note 5)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\ \mu\text{A}$	1.5	2.1	2.5	V	
Negative Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$			5.5		mV/°C	
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V to } 11.5\text{ V}$	$I_D = 30\text{ A}$		4.3	5.5	m $\Omega$
			$I_D = 15\text{ A}$		4.3		
		$V_{GS} = 4.5\text{ V}$	$I_D = 30\text{ A}$		8.2	10.3	
			$I_D = 15\text{ A}$		7.8		
Forward Transconductance	$g_{FS}$	$V_{DS} = 1.5\text{ V}, I_D = 50\text{ A}$		60		S	

**CHARGES, CAPACITANCES & GATE RESISTANCE**

Input Capacitance	$C_{ISS}$	$V_{GS} = 0\text{ V}, f = 1\text{ MHz}, V_{DS} = 12\text{ V}$		1744	2354	pF
Output Capacitance	$C_{OSS}$			355	479	
Reverse Transfer Capacitance	$C_{RSS}$			191	296	
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 15\text{ V}; I_D = 30\text{ A}$		12.9	19.5	nC
Threshold Gate Charge	$Q_{G(TH)}$			2.2	3.3	
Gate-to-Source Charge	$Q_{GS}$			5.2	7.8	
Gate-to-Drain Charge	$Q_{GD}$			5.4	8.0	
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 11.5\text{ V}, V_{DS} = 15\text{ V}; I_D = 30\text{ A}$		31	43.5	nC

**SWITCHING CHARACTERISTICS** (Note 6)

Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 15\text{ V}, I_D = 15\text{ A}, R_G = 3.0\ \Omega$		13.4	20	ns
Rise Time	$t_r$			22.5	33.7	
Turn-Off Delay Time	$t_{d(OFF)}$			16	24	
Fall Time	$t_f$			5.3	7.9	

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

6. Switching characteristics are independent of operating junction temperatures.

**NTMFS4839NH****ELECTRICAL CHARACTERISTICS** ( $T_J = 25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>SWITCHING CHARACTERISTICS</b> (Note 6)						
Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = 11.5\text{ V}, V_{DS} = 15\text{ V},$ $I_D = 15\text{ A}, R_G = 3.0\ \Omega$		8.1	12.2	ns
Rise Time	$t_r$			19.6	29.4	
Turn-Off Delay Time	$t_{d(OFF)}$			23.2	34.9	
Fall Time	$t_f$			3.4	5.1	

**DRAIN-SOURCE DIODE CHARACTERISTICS**

Forward Diode Voltage	$V_{SD}$	$V_{GS} = 0\text{ V},$ $I_S = 30\text{ A}$	$T_J = 25^\circ\text{C}$		0.83	1.2	V
			$T_J = 125^\circ\text{C}$		0.73		
Reverse Recovery Time	$t_{RR}$	$V_{GS} = 0\text{ V}, dI_S/dt = 100\text{ A}/\mu\text{s},$ $I_S = 30\text{ A}$			19.3		ns
Charge Time	$t_a$				10.1		
Discharge Time	$t_b$				9.2		
Reverse Recovery Charge	$Q_{RR}$				6.3		nC

**PACKAGE PARASITIC VALUES**

Source Inductance	$L_S$	$T_A = 25^\circ\text{C}$		0.93		nH
Drain Inductance	$L_D$			0.005		nH
Gate Inductance	$L_G$			1.84		nH
Gate Resistance	$R_G$			0.9		$\Omega$

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

6. Switching characteristics are independent of operating junction temperatures.

### NTMFS4839NH

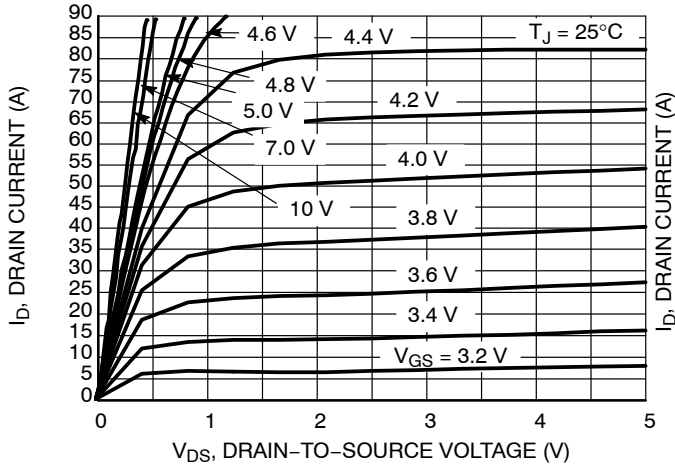


Figure 1. On-Region Characteristics

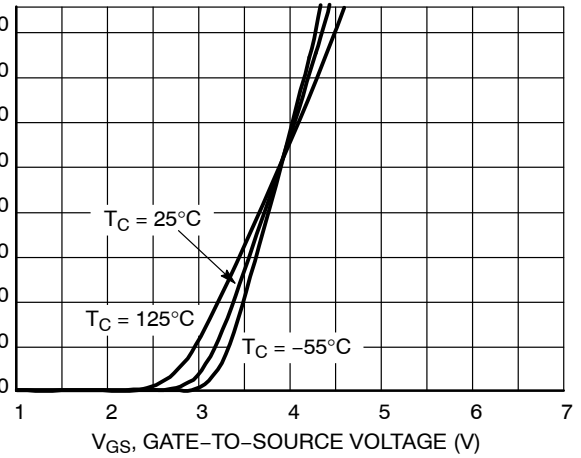


Figure 2. Transfer Characteristics

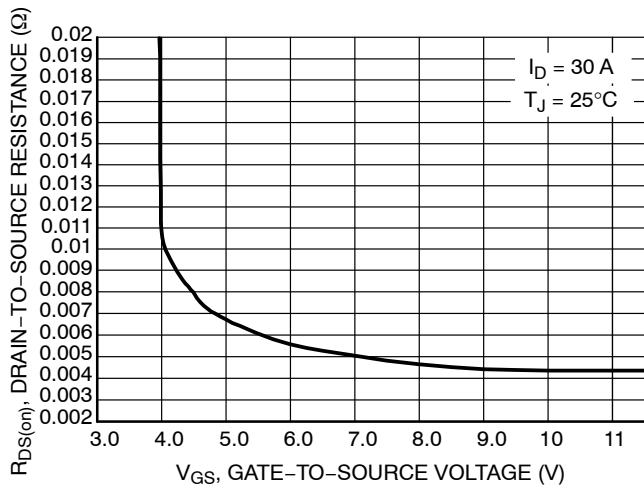


Figure 3. On-Resistance versus Gate-to-Source Voltage

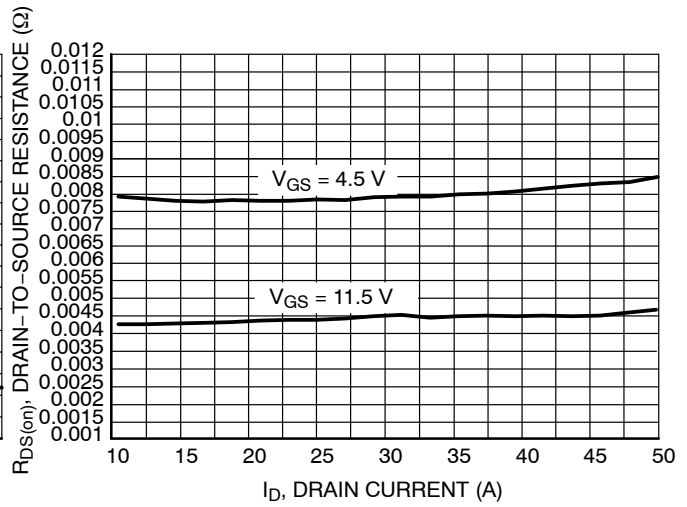


Figure 4. On-Resistance versus Drain Current and Gate Voltage

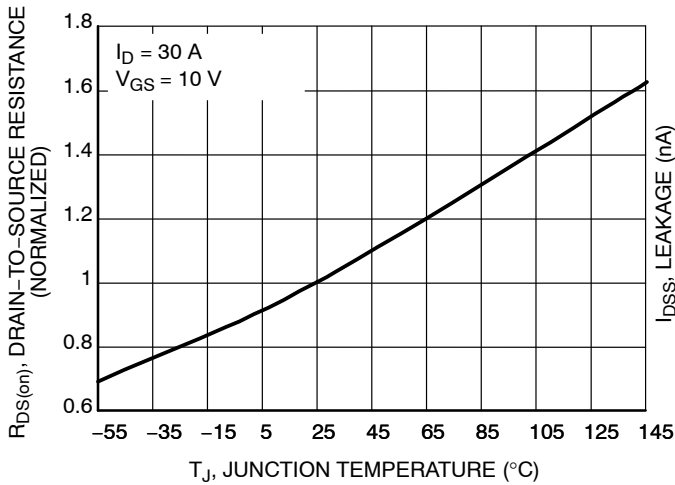


Figure 5. On-Resistance Variation with Temperature

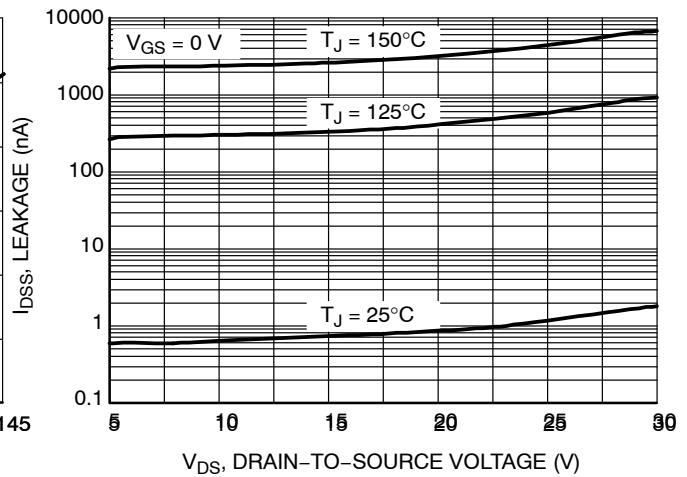
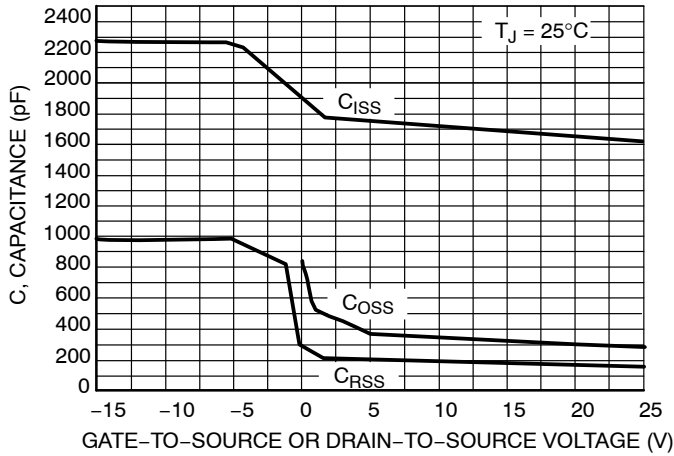
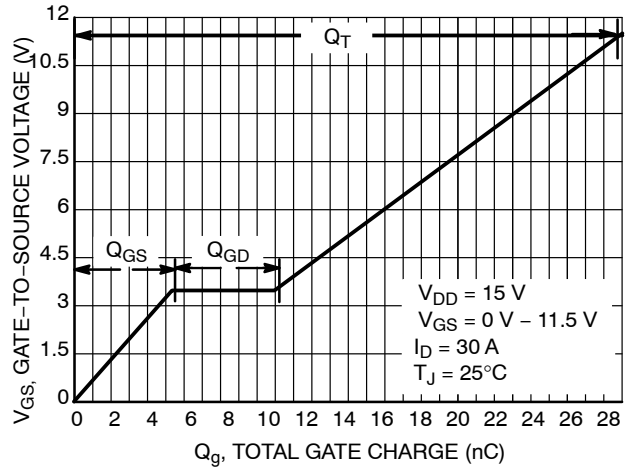


Figure 6. Drain-to-Source Leakage Current versus Voltage

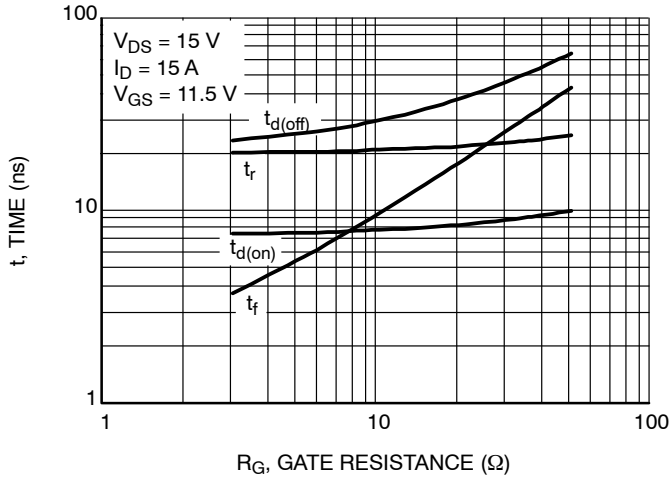
### NTMFS4839NH



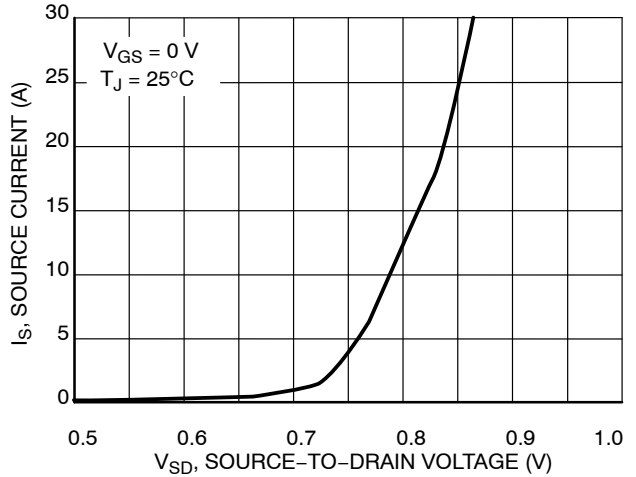
**Figure 7. Capacitance Variation**



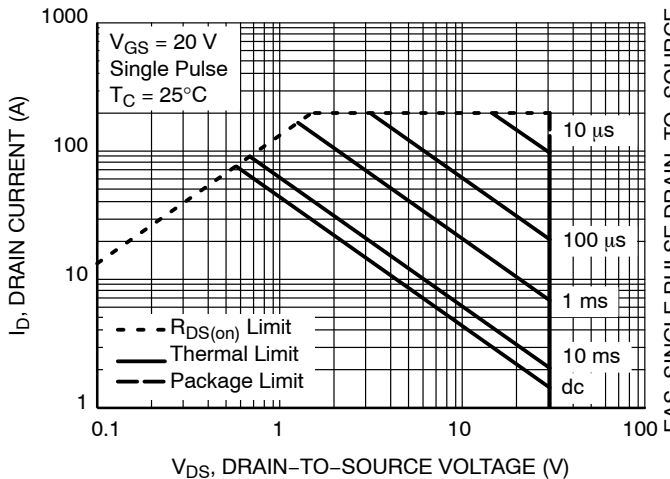
**Figure 8. Gate-to-Source and Drain-to-Source Voltage vs. Total Gate Charge**



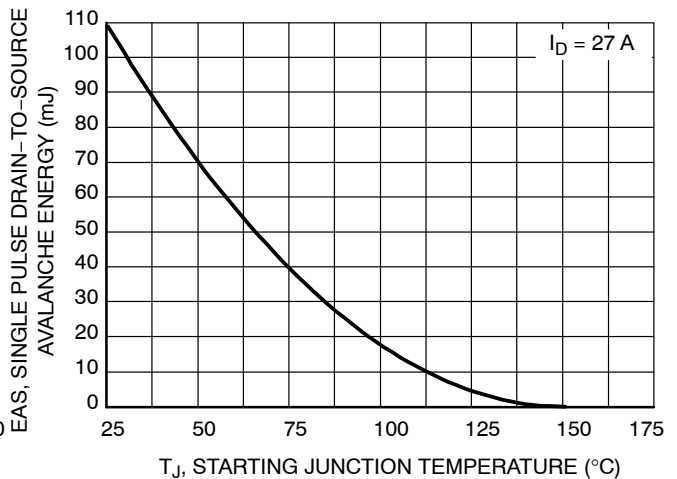
**Figure 9. Resistive Switching Time Variation versus Gate Resistance**



**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**

### NTMFS4839NH

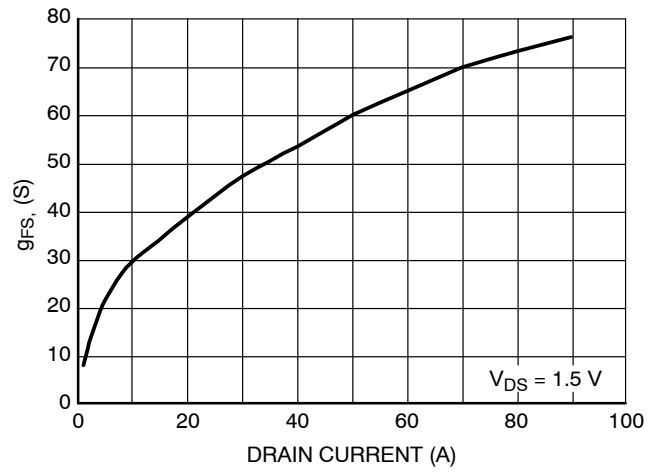


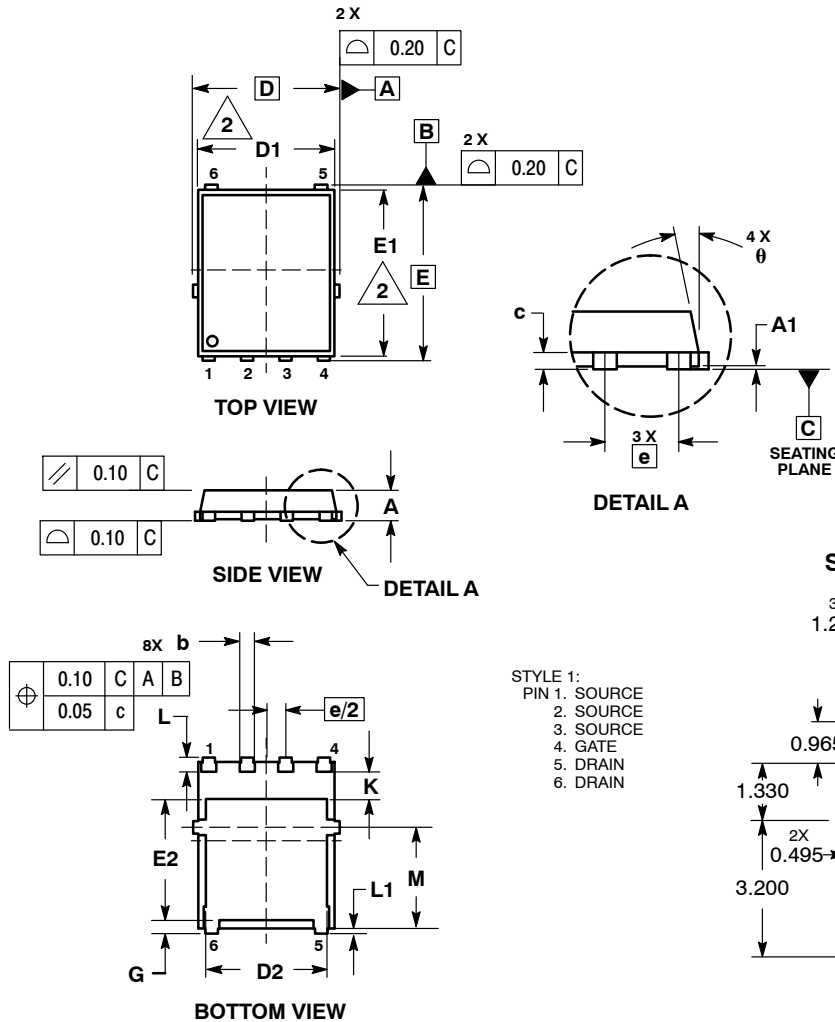
Figure 13.  $G_{FS}$  versus Drain Current



# NTMFS4839NH

## PACKAGE DIMENSIONS

DFN6 5x6, 1.27P (S08 FL)  
CASE 488AA-01  
ISSUE C

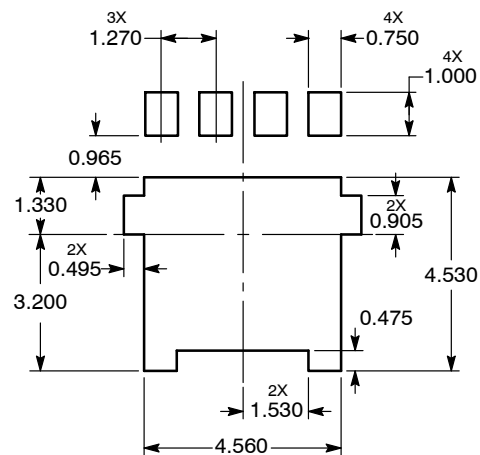


NOTES:

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.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.90	1.00	1.10
A1	0.00	---	0.05
b	0.33	0.41	0.51
c	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
e	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
M	3.00	3.40	3.80
theta	0°	---	12°

### SOLDERING FOOTPRINT\*



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

\*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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