MOSFET – Power, Single, N-Channel, SO-8 FL 30 V, 78 A

Features

- Low R_{DS(on)} to Minimize Conduction Losses
- Low Capacitance to Minimize Driver Losses
- Optimized Gate Charge to Minimize Switching Losses
- These Devices are Pb–Free, Halogen Free/BFR Free and are RoHS Compliant

Applications

- CPU Power Delivery
- DC–DC Converters

Para	Symbol	Value	Unit		
Drain-to-Source Voltage			V _{DSS}	30	V
Gate-to-Source Voltage			V _{GS}	±20	V
Continuous Drain Current R _{θJA} (Note 1)		$T_A = 25^{\circ}C$ $T_A = 80^{\circ}C$	ID	21.7 16.3	A
Power Dissipation $R_{\theta JA}$ (Note 1)		$T_A = 25^{\circ}C$	P _D	2.57	w
Continuous Drain Current $R_{\theta JA} \le 10 \text{ s}$ (Note 1)		$T_A = 25^{\circ}C$ $T_A = 80^{\circ}C$	Ι _D	34.8 26.0	A
Power Dissipation $R_{\theta JA} \leq 10 \text{ s} \text{ (Note 1)}$	Steady	T _A = 25°C	P _D	6.6	W
Continuous Drain	State	$T_A = 25^{\circ}C$	I _D	11.9	А
Current R _{θJA} (Note 2)		$T_A = 80^{\circ}C$		8.9	
Power Dissipation $R_{\theta JA}$ (Note 2)		$T_A = 25^{\circ}C$	PD	0.77	W
Continuous Drain		$T_{C} = 25^{\circ}C$	I _D	78	Α
Current R _{θJC} (Note 1)		T _C =80°C		58	
Power Dissipation $R_{\theta JC}$ (Note 1)		T _C = 25°C	PD	33	W
Pulsed Drain Current	T _A = 25°	°C, t _p = 10 μs	I _{DM}	174	A
Current Limited by Pa	ackage	T _A = 25°C	I _{Dmax}	80	Α
Operating Junction an Temperature	nd Storage	•	T _J , T _{STG}	–55 to +150	°C
Source Current (Body Diode)			ا _S	30	Α
Drain to Source dV/dt			dV/d _t	7.0	V/ns
Single Pulse Drain-to-Source Avalanche Energy (T _J = 25°C, V _{GS} = 20 V, I _L = 41 A _{pk} , L = 0.1 mH, R _{GS} = 25 Ω) (Note 3)			E _{AS}	84	mJ
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			ΤL	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.

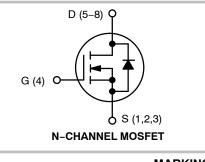
1. Surface-mounted on FR4 board using 1 sq-in pad, 1 oz Cu.

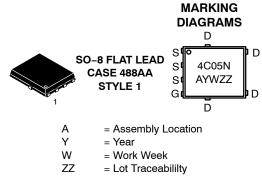


ON Semiconductor®

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V _{(BR)DSS}	R _{DS(ON)} MAX	I _D MAX
30 V	3.4 mΩ @ 10 V	78 A
30 V	5.0 mΩ @ 4.5 V	764





ORDERING INFORMATION

Device	Package	Shipping [†]
NTMFS4C05NT1G	SO-8 FL (Pb-Free)	1500 / Tape & Reel
NTMFS4C05NT3G	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.

- 2. Surface-mounted on FR4 board using the minimum recommended pad size. 3. This is the absolute maximum ratings. Parts are 100% tested at $T_J = 25^{\circ}C$, $V_{GS} = 20$ V, $I_L = 29$ A, $E_{AS} = 42$ mJ.

THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction-to-Case (Drain)	$R_{\theta JC}$	3.8	
Junction-to-Ambient - Steady State (Note 4)	$R_{\theta JA}$	48.6	°C/W
Junction-to-Ambient - Steady State (Note 5)	$R_{\theta JA}$	161.7	°C/W
Junction-to-Ambient – (t \leq 10 s) (Note 4)	$R_{\theta JA}$	19	

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

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 μ A		30			V
Drain-to-Source Breakdown Voltage (transient)	V _{(BR)DSSt}	V_{GS} = 0 V, $I_{D(aval)}$ = 12.6 A, T_{case} = 25°C, $t_{transient}$ = 100 ns		34			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} / T _J				12		mV/∘C
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V,	$T_J = 25^{\circ}C$			1.0	
		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 6)		• •			-	-	-
Gate Threshold Voltage	V _{GS(TH)}	$V_{GS} = V_{DS}, I_D =$	= 250 μA	1.3		2.2	V
Negative Threshold Temperature Coefficient	V _{GS(TH)} /T _J				5.1		mV/°C
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = 10 V	In the second se	3.4			
		V _{GS} = 4.5 V	I _D = 30 A		4.0	5.0	mΩ
Forward Transconductance	9FS	V _{DS} = 1.5 V, I _D = 15 A			68		S
Gate Resistance	R _G	$T_A = 25^{\circ}C$		0.3	1.0	2.0	Ω
CHARGES AND CAPACITANCES		• •			-	-	-
Input Capacitance	C _{ISS}				1972		
Output Capacitance	C _{OSS}	V _{GS} = 0 V, f = 1 MHz	z, V _{DS} = 15 V		1215		pF
Reverse Transfer Capacitance	C _{RSS}				59		
Capacitance Ratio	C _{RSS} /C _{ISS}	V _{GS} = 0 V, V _{DS} = 15	V, f = 1 MHz		0.030		
Total Gate Charge	Q _{G(TOT)}				14		
Threshold Gate Charge	Q _{G(TH)}				3.3		
Gate-to-Source Charge	Q _{GS}	V _{GS} = 4.5 V, V _{DS} = 1	5 V; I _D = 30 A		6.0		nC
Gate-to-Drain Charge	Q _{GD}	1			5.0		
Gate Plateau Voltage	V _{GP}				3.1		V
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 10 V, V _{DS} = 15 V; I _D = 30 A			30		nC
SWITCHING CHARACTERISTICS (Note 7)		-					-
Turn-On Delay Time	t _{d(ON)}				11		
Rise Time	t _r	Vcc = 4.5 V. Vcc	. – 15 V		32		1

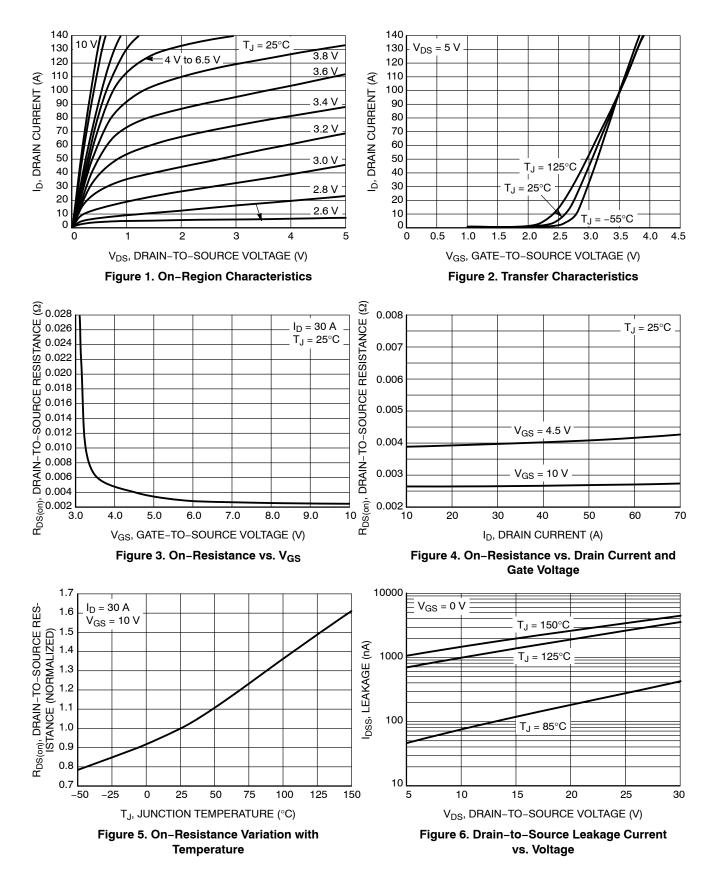
Turn-On Delay Time	t _{d(ON)}		11	
Rise Time	t _r	V _{GS} = 4.5 V, V _{DS} = 15 V,	32	
Turn-Off Delay Time	t _{d(OFF)}	I_D = 15 A, R_G = 3.0 Ω	21	ns
Fall Time	t _f		7.0	

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

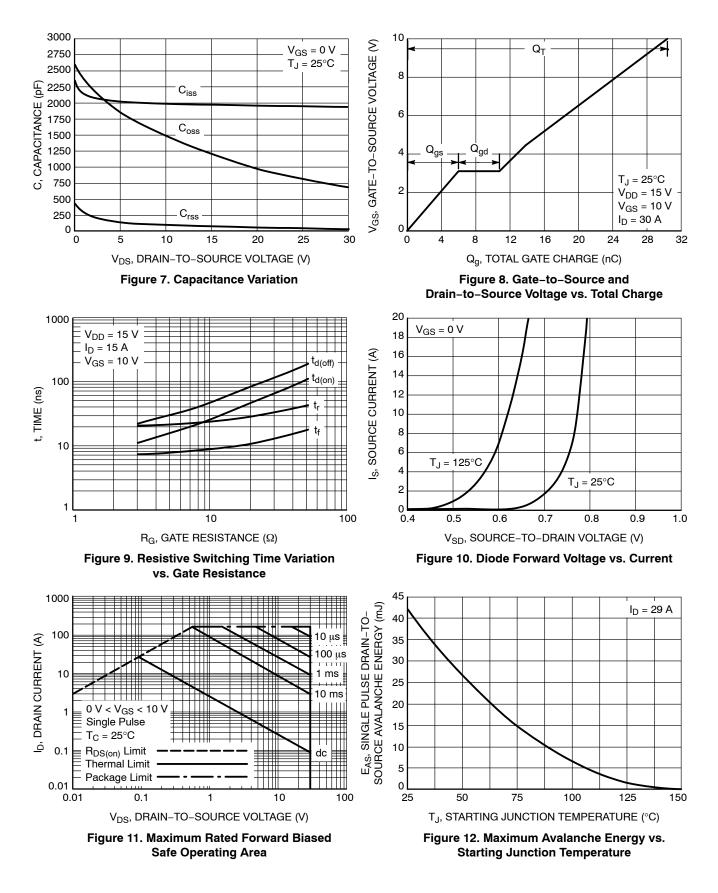
Parameter	Symbol	Test Condition		Min	Тур	Max	Unit
SWITCHING CHARACTERISTICS (Note 7)		-		-			
Turn-On Delay Time	t _{d(ON)}			8.0			
Rise Time	t _r	V_{GS} = 10 V, V_{DS} = 15 V, I_{D} = 15 A, R_{G} = 3.0 Ω			26		
Turn-Off Delay Time	t _{d(OFF)}				26		ns
Fall Time	t _f			5.0			
DRAIN-SOURCE DIODE CHARACTERIST	ICS						
Forward Diode Voltage	V _{SD}	$V_{GS} = 0 V.$ $T_{J} = 25^{\circ}C$			0.77	1.1	
		V _{GS} = 0 V, I _S = 10 A	T _J = 125°C		0.62		V
Reverse Recovery Time	t _{RR}	V _{GS} = 0 V, dI _S /dt = 100 A/µs, I _S = 30 A			40.2		
Charge Time	t _a				20.3		ns
Discharge Time	t _b				19.9		
Reverse Recovery Charge	Q _{RR}	1		30.2		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. 6. Pulse Test: pulse width $\leq 300 \ \mu$ s, duty cycle $\leq 2\%$. 7. Switching characteristics are independent of operating junction temperatures.

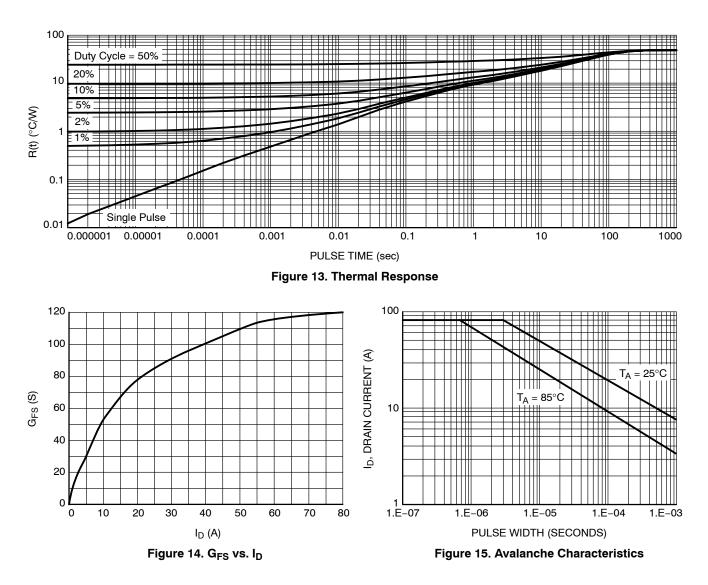
TYPICAL CHARACTERISTICS



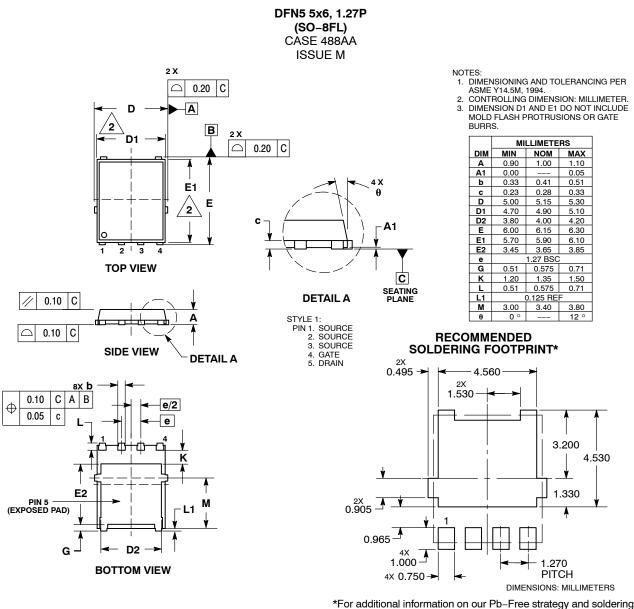
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS



PACKAGE DIMENSIONS



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