Power MOSFET 30 V, 90 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
- These are Pb–Free Devices

Applications

- Refer to Application Note AND8195/D
- CPU Power Delivery
- DC–DC Converters
- Low Side Switching

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

Parameter			Symbol	Value	Unit
Drain-to-Source Vo	ltage		V _{DSS}	30	V
Gate-to-Source Vol	tage		V _{GS}	±20	V
Continuous Drain		T _A = 25°C	Ι _D	18	A
(Note 1)		T _A = 85°C		13	
Power Dissipation $R_{\theta JA}$ (Note 1)		T _A = 25°C	PD	2.25	W
Continuous Drain		T _A = 25°C	ID	11	A
(Note 2)	Steady	T _A = 85°C	1	8	
Power Dissipation $R_{\theta JA}$ (Note 2)	Siale	$T_A = 25^{\circ}C$ P_D		0.89	W
Continuous Drain		$T_{C} = 25^{\circ}C$	Ι _D	90	A
(Note 1)		T _C = 85°C		65	
Power Dissipation $R_{\theta JC}$ (Note 1)		$T_{\rm C} = 25^{\circ}{\rm C}$	PD	55.6	W
Pulsed Drain Current	T _A t _p	T _A = 25°C, t _p = 10 μs		180	A
Operating Junction a Temperature	Operating Junction and Storage Temperature			–55 to +150	°C
Source Current (Boo	ly Diode)		۱ _S	46	А
Drain to Source DV/DT			dV/dt	6	V/ns
$ \begin{array}{l} \mbox{Single Pulse Drain-to-Source Avalanche} \\ \mbox{Energy } (T_J = 25^\circ C, V_{DD} = 50 \mbox{ V}, V_{GS} = 10 \mbox{ V}, \\ \mbox{I}_L = 22 \mbox{ A}_{pk}, \mbox{L} = 1.0 \mbox{ mH}, \mbox{ R}_G = 25 \Omega) \end{array} $			EAS	242	mJ
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			TL	260	°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.



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V _{(BR)DSS}	R _{DS(ON)} MAX	I _D MAX
	4.0 mΩ @ 10 V	
30 V	6.0 mΩ @ 4.5 V	90 A



ORDERING INFORMATION

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= Lot Traceability

Device	Package	Shipping [†]
NTMFS4836NT1G	SO-8FL (Pb-Free)	1500 / Tape & Reel
NTMFS4836NT3G	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)	$R_{\theta JC}$	2.25	
Junction-to-Ambient - Steady State (Note 3)	$R_{\theta JA}$	55.6	°C/W
Junction-to-Ambient - Steady State (Note 4)	$R_{ hetaJA}$	140.8	

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 (T₁ = 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 µA		30			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} /T _J				25		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	$V_{GS} = 0 V,$	T _J = 25 °C			1	
		V _{DS} = 24 V	T _J = 125°C			10	μΑ
Gate-to-Source Leakage Current	I _{GSS}	$V_{DS} = 0 V, V_{GS}$	_S = ±20 V			±100	nA
ON CHARACTERISTICS (Note 5)							
Gate Threshold Voltage	V _{GS(TH)}	$V_{GS} = V_{DS}, I_D = 250 \ \mu A$		1.5		2.5	V
Negative Threshold Temperature Coefficient	V _{GS(TH)} /T _J				6.0		mV/°C
Drain-to-Source On Resistance	$\begin{array}{ c c c c c } R_{DS(on)} & V_{GS} = 10 \text{ V to} \\ \hline 11.5 \text{ V} \\ \hline \\ V_{GS} = 4.5 \text{ V} \\ \hline \end{array}$	I _D = 30 A		2.8	4.0		
		I _D = 15 A		2.8		mΩ	
		I _D = 30 A		4.8	6.0		
			I _D = 15 A		4.8		
Forward Transconductance	9fs	V _{DS} = 15 V, I	_D = 15 A		24		S
CHARGES, CAPACITANCES & GATE RESIS	STANCE						
Input Capacitance	C _{ISS}				2677		
Output Capacitance	C _{OSS}	V_{GS} = 0 V, f = 1 MHz, V_{DS} = 12 V			565		pF
Reverse Transfer Capacitance	C _{RSS}				307		1
Total Gate Charge	Q _{G(TOT)}				20	28	
						1	1

5	·a(101)			
Threshold Gate Charge	Q _{G(TH)}	V _{GS} = 4.5 V, V _{DS} = 15 V; I _D = 30 A	3.2	-0
Gate-to-Source Charge	Q _{GS}	I _D = 30 A	8.0	
Gate-to-Drain Charge	Q _{GD}		8.0	
Total Gate Charge	Q _{G(TOT)}	V_{GS} = 11.5 V, V_{DS} = 15 V; I _D = 30 A	45	nC

SWITCHING CHARACTERISTICS (Note 6)

Turn-On Delay Time	t _{d(ON)}	V_{GS} = 4.5 V, V_{DS} = 15 V, I _D = 15 A, R _G = 3.0 Ω		14		
Rise Time	t _r			30		ns
Turn-Off Delay Time	t _{d(OFF)}			20		
Fall Time	t _f			12		
Turn-On Delay Time	t _{d(ON)}			8.0		
Rise Time	t _r	V _{GS} = 11.5 V, V _{DS} = 15 V,		27		ns
Turn-Off Delay Time	t _{d(OFF)}	I_D = 15 A, R_G = 3.0 Ω		31		
Fall Time	t _f			7.0		

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

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

Parameter	Symbol	Test Condition		Min	Тур	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS							
Forward Diode Voltage	V _{SD}	$V_{GS} = 0 V,$ $I_{S} = 30 A$ $T_{J} = 1$	$T_J = 25^{\circ}C$		0.83	1.2	Ň
			T _J = 125°C		0.7		v
Reverse Recovery Time	t _{RR}	V _{GS} = 0 V, dIS/dt = 100 A/µs, I _S = 30 A			27.1		ns
Charge Time	ta				13.8		
Discharge Time	t _b				13.3		
Reverse Recovery Charge	Q _{RR}				16		nC
PACKAGE PARASITIC VALUES							
Source Inductance	L _S	- T _A = 25°C			0.65		nH
Drain Inductance	L _D				0.005		nH
Gate Inductance	L _G				1.84		nH
Gate Resistance	R _G			1.2		Ω	

TYPICAL PERFORMANCE CURVES



TYPICAL PERFORMANCE CURVES



TYPICAL PERFORMANCE CURVES



Figure 13. Avalanche Characteristics

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