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MOSFET – Power, Single, N-Channel 40 V, 7.3 mΩ, 51 A

NTTFS5C466NL

Features

- Small Footprint (3.3 x 3.3 mm) for Compact Design
- Low R_{DS(on)} to Minimize Conduction Losses
- Low Capacitance to Minimize Driver Losses
- These Devices are Pb-Free and are RoHS Compliant

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

Parameter			Symbol	Value	Unit
Drain-to-Source Voltage			V _{DSS}	40	V
Gate-to-Source Voltage			V_{GS}	±20	V
Continuous Drain		T _C = 25°C	I _D	51	Α
Current R _{0JC} (Notes 1, 2, 3, 4)	Steady	T _C = 100°C		36	
Power Dissipation	State	T _C = 25°C	P_{D}	38	W
R _{θJC} (Notes 1, 2, 3)		T _C = 100°C		19	
Continuous Drain		T _A = 25°C	I _D	14	Α
Current R _{θJA} (Notes 1, 3, 4)	Steady	T _A = 100°C		12	
Power Dissipation	State	T _A = 25°C	P_{D}	3.1	W
R _{θJA} (Notes 1, 3)		T _A = 100°C		2.1	
Pulsed Drain Current	$T_A = 25$	°C, t _p = 10 μs	I _{DM}	200	Α
Operating Junction and Storage Temperature Range			T _J , T _{stg}	-55 to +175	°C
Source Current (Body Diode)			Is	10	Α
Single Pulse Drain-to-Source Avalanche Energy (I _{L(pk)} = 3 A)			E _{AS}	72	mJ
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			TL	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.

THERMAL RESISTANCE MAXIMUM RATINGS (Note 1)

Parameter	Symbol	Value	Unit
Junction-to-Case - Steady State (Note 3)	$R_{\theta JC}$	3.5	°C/W
Junction-to-Ambient - Steady State (Note 3)	$R_{\theta JA}$	48	

- The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
- 2. Psi (Ψ) is used as required per JESD51-12 for packages in which substantially less than 100% of the heat flows to single case surface.
- 3. Surface-mounted on FR4 board using a 650 mm², 2 oz. Cu pad.
- Continuous DC current rating. Maximum current for pulses as long as 1 second is higher but is dependent on pulse duration and duty cycle.

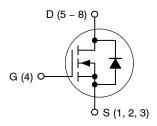


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V _{(BR)DSS}	R _{DS(on)} MAX	I _D MAX
40 V	7.3 mΩ @ 10 V	51 A
40 V	12 mΩ @ 4.5 V	JIA

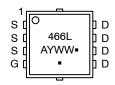
N-Channel





WDFN8 (μ8FL) CASE 511AB

MARKING DIAGRAM



466L = Specific Device Code A = Assembly Location

Y = Year
WW = Work Week
Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering, marking and shipping information in the package dimensions section on page 5 of this data sheet.

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

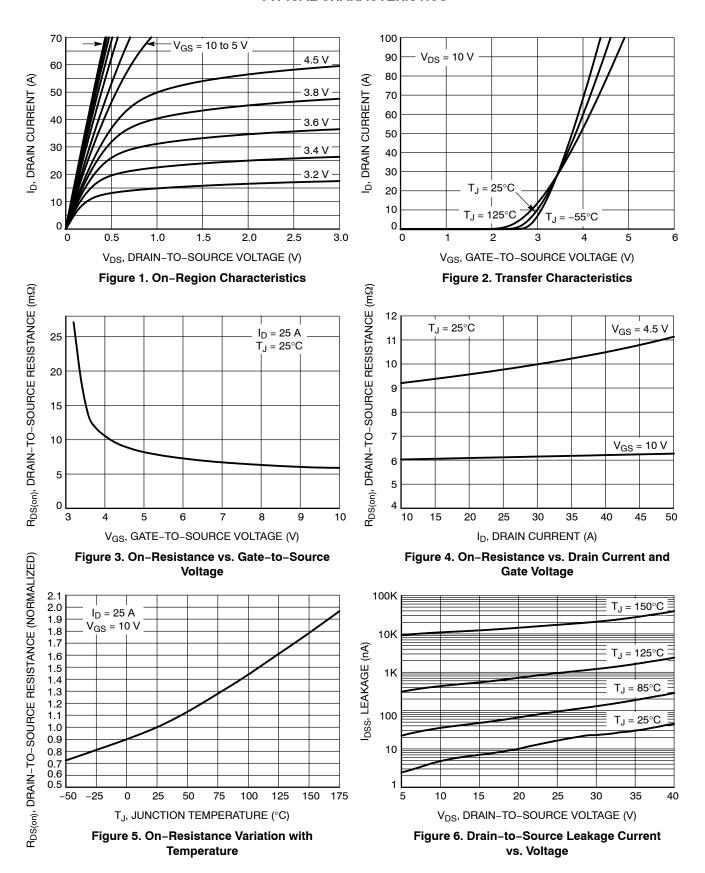
Parameter	Symbol	Test Condition		Min	Тур	Max	Unit
OFF CHARACTERISTICS		•					
Drain-to-Source Breakdown Voltage	V _{(BR)DSS}	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$		40			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} /				29		mV/° C
Zero Gate Voltage Drain Current	I _{DSS}	Vcs = 0 V.	T _J = 25°C			10	μΑ
		V _{GS} = 0 V, V _{DS} = 40 V	T _J = 125°C			250	1
Gate-to-Source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = 20 V				100	nA
ON CHARACTERISTICS (Note 5)	•	•			•	•	•
Gate Threshold Voltage	V _{GS(TH)}	$V_{GS} = V_{DS}, I_{D}$	= 30 μΑ	1.2		2.2	V
Drain-to-Source On Resistance	R _{DS(on)}	$V_{GS} = 10 \text{ V}, I_{D} = 10 \text{ A}$ $V_{GS} = 4.5 \text{ V}, I_{D} = 10 \text{ A}$			6.1	7.3	mΩ
					9.7	12	
Forward Transconductance	9FS	V _{DS} = 15 V, I _E	₎ = 25 A		33		S
CHARGES, CAPACITANCES AND GA	TE RESISTANO	E			•	•	•
Input Capacitance	C _{iss}	$V_{GS} = 0 \text{ V, f} = 1.0 \text{ MHz,}$ $V_{DS} = 25 \text{ V}$			880		pF
Output Capacitance	C _{oss}				340		_
Reverse Transfer Capacitance	C _{rss}				16		
Total Gate Charge	Q _{G(TOT)}	$V_{GS} = 4.5 \text{ V}, V_{DS} = 20 \text{ V}, I_D = 25 \text{ A}$			7.0		nC
Threshold Gate Charge	Q _{G(TH)}				1.8		nC
Gate-to-Source Charge	Q_{GS}				3.3		
Gate-to-Drain Charge	Q_{GD}				2.5		1
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 10 V, V _{DS} = 20 V, I _D = 25 A			16		nC
Gate Resistance	R_{G}	T _A = 25°C				3.0	Ω
SWITCHING CHARACTERISTICS (No	ote 6)	-					
Turn-On Delay Time	t _{d(on)}				10		ns
Rise Time	t _r	$V_{GS} = 4.5 \text{ V}, V_{D}$	_S = 20 V,		67		
Turn-Off Delay Time	t _{d(off)}	$I_D = 25 \text{ A}, R_G = 2.5 \Omega$			26		
Fall Time	t _f				32		1
DRAIN-SOURCE DIODE CHARACTE	RISTICS	-					
Forward Diode Voltage	ard Diode Voltage $ V_{SD} \qquad V_{GS} = 0 \text{ V}, \\ I_{S} = 20 \text{ A} $	V _{GS} = 0 V,	T _J = 25°C		0.9	1.2	V
		T _J = 125°C		0.8		1	
Reverse Recovery Time	t _{RR}	V_{GS} = 0 V, dI_S/dt = 100 A/ μ s, I_S = 25 A			22		ns
Charge Time	t _a				10		1
Discharge Time	t _b				12		1
Reverse Recovery Charge	Q_{RR}				6.0		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.

5. Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%.

6. Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS

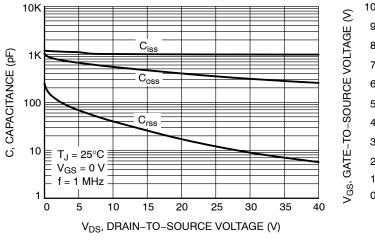


Figure 7. Capacitance Variation

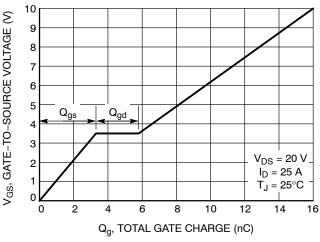


Figure 8. Gate-to-Source vs. Total Charge

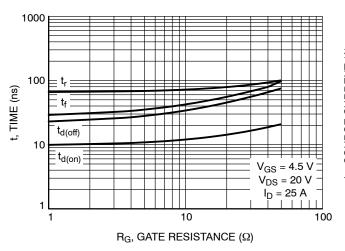


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

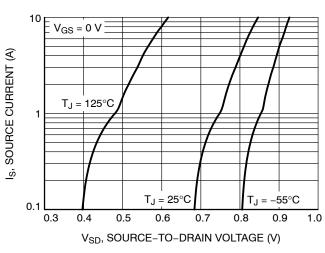


Figure 10. Diode Forward Voltage vs. Current

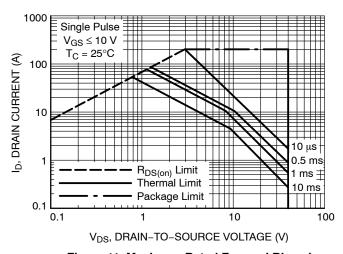


Figure 11. Maximum Rated Forward Biased Safe Operating Area

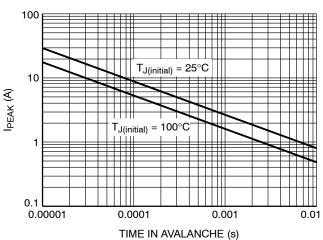


Figure 12. Maximum Drain Current vs. Time in Avalanche

TYPICAL CHARACTERISTICS

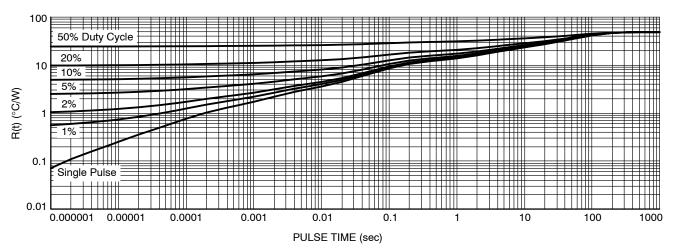


Figure 13. Thermal Response

DEVICE ORDERING INFORMATION

Device	Marking	Package	Shipping [†]
NTTFS5C466NLTAG	466L	WDFN8 (Pb-Free)	1500 / 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.