Power MOSFET

30 V, 7.3 A, Dual N–Channel, 2.0x2.0x0.55 mm μCool™ UDFN6 Package

Features

- UDFN Package with Exposed Drain Pads for Excellent Thermal Conduction
- Low Profile UDFN 2.0 x 2.0 x 0.55 mm for Board Space Saving
- Ultra Low R_{DS(on)}
- These Devices are Pb–Free, Halogen Free/BFR Free and are RoHS Compliant

Applications

- Power Load Switch
- Wireless Charging
- DC-DC Converters

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

Pa	Symbol	Value	Unit		
Drain-to-Source Voltage			V_{DSS}	30	V
Gate-to-Source Vol	Gate-to-Source Voltage			±12	V
Continuous Drain	Steady	T _A = 25°C	I _D	7.3	Α
Current (Note 1)	State	T _A = 85°C		5.3	
	t ≤ 5 s	T _A = 25°C		9.1	
Power Dissipation (Note 1)	Steady State	T _A = 25°C	P _D	1.70	W
	t ≤ 5 s	T _A = 25°C		2.63	
Continuous Drain	Steady	T _A = 25°C	I _D	4.8	Α
Current (Note 2)	State	T _A = 85°C		3.4	
Power Dissipation (Note 2)		T _A = 25°C	P _D	0.72	W
Pulsed Drain Current $t_p = 10 \mu s$			I _{DM}	22	Α
MOSFET Operating Junction and Storage Temperature			T _J , T _{STG}	-55 to 150	°C
Source Current (Body Diode) (Note 1)			IS	3.0	Α
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.

- Surface Mounted on FR4 Board using 1 in sq pad size (Cu area = 1.127 in sq [2 oz] including traces).
- Surface-mounted on FR4 board using the minimum recommended pad size, 2 oz. Cu.

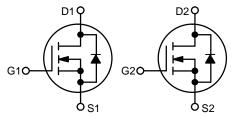


ON Semiconductor®

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MOSFET

V _{(BR)DSS}	R _{DS(on)} MAX	I _D MAX
	21 mΩ @ 10 V	
	24 mΩ @ 4.5 V	
30 V	26 mΩ @ 3.7 V	7.3 A
30 V	28 mΩ @ 3.3 V	7.3 A
	36 mΩ @ 2.5 V	
	65 mΩ @ 1.8 V	



Dual N-Channel MOSFET

MARKING DIAGRAM

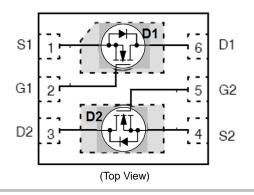


UDFN6 CASE 517BF μCOOL™



AC= Specific Device Code
M = Date Code
■ = Pb-Free Package

(Note: Microdot may be in either location)



ORDERING INFORMATION

See detailed ordering and shipping information on page 3 of this data sheet.

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction-to-Ambient – Steady State (Note 3)	$R_{\theta JA}$	73.6	
Junction-to-Ambient – $t \le 5$ s (Note 3)	$R_{\theta JA}$	47.6	°C/W
Junction-to-Ambient – Steady State min Pad (Note 4)	$R_{\theta JA}$	174.4	

- 3. Surface-mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [2 oz] including traces).
 4. Surface-mounted on FR4 board using the minimum recommended pad size, 2 oz. Cu.

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

Parameter	Symbol	Test Condition		Min	Тур	Max	Units
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	I _D = 250 μA, ref to 25°C			7		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	$V_{GS} = 0 \text{ V}, T_{J} = 25^{\circ}\text{C}$				1	μΑ
		$V_{DS} = 24 \text{ V}$	T _J = 125°C			10	
Gate-to-Source Leakage Current	I _{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 12 \text{ V}$				±100	nA
ON CHARACTERISTICS (Note 5)							
Gate Threshold Voltage	V _{GS(TH)}	$V_{GS} = V_{DS}$, I _D = 250 μA	0.6		1.1	V
Negative Threshold Temp. Coefficient	V _{GS(TH)} /T _J				2.8		mV/°C
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = 10 V, I _D = 6.0 A			17.5	21	mΩ
		V _{GS} = 4.5	V, I _D = 5.0 A		20	24	1
		$V_{GS} = 3.7 \text{ V}, I_D = 3.0 \text{ A}$			21	26	
		$V_{GS} = 3.3 \text{ V, } I_D = 3.0 \text{ A}$ $V_{GS} = 2.5 \text{ V, } I_D = 2.0 \text{ A}$			22	28	
					25	36	
		V _{GS} = 1.8	V, I _D = 1.0 A		40	65	
Forward Transconductance	9FS	V _{DS} = 1.5	V, I _D = 5.0 A		23		S
CHARGES, CAPACITANCES & GATE	RESISTANCE						
Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1 MHz, V _{DS} = 15 V			460		pF
Output Capacitance	C _{OSS}				225		
Reverse Transfer Capacitance	C _{RSS}				27		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 4.5 \text{ V}, V_{DS} = 10 \text{ V};$ $I_{D} = 5.0 \text{ A}$			5.0	8.0	nC
Total Gate Charge	Q _{G(TOT)}				5.5	9.0	nC
Threshold Gate Charge	Q _{G(TH)}	$V_{GS} = 4.5 \text{ V}, V_{DS} = 15 \text{ V};$ $I_D = 5.0 \text{ A}$			0.55		
Gate-to-Source Charge	Q_{GS}				2.5		
Gate-to-Drain Charge	Q_{GD}				1.1		
SWITCHING CHARACTERISTICS, V _G	S = 4.5 V (Note 6)						
Turn-On Delay Time	t _{d(ON)}	$V_{GS} = 4.5 \text{ V}, V_{DD} = 15 \text{ V},$ $I_{D} = 5.0 \text{ A}, R_{G} = 1 \Omega$			5		ns
Rise Time	t _r				15		
Turn-Off Delay Time	t _{d(OFF)}				13		
Fall Time	t _f				1.7		

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.

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

Parameter	Symbol	Test Co	ondition	Min	Тур	Max	Units
DRAIN-SOURCE DIODE CHARAC	TERISTICS						
Forward Diode Voltage	V_{SD}	$V_{GS} = 0 V$	T _J = 25°C		0.7	1.0	V
		$V_{GS} = 0 \text{ V},$ $I_{S} = 2.0 \text{ A}$	T _J = 125°C		0.6		
Reverse Recovery Time	t _{RR}				18.5		ns
Charge Time	t _a	$V_{GS} = 0 \text{ V, dls/dt} = 100 \text{ A/}\mu\text{s,}$ $I_{S} = 2.0 \text{ A}$			9.3		
Discharge Time	t _b				9.1		
Reverse Recovery Charge	Q_RR	1			7.8		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 $\leq 300~\mu s$, duty cycle $\leq 2\%$.

DEVICE ORDERING INFORMATION

Device	Package	Shipping [†]
NTLUD4C26NTAG	UDFN6 (Pb-Free)	3000 / Tape & Reel
NTLUD4C26NTBG	UDFN6 (Pb-Free)	3000 / 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.

^{6.} Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS

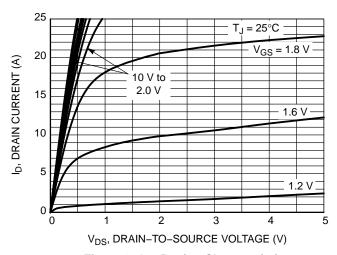


Figure 1. On-Region Characteristics

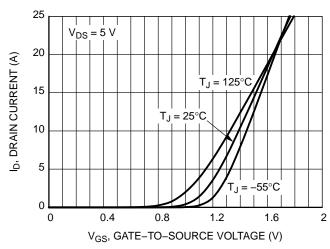


Figure 2. Transfer Characteristics

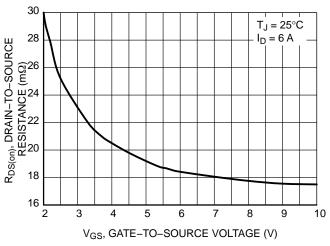


Figure 3. On-Resistance vs. Gate-to-Source Voltage

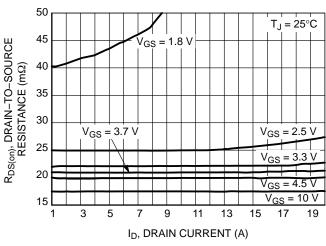


Figure 4. On–Resistance vs. Drain Current and Gate Voltage

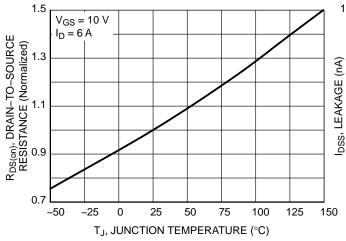


Figure 5. On–Resistance Variation with Temperature

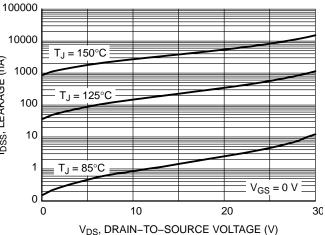


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

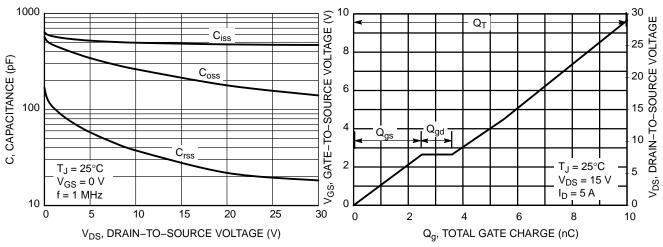


Figure 7. Capacitance Variation

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

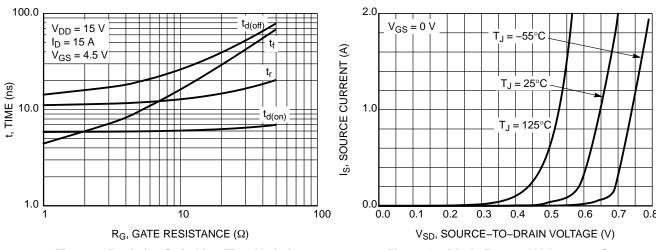


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

Figure 10. Diode Forward Voltage vs. Current

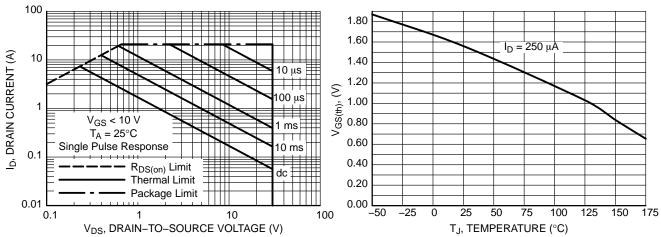


Figure 11. Maximum Rated Forward Biased Safe Operating Area

Figure 12. Threshold Voltage

TYPICAL CHARACTERISTICS

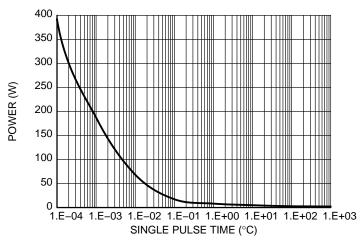


Figure 13. Single Pulse Maximum Power Dissipation

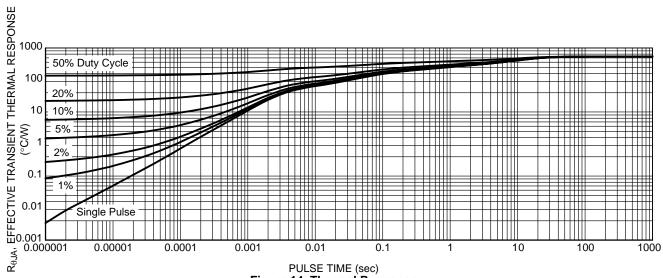
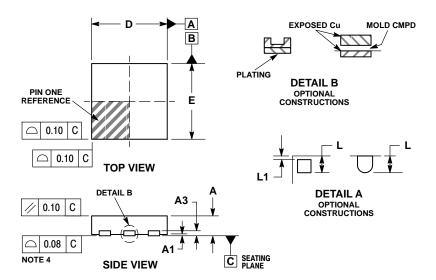


Figure 14. Thermal Response

PACKAGE DIMENSIONS

UDFN6 2x2, 0.65P CASE 517BF ISSUE B



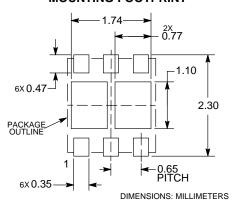
NOTES:

- DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
- CONTROLLING DIMENSION: MILLIMETERS.
 DIMENSION & APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN
- 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
 4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

	MILLIMETERS				
DIM	MIN	MAX			
Α	0.45	0.55			
A1	0.00	0.05			
A3	0.13	REF			
b	0.25	0.35			
D	2.00 BSC				
D2	0.57	0.77			
E	2.00 BSC				
E2	0.90	1.10			
е	0.65 BSC				
F	0.15 BSC				
K	0.25 REF				
L	0.20 0.30				
L1		0.10			

⊕ 0.10 C A D₂ DETAIL A E2 С \oplus 0.10 Α С Α В 0.10 е 0.05 С NOTE 3

RECOMMENDED MOUNTING FOOTPRINT



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