Power MOSFET

40 V, 1.7 m Ω , 185 A, Single N-Channel

Features

- Small Footprint (5x6 mm) for Compact Design
- Low R_{DS(on)} to Minimize Conduction Losses
- Low Q_G and 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	Э		V_{GS}	±20	V
Continuous Drain	Steady	T _C = 25°C	I _D	185	Α
Current R _{θJC} (Notes 1, 3)		T _C = 100°C		131	
Power Dissipation	State	T _C = 25°C	P _D	106	W
R _{θJC} (Note 1)		T _C = 100°C		53	
Continuous Drain	Steady State	T _A = 25°C	I _D	35	Α
Current R _{θJA} (Notes 1, 2, 3)		T _A = 100°C		25	
Power Dissipation		T _A = 25°C	P_{D}	3.8	W
R _{θJA} (Notes 1 & 2)		T _A = 100°C		1.9	
Pulsed Drain Current	$T_A = 25^{\circ}C, t_p = 10 \mu s$		I _{DM}	900	Α
Operating Junction and Storage Temperature			T _J , T _{stg}	-55 to + 175	°C
Source Current (Body Diode)			I _S	102	Α
Single Pulse Drain-to-Source Avalanche Energy (I _{L(pk)} = 15 A)			E _{AS}	338	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

Parameter	Symbol	Value	Unit
Junction-to-Case - Steady State	$R_{\theta JC}$	1.4	°C/W
Junction-to-Ambient - Steady State (Note 2)	$R_{\theta JA}$	40	

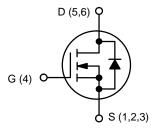
- The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
- 2. Surface-mounted on FR4 board using a 650 mm², 2 oz. Cu pad.
- Maximum current for pulses as long as 1 second is higher but is dependent on pulse duration and duty cycle.



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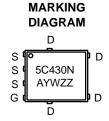
V _{(BR)DSS}	R _{DS(ON)} MAX	I _D MAX
40 V	1.7 mΩ @ 10 V	185 A



N-CHANNEL MOSFET



DFN5 (SO-8FL) CASE 488AA STYLE 1



5C430N = NTMFS5C430N

A = Assembly Location

Y = Year
W = Work Week
ZZ = Lot Traceability

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 specified)

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} / T _J				12.8		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V,	T _J = 25 °C			10	
		$V_{DS} = 40 \text{ V}$	T _J = 125°C			100	μΑ
Gate-to-Source Leakage Current	I _{GSS}	$V_{DS} = 0 \text{ V, } V_{GS}$	= 20 V			100	nA
ON CHARACTERISTICS (Note 4)							
Gate Threshold Voltage	V _{GS(TH)}	$V_{GS} = V_{DS}, I_D =$	= 250 μΑ	2.5		3.5	V
Threshold Temperature Coefficient	V _{GS(TH)} /T _J				-8.2		mV/°C
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = 10 V	I _D = 50 A		1.4	1.7	mΩ
Forward Transconductance	9FS	V _{DS} =15 V, I _D	= 50 A		130		S
CHARGES, CAPACITANCES & GATE RE	SISTANCE						
Input Capacitance	C _{ISS}				3300		
Output Capacitance	C _{OSS}	V _{GS} = 0 V, f = 1 MH	z, V _{DS} = 25 V		1600		pF
Reverse Transfer Capacitance	C _{RSS}				45		1
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 10 V, V _{DS} = 20 V; I _D = 50 A			47		
Threshold Gate Charge	Q _{G(TH)}	V _{GS} = 10 V, V _{DS} = 20 V; I _D = 50 A			10		0
Gate-to-Source Charge	Q _{GS}				16		nC
Gate-to-Drain Charge	Q_{GD}				7		
Plateau Voltage	V _{GP}				4.7		V
SWITCHING CHARACTERISTICS (Note 5	i)						
Turn-On Delay Time	t _{d(ON)}	V_{GS} = 10 V, V_{DS} = 20 V, I_{D} = 50 A, R_{G} = 2.5 Ω			13		
Rise Time	t _r				48		- ns
Turn-Off Delay Time	t _{d(OFF)}				29		
Fall Time	t _f				8		
DRAIN-SOURCE DIODE CHARACTERIS	TICS						
	V_{SD}	V _{GS} = 0 V,	$T_J = 25^{\circ}C$		0.83	1.2	
	I _S = 50 A	T _J = 125°C		0.7		·	
Reverse Recovery Time	t _{RR}	$V_{GS} = 0 \text{ V, dIS/dt} = 100 \text{ A/}\mu\text{s,}$ $I_{S} = 50 \text{ A}$			57		
Charge Time	ta				30		ns
Discharge Time	t _b				27		1
Reverse Recovery Charge	Q_{RR}				68		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. 4. Pulse Test: pulse width $\leq 300~\mu s$, duty cycle $\leq 2\%$.

^{5.} Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS

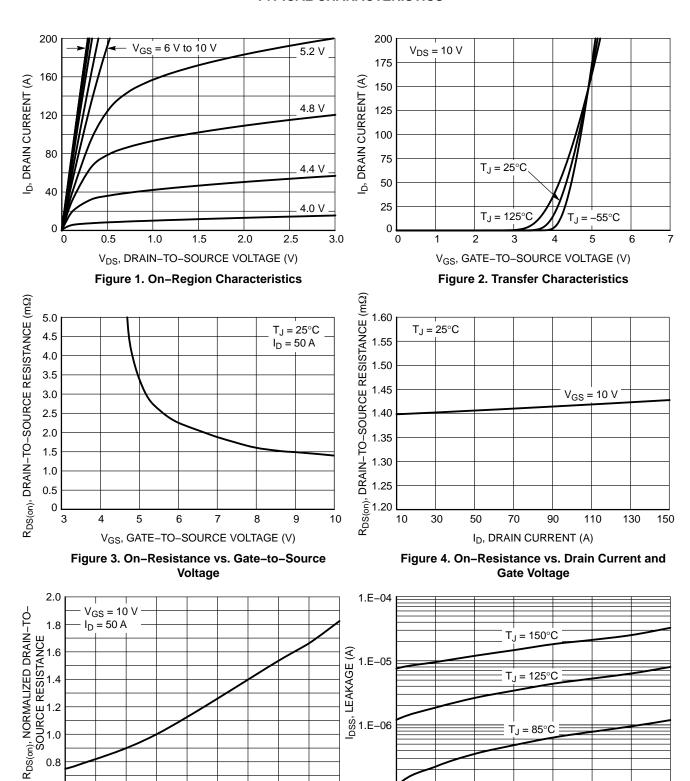


Figure 5. On–Resistance Variation with Temperature

TJ, JUNCTION TEMPERATURE (°C)

75

50

25

125

100

150

175

-25

-50

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

V_{DS}, DRAIN-TO-SOURCE VOLTAGE (V)

25

30

35

40

20

1.E-07

10

15

TYPICAL CHARACTERISTICS

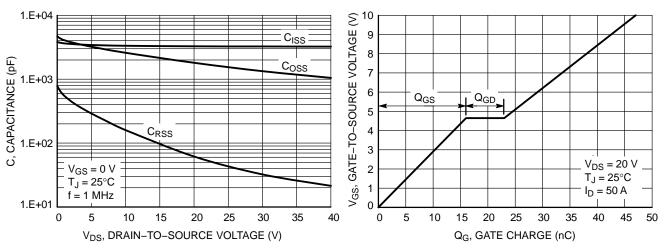


Figure 7. Capacitance Variation

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

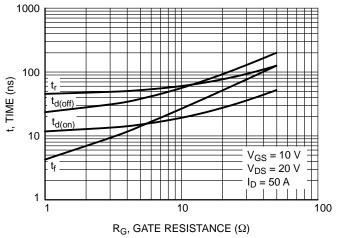


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

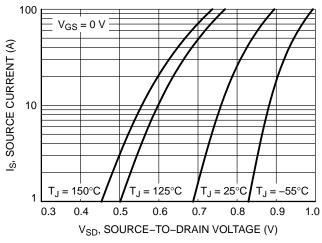


Figure 10. Diode Forward Voltage vs. Current

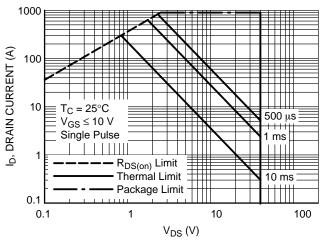


Figure 11. Safe Operating Area

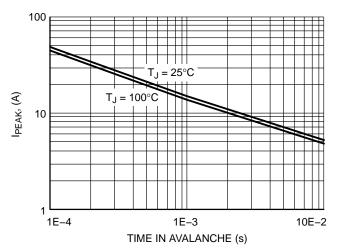


Figure 12. I_{PEAK} vs. Time in Avalanche

TYPICAL CHARACTERISTICS

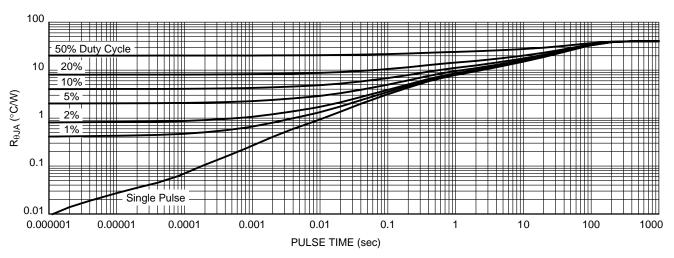


Figure 13. Thermal Characteristics

DEVICE ORDERING INFORMATION

Device	Marking	Package	Shipping [†]
NTMFS5C430NT1G	5C430N	DFN5 (Pb–Free)	1500 / Tape & Reel
NTMFS5C430NT3G	5C430N	DFN5 (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.





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SIDE VIEW

DFN5 5x6, 1.27P (SO-8FL) CASE 488AA ISSUE N

DATE 25 JUN 2018

NOTES:

- DIMENSIONING AND TOLERANCING PER
- ASME Y14.5M, 1994. CONTROLLING DIMENSION: MILLIMETER. DIMENSION D1 AND E1 DO NOT INCLUDE
- MOLD FLASH PROTRUSIONS OR GATE BURRS

	MILLIMETERS			
DIM	MIN	NOM	MAX	
Α	0.90	1.00	1.10	
A1	0.00		0.05	
b	0.33	0.41	0.51	
С	0.23	0.28	0.33	
D	5.00	5.15	5.30	
D1	4.70	4.90	5.10	
D2	3.80	4.00	4.20	
E	6.00	6.15	6.30	
E1	5.70	5.90	6.10	
E2	3.45	3.65	3.85	
е	1.27 BSC			
G	0.51	0.575	0.71	
K	1.20	1.35	1.50	
L	0.51	0.575	0.71	
L1	0.125 REF			
M	3.00	3.40	3.80	
θ	0 °		12 °	

GENERIC MARKING DIAGRAM*



XXXXXX = Specific Device Code

= Lot Traceability

= Assembly Location Α

Υ = Year W = Work Week

ZZ

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot " ", may or may not be present. Some products may not follow the Generic Marking.





DETAIL A

*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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