FDMC9430L

Product Preview

Dual N-Channel Logic Level PowerTrench® MOSFET

40 V, 8.2 mΩ, 12 A

Features

- Typical $R_{DS(on)}$ = 6.3 mΩ at V_{GS} = 10 V, I_D = 12 A
- Typical $Q_{g(tot)}$ = 15 nC at V_{GS} = 10 V, I_D = 12 A
- UIS Capability
- These Devices are Pb−Free and are RoHS Compliant

Applications

- Battery Protection
- Load Switching
- Point of Load

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}	±12	V
Continuous Drain Current (V_{GS} = 10) (Note 1)	T_C = 25°C	I_D	12	A
Pulsed Drain Current	T_C = 25°C	I_D	See Figure 4	A
Single Pulse Avalanche Energy (Note 2)		E_{AS}	21.6	mJ
Power Dissipation		P_D	11.4	W
Derate Above 25°C			0.1	W/°C
Operating and Storage Temperature Range		T_J, T_{stg}	−55 to +150	°C
Thermal Resistance, Junction−to−Case		$R_{\theta JC}$	13	°C/W
Maximum Thermal Resistance, Junction−to−Ambient (Note 3)		$R_{\theta JA}$	65	°C/W

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. Current is limited by bondwire configuration.
2. Starting T_J = 25°C, L = 0.3 mH, I_{AS} = 12 A, V_{DD} = 40 V during inductor charging and V_{DD} = 0 V during time in avalanche.
3. $R_{\theta JA}$ is the sum of the junction−to−case and case−to−ambient thermal resistance, where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design, while $R_{\theta JA}$ is determined by the board design. The maximum rating presented here is based on mounting on a 1 in^2 pad of 2 oz copper.

This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.

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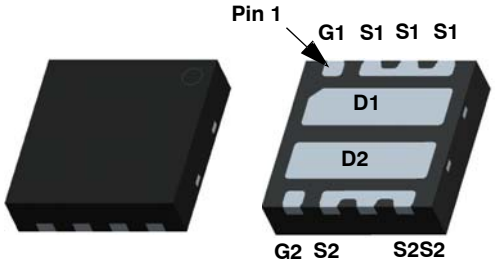
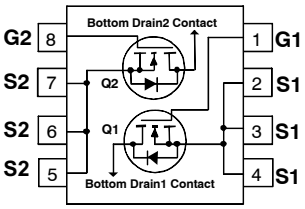


WDFN8
POWER 33
CASE 511DG



ORDERING INFORMATION

See detailed ordering, marking and shipping information on page 7 of this data sheet.

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

Symbol	Parameter	Test Condition		Min	Typ	Max	Unit
OFF CHARACTERISTICS							
B_{VDSS}	Drain−to−Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA		40	–	–	V
I_{DSS}	Drain−to−Source Leakage Current	V_{GS} = 0 V, V_{DS} = 40 V	T_J = 25°C	–	–	1	μA
			T_J = 150°C (Note 4)	–	–	0.2	mA
I_{GSS}	Gate−to−Source Leakage Current	V_{GS} = ±12 V		–	–	±100	nA
ON CHARACTERISTICS							
$V_{GS(th)}$	Gate−to−Source Threshold Voltage	V_{GS} = V_{DS}, I_D = 250 μA		1	1.8	3	V
$R_{DS(on)}$	Drain−to−Source On Resistance	I_D = 10 A, V_{GS} = 4.5 V		–	8.9	11.5	mΩ
		I_D = 12 A, V_{GS} = 10 V	T_J = 25°C	–	6.3	8.0	
			T_J = 150°C (Note 4)	–	10.2	13.0	
DYNAMIC CHARACTERISTICS							
C_{iss}	Input Capacitance	V_{GS} = 0 V, f = 1 MHz, V_{DS} = 20 V		–	984	–	pF
C_{oss}	Output Capacitance			–	315	–	
C_{rss}	Reverse Transfer Capacitance			–	18	–	
R_g	Gate Resistance	V_{GS} = 0.5 V, f = 1 MHz		–	1.1	–	Ω
$Q_{g(ToT)}$	Total Gate Charge	V_{GS} = 0 to 10 V	V_{DD} = 32 V, I_D = 12 A	–	15	22	nC
$Q_{g(th)}$	Threshold Gate Charge	V_{GS} = 0 to 1 V		–	0.9	–	
Q_{gs}	Gate−to−Source Gate Charge			–	2.6	–	
Q_{gd}	Gate−to−Drain “Miller” Charge			–	2.1	–	
SWITCHING CHARACTERISTICS							
t_{on}	Turn−On Time	V_{DD} = 20 V, V_{GS} = 10 V, I_D = 12 A, R_{GEN} = 6 Ω		–	–	13	ns
$t_{d(on)}$	Turn−On Delay			–	7	–	
t_r	Rise Time			–	2	–	
$t_{d(off)}$	Turn−Off Delay			–	17	–	
t_f	Fall Time			–	2	–	
t_{off}	Turn−Off Time			–	–	28	
DRAIN−SOURCE DIODE CHARACTERISTICS							
V_{SD}	Source−to−Drain Diode Voltage	I_{SD} = 12 A, V_{GS} = 0 V		–	–	1.2	V
		I_{SD} = 6 A, V_{GS} = 0 V		–	–	1.1	
t_{rr}	Reverse−Recovery Time	V_{DD} = 32 V, I_F = 12 A, dI_{SD}/dt = 100 A/μs		–	32	48	ns
Q_{rr}	Reverse−Recovery Charge			–	16	24	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. The maximum value is specified by design at T_J = 150°C. Product is not tested to this condition in production.

TYPICAL CHARACTERISTICS

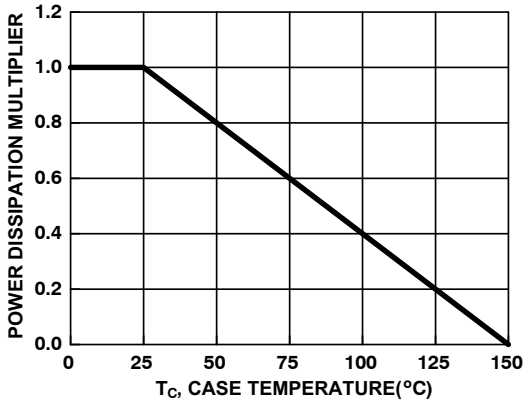


Figure 1. Normalized Power Dissipation vs. Case Temperature

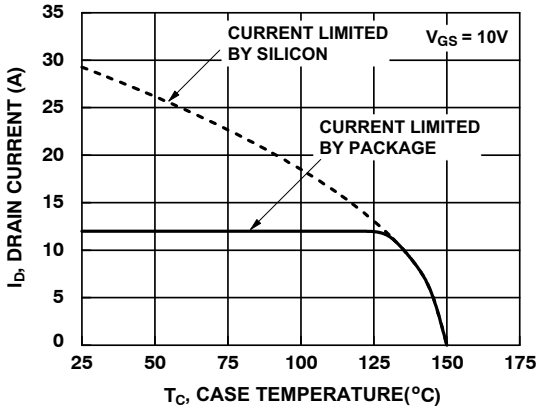


Figure 2. Maximum Continuous Drain Current vs. Case Temperature

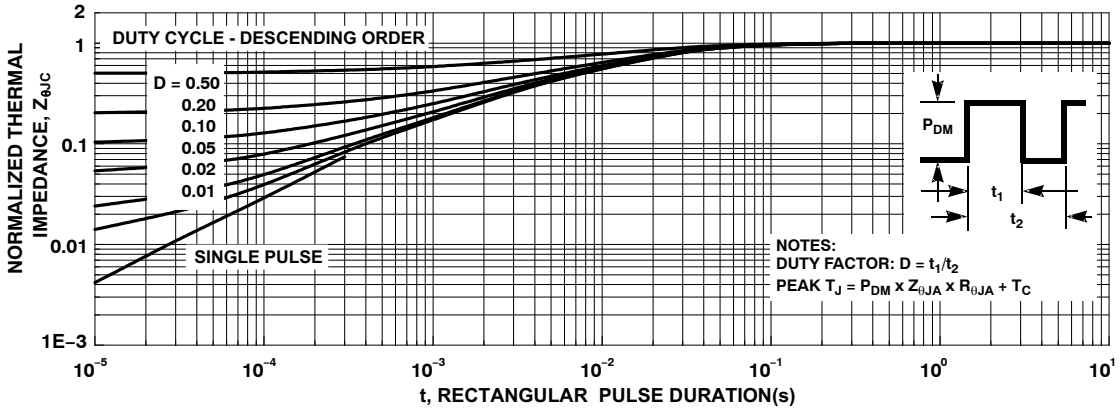


Figure 3. Normalized Maximum Transient Thermal Impedance

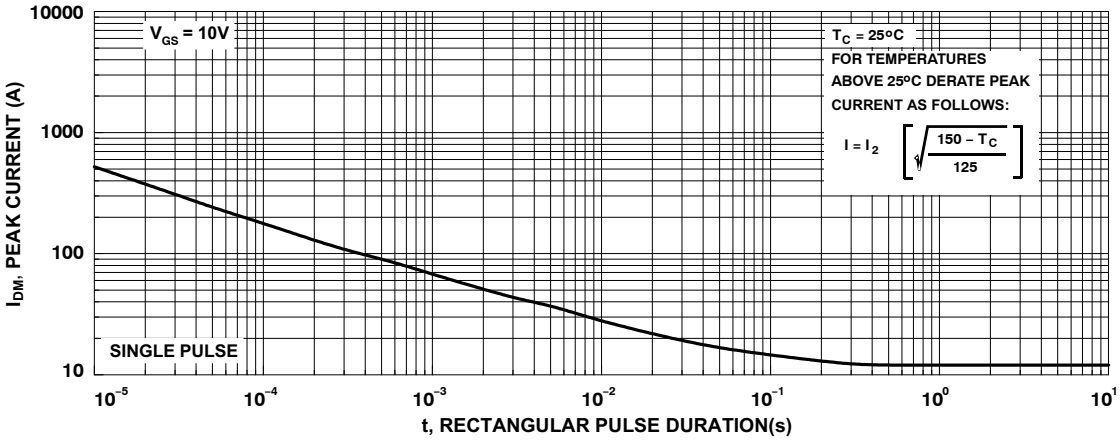


Figure 4. Peak Current Capability

TYPICAL CHARACTERISTICS

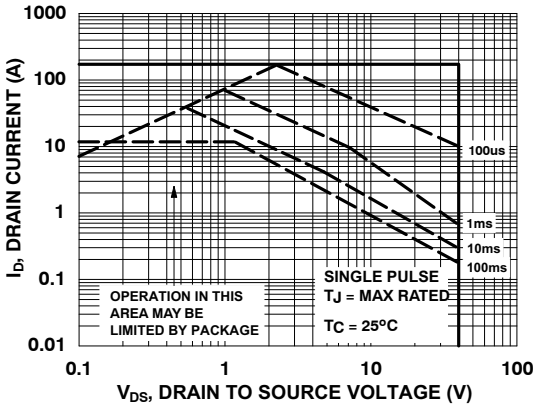
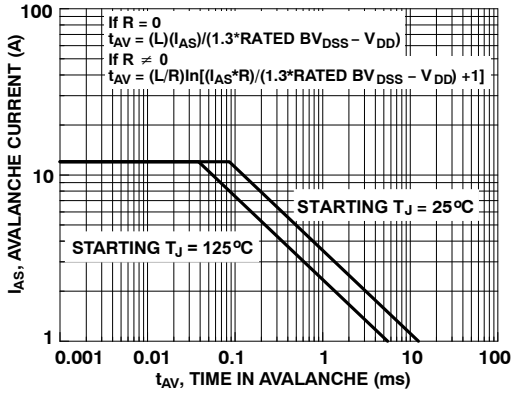


Figure 5. Forward Bias Safe Operating Area



NOTE: Refer to ON Semiconductor Application Notes AN7514 and AN7515

Figure 6. Unclamped Inductive Switching Capability

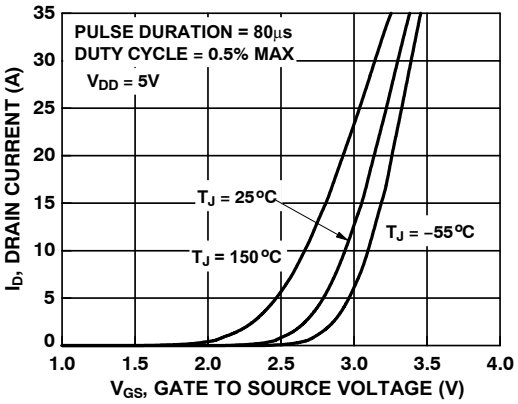


Figure 7. Transfer Characteristics

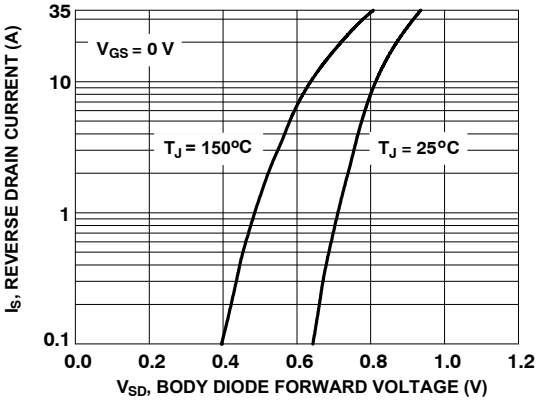


Figure 8. Forward Diode Characteristics

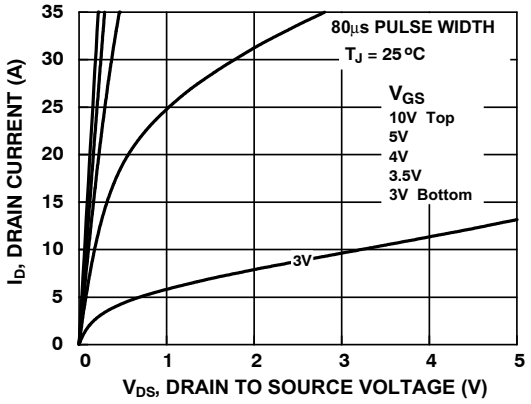


Figure 9. Saturation Characteristics

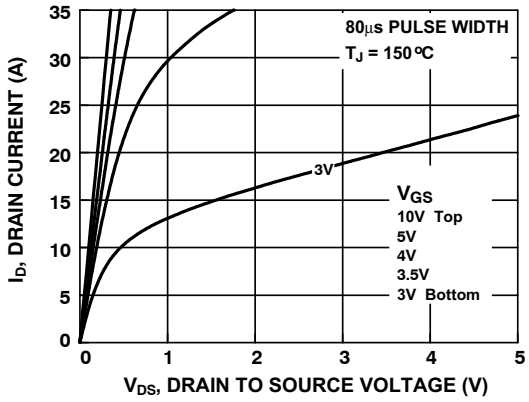


Figure 10. Saturation Characteristics

TYPICAL CHARACTERISTICS

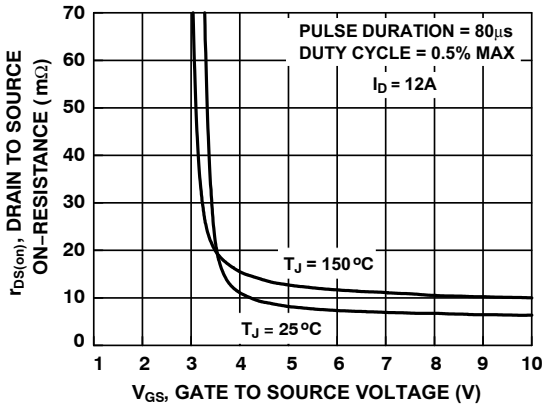


Figure 11. $R_{DS(on)}$ vs. Gate Voltage

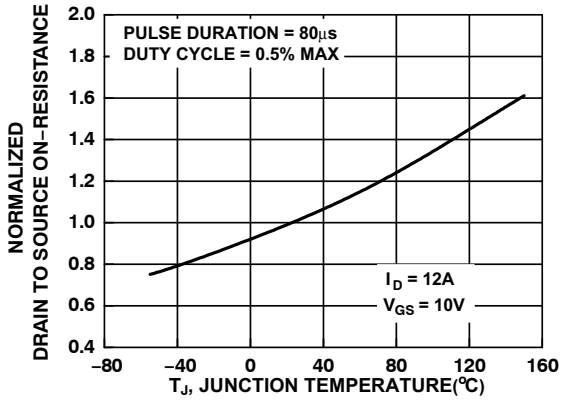


Figure 12. Normalized $R_{DS(on)}$ vs. Junction Temperature

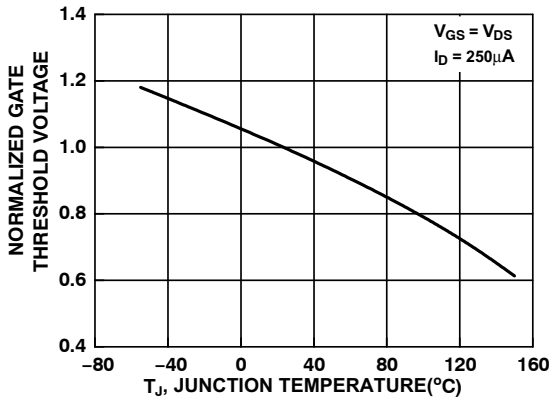


Figure 13. Normalized Gate Threshold Voltage vs. Temperature

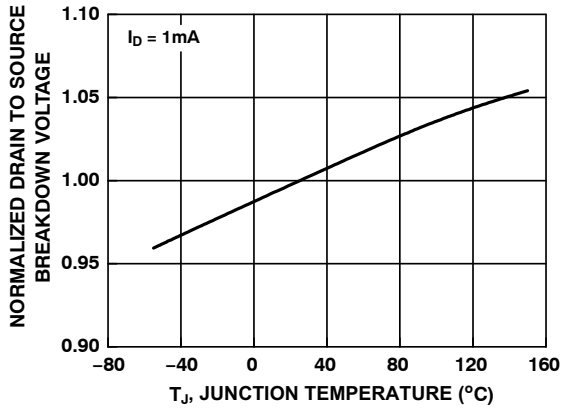


Figure 14. Normalized Drain−to−Source Breakdown Voltage vs. Junction Temperature

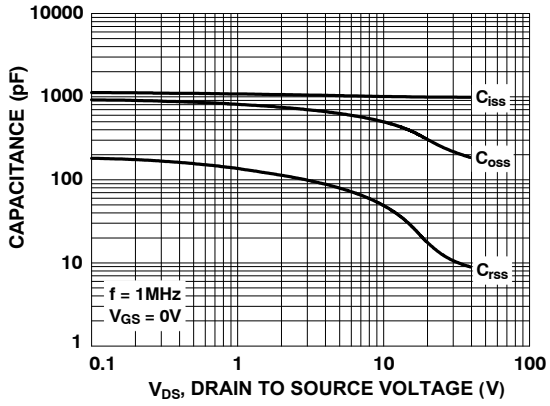


Figure 15. Capacitance vs. Drain−to−Source Voltage

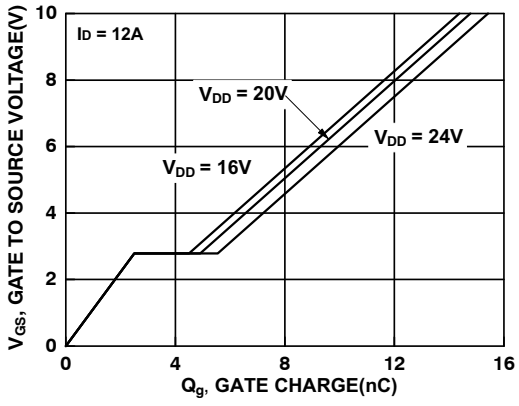
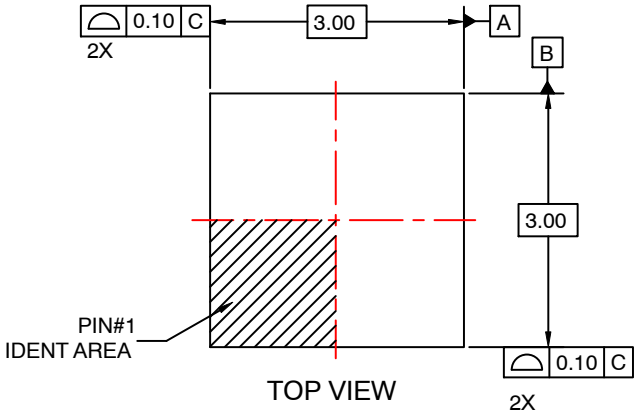


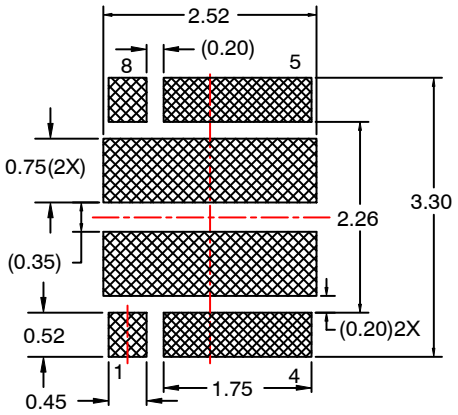
Figure 16. Gate Charge vs. Gate−to−Source Voltage

PACKAGE DIMENSIONS

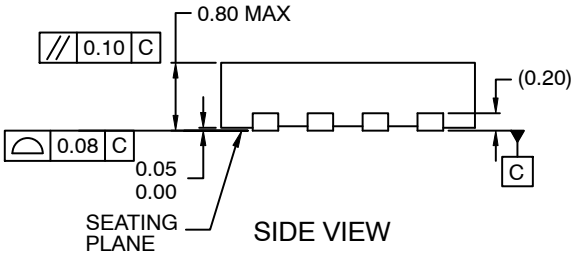
WDFN8 3x3, 0.65P
CASE 511DG
ISSUE O



TOP VIEW



RECOMMENDED LAND PATTERN



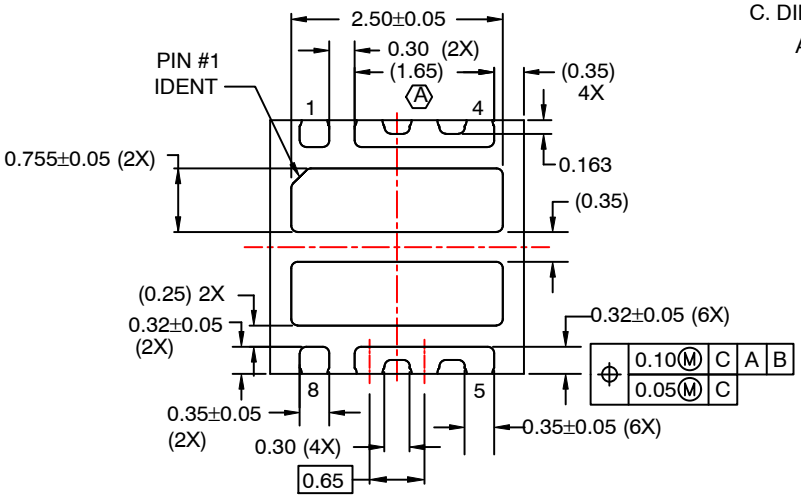
SIDE VIEW

NOTES:

A. DOES NOT FULLY CONFORM TO JEDEC REGISTRATION, MO−229.

B. DIMENSIONS ARE IN MILLIMETERS.

C. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994



BOTTOM VIEW

PACKAGE MARKING AND ORDERING INFORMATION

Device	Marking	Package	Reel Size	Tape Width	Quantity
FDMC9430L	FDMC9430L	Power 33	13″	12 mm	3000 Units

†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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PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
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