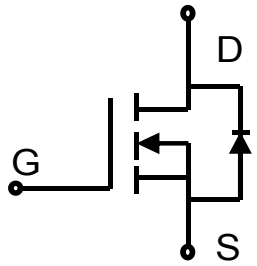
WLE042R10G

100V 150A 4.2mΩ N-Channel Power MOSFET

Description

These N-Channel enhancement mode power field effect transistors are using shielded gate trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance,provide superior switching performance, and with stand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.



N-Channel MOSFET

Features

- 100V,100A,$R_{DS(on).max}$=4.2mΩ@V_{GS} = 10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green device available

Applications

- DC-DC Converter
- Hard switchiing and high speed circuit

Pin Configuration

TO-263

Product Summary

V_{DSS}	100V
$R_{DS(on).max}$@ V_{GS}=10V	4.2mΩ
I_D	150A

Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	100	V
Continuous drain current (T_C = 25°C)	I_D	150	A
(T_C = 100°C)		63	A
Pulsed drain current[1)]	I_{DM}	400	A
Gate-Source voltage	V_{GSS}	±20	V
Avalanche energy[2)]	E_{AS}	324	mJ
Power Dissipation	P_D	86	W
Storage Temperature Range	T_{STG}	-55 to +150	°C
Operating Junction Temperature Range	T_J	-55 to +150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.45	°C/W
Thermal Resistance, Junction-to-Ambient[3)]	$R_{\theta JA}$	65	°C/W

Package Marking and Ordering Information

Device	Device Package	Marking
WLE042R10G	TO-263	WLE042R10G

Electrical Characteristics

T_J = 25°C unless otherwise noted

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0 V, I_D=250uA	100	---	---	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	1.5	---	2.5	V
Drain-source leakage current	I_{DSS}	V_{DS}=100 V, V_{GS}=0 V, T_J = 25°C	---	---	1	μA
		V_{DS}=100 V, V_{GS}=0 V, T_J = 150°C	---	---	10	mA
Gate leakage current, Forward	I_{GSSF}	V_{GS}=20 V, V_{DS}=0 V	---	---	100	nA
Gate leakage current, Reverse	I_{GSSR}	V_{GS}=-20 V, V_{DS}=0 V	---	---	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=50 A,T_J = 25°C	---	3.0	4.2	mΩ
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS} = 50 V, V_{GS} = 0 V, f = 250kHz	---	5858	---	pF
Output capacitance	C_{oss}		---	1235	---	
Reverse transfer capacitance	C_{rss}		---	57.5	---	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 50V,V_{GS}=10V, I_D =50 A	---	42.6	---	ns
Rise time	t_r		---	137	---	
Turn-off delay time	$t_{d(off)}$		---	132	---	
Fall time	t_f		---	16.5	---	
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DS}=80 V, I_D=50A, V_{GS}= 10 V	---	20	---	nC
Gate to drain charge	Q_{gd}		---	22.5	---	
Gate charge total	Q_g		---	98.3	---	
Drain-Source diode characteristics and Maximum Ratings						
Continuous Source Current	I_S		---	---	71.5	A
Pulsed Source Current	I_{SM}		---	---	286	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=50A, T_J=25℃	---	---	1.2	V
Reverse Recovery Time	t_{rr}	I_S=50A, di/dt=100A/us, T_J=25℃	---	35.7	---	ns
Reverse Recovery Charge	Q_{rr}		---	25	---	nC

Notes:

1: Repetitive Rating: Pulse width limited by maximum junction temperature.

2: V_{DD}=50V, V_{GS}=10V, L=0.5mH, I_{AS}=36A, Starting T_J=25℃.

3: Weld the device to a PCB board with the size of 32mm*36mm and then place it in an one-cubic-foot air static box.

Electrical Characteristics Diagrams

Figure 1. Typ. Output Characteristics

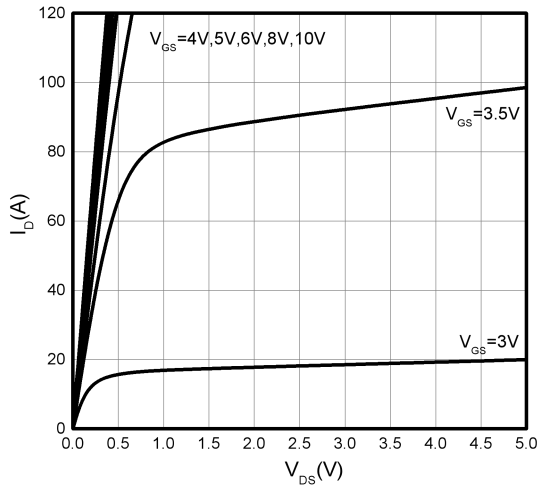


Figure 2. Transfer Characteristics

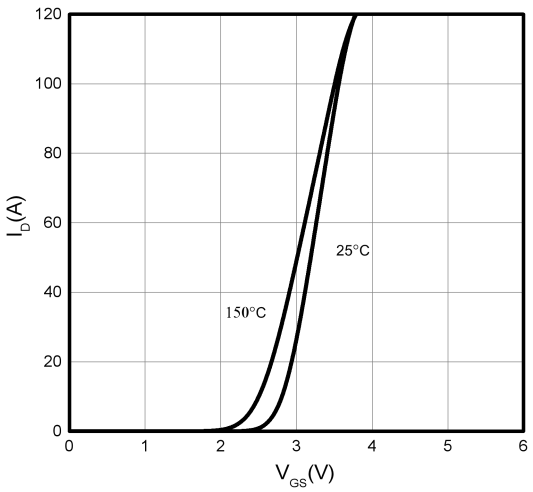


Figure 3. On-Resistance vs. Drain Current

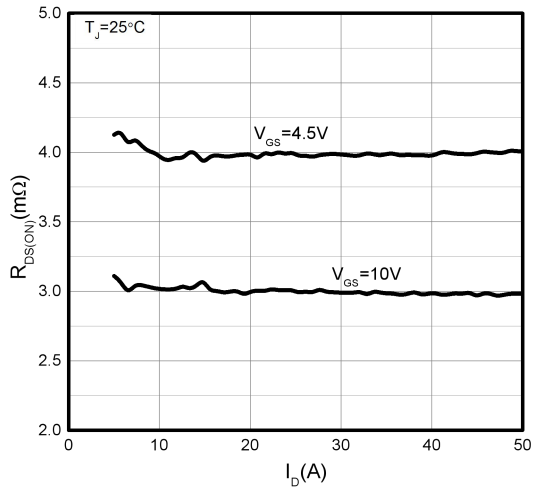


Figure 4.On-Resistance vs.Temperature

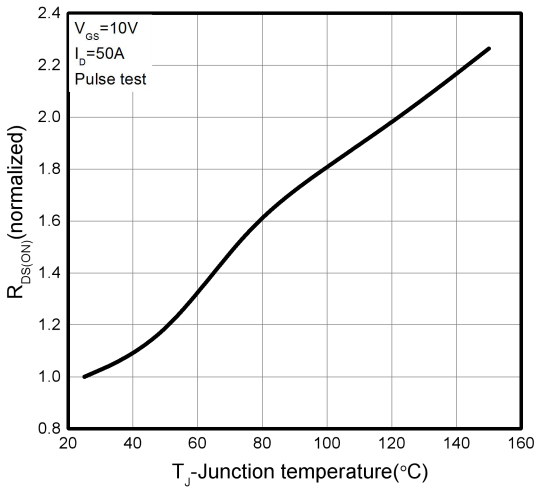


Figure 5.Breakdown Voltage vs.Temperature

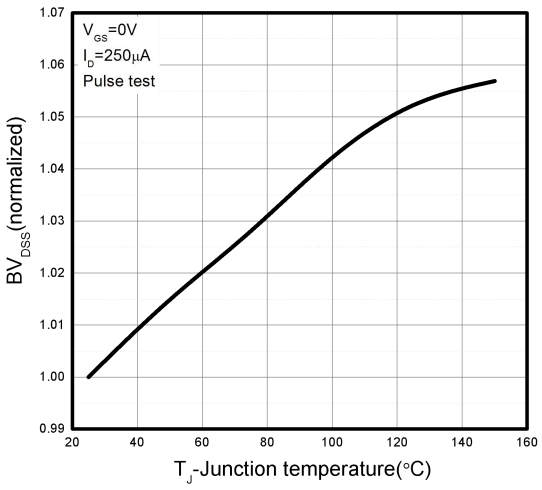


Figure 6.Threshold Voltage vs.Temperature

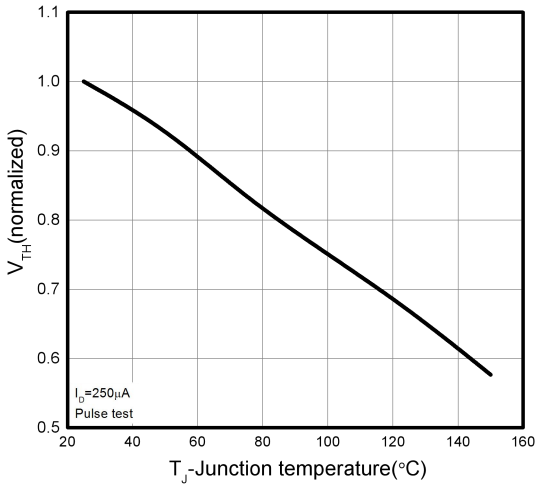


Figure 7.Rds(on) vs. Gate Voltage

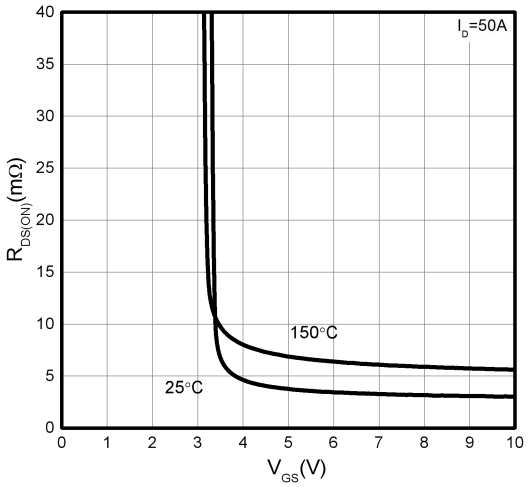


Figure 8.Body-Diode Characteristics

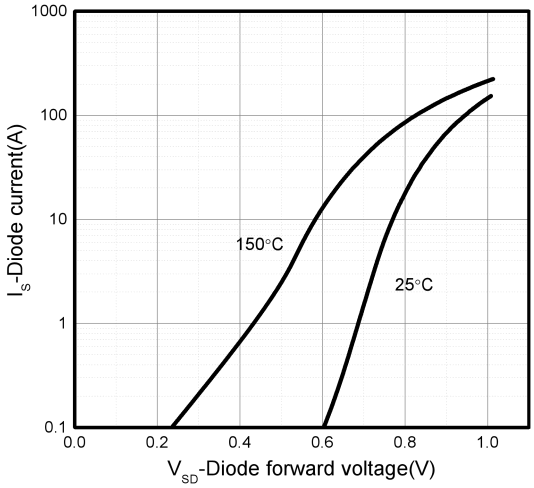


Figure 9.Capacitance Characteristics

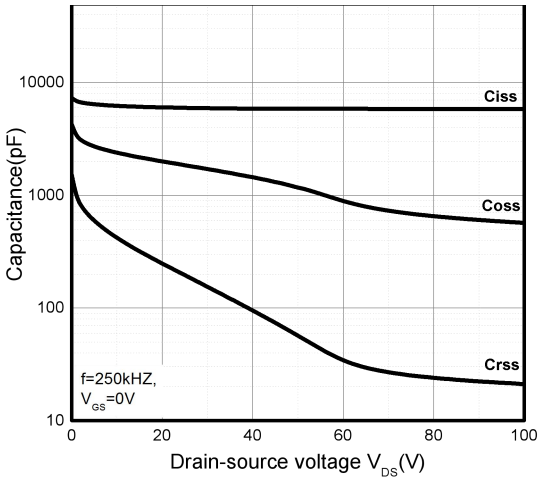


Figure 10.Gate Charge Characteristics

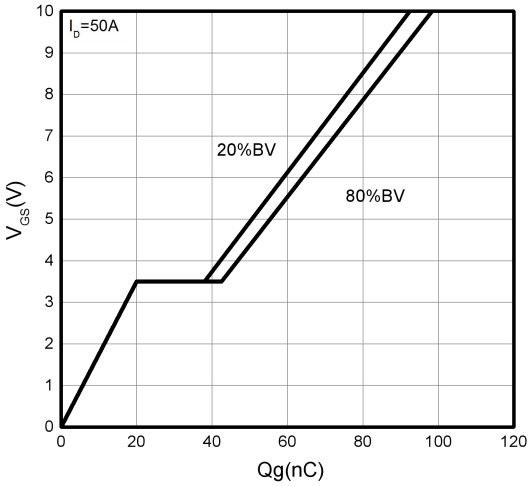


Figure 11.Drain Current Derating

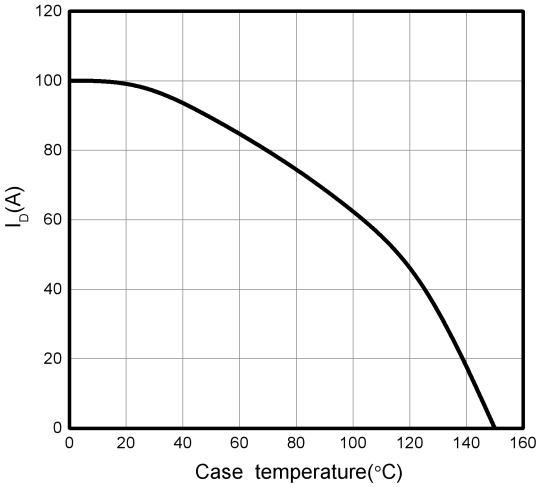


Figure 12.Power Dissipation vs.Temperature

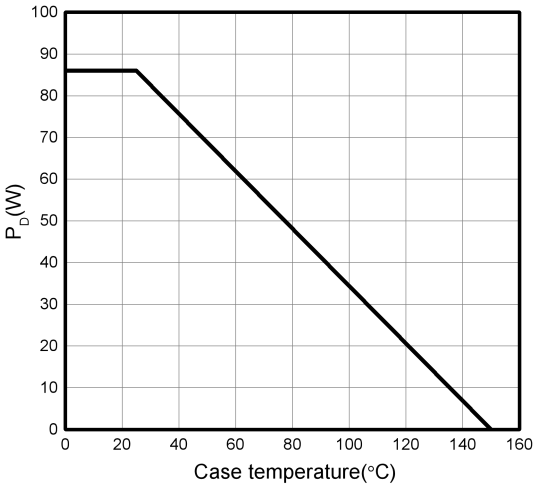


Figure 13: Safe Operating Area

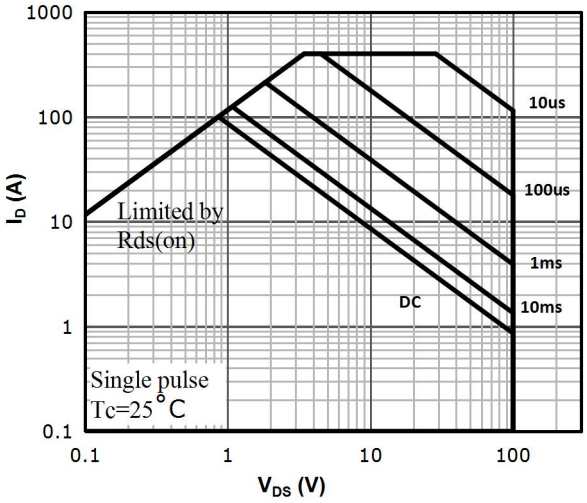
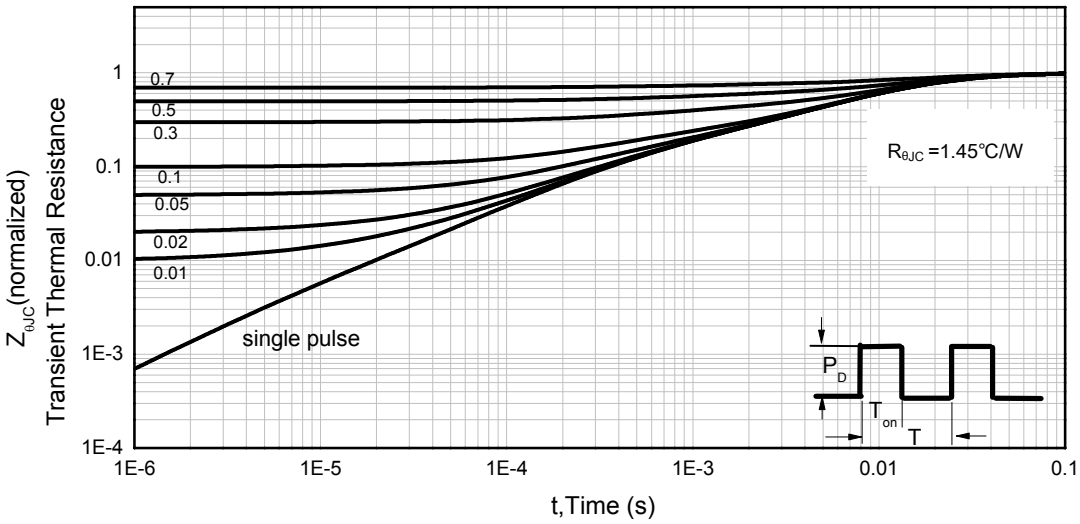
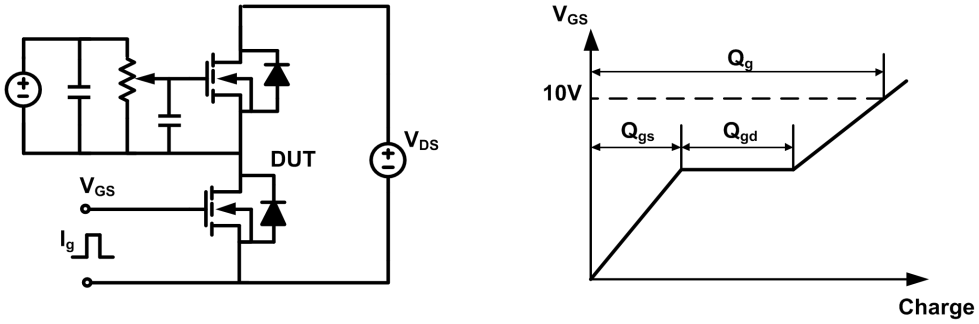


Figure 14. Normalized Maximum Transient Thermal Impedance (RthJC)

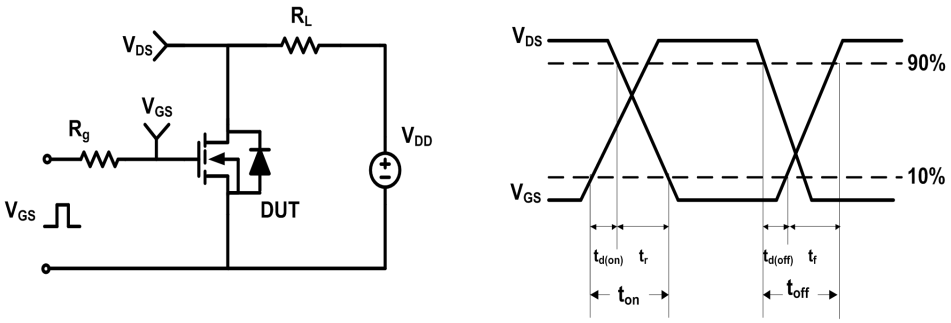


Test Circuit & Waveforms

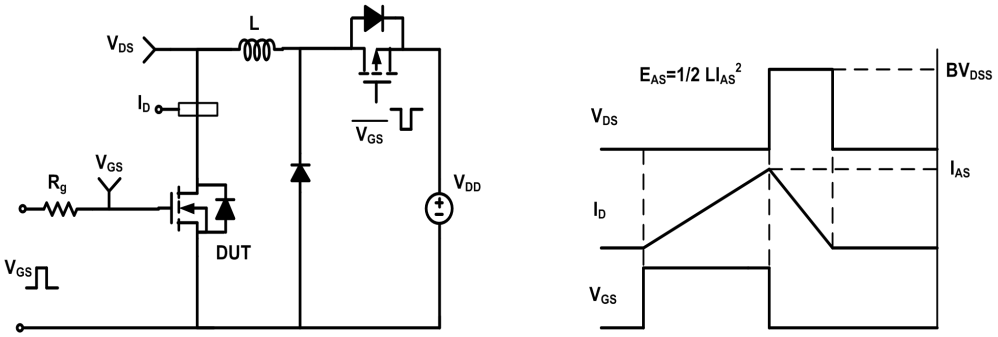
Gate Charge Test Circuit & Waveform



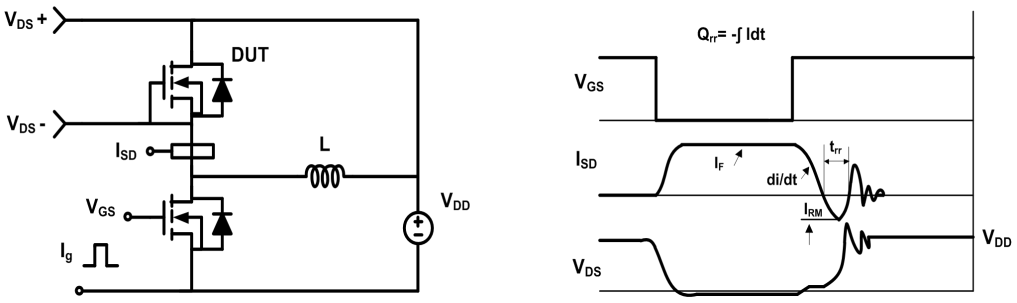
Resistive Switching Test Circuit & Waveform



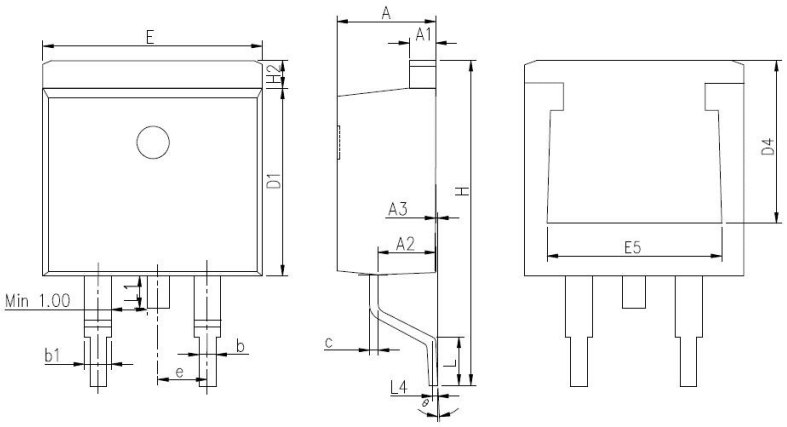
Unclamped Inductive Switching (UIS) Test Circuit & Waveform



Diode Recovery Test Circuit & Waveform



Mechanical Dimensions for TO-263



DIMENSIONS IN MILLITMETERS		
SYMBOL	MIN	MAX
A	4.36	4.8
A1	1.19	1.42
A2	2.2	2.96
A3	0	0.25
b	0.7	0.96
b1	1.17	1.47
c	0.3	0.69
D1	8.5	9.5
D4	6.6	-
E	9.8	10.55
E5	7.06	8.7
e	2.54BSC	
H	14.7	15.7
H2	0.95	1.65
L	1.9	2.8
L1	-	1.78
L4	0.25BSC	
θ	0°	9°

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