



General Description

The ZLM0304CF combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is for PWM applications.

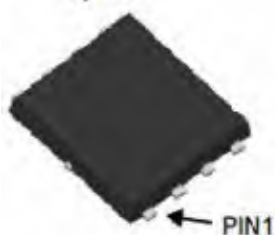
Applications

- Power Management
- Portable Equipment
- Switching Power Supply

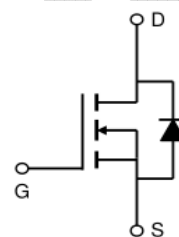
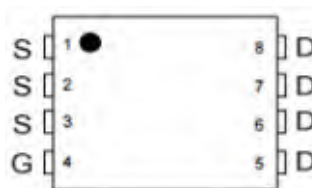
Product Summary

- V_{DS} 30V
- I_D (at $V_{GS}=10V$) 18A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $< 6.5m\Omega$
- $R_{DS(ON)}$ (at $V_{GS}=4.5V$) $< 9.5m\Omega$

Top View



Bottom View



Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	18	A
$T_A=25^\circ\text{C}$		14	
$T_A=70^\circ\text{C}$			
Pulsed Drain Current ^C	I_{DM}	130	A
Power Dissipation ^B	P_D	3.1	W
$T_A=25^\circ\text{C}$		2	
$T_A=70^\circ\text{C}$			
Storage Temperature Range	T_{STG}	-55 to +150	$^\circ\text{C}$
Operating Junction Temperature Range	T_J	-55 to +150	$^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient ^A	$R_{\theta JA}$	40	$^\circ\text{C/W}$

**Electrical Characteristics (T_J=25°C unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
B _{VSS}	Drain-Source Breakdown Voltage	I _D =250uA, V _{GS} =0V	30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30V, V _{GS} =0V			1	uA
I _{GSS}	Gate-Bodyleakagecurrent	V _{DS} =0V, V _{GS} =±20V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	1		2.5	V
I _{D(ON)}	Onstate draincurrent	V _{GS} =10V, V _{DS} =5V	130			A
R _{DS(ON)}	StaticDrain-Source On-Resistance	V _{GS} =10V, I _D =18A		5.4	6.5	mΩ
		V _{GS} =4.5V, I _D =16A		7.5	9	mΩ
g _{FS}	ForwardTransconductance	V _{DS} =5V, I _D =18A		70		S
V _{SD}	Diode Forward Voltage	I _{DS} =1A, V _{GS} =0V		0.75	1	V
I _S	Maximum Body-Diode ContinuousCurrent				3	A
DYNAMIC PARAMETERS						
C _{iss}	InputCapacitance	V _{GS} =0V, V _{DS} =15V, f=1MHz	1250	1590	1950	pF
C _{oss}	OutputCapacitance		160	240	320	pF
C _{rss}	Reverse TransferCapacitance		90	145	210	pF
SWITCHING PARAMETERS						
Q _g	TotalGate Charge	V _{GS} =10V, V _{DS} =15V, I _D =18A	24	30	37	nC
Q _{gs}	Gate Source Charge		4	5.6	6.5	nC
Q _{gd}	Gate Drain Charge		4.5	7.8	11.2	nC
t _{D(on)}	Turn-OnDelayTime	V _{GS} =10V, V _{DS} =15V, R _L =0.83Ω, R _{GEN} =3Ω		6.7		ns
t _r	Turn-On Rise Time			3.5		ns
t _{D(off)}	Turn-OffDelayTime			22.5		ns
t _f	Turn-OffFallTime			4		ns
t _{rr}	Body Diode Reverse Recovery Time		I _F =18A, dI/dt=500A/μs	20	28	35
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =18A, dI/dt=500A/μs	18	24	30	nC

Notes:

- A. The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design.
- B. The power dissipation P_D is based on T_{J(MAX)}=150°C, using ≤ 10s junction-to-ambient thermal resistance
- C. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150°C. Ratings are based on low frequency and duty cycles to keep initial T_J=25°C.
- D. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max
- E. These curves are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, assuming a maximum junction temperature of T_{J(MAX)}=150°C. The SOA curve provides a single pulse rating.



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

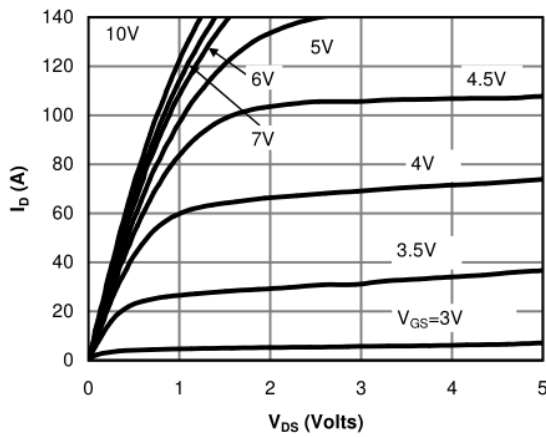


Fig 1: On-Region Characteristics (Note D)

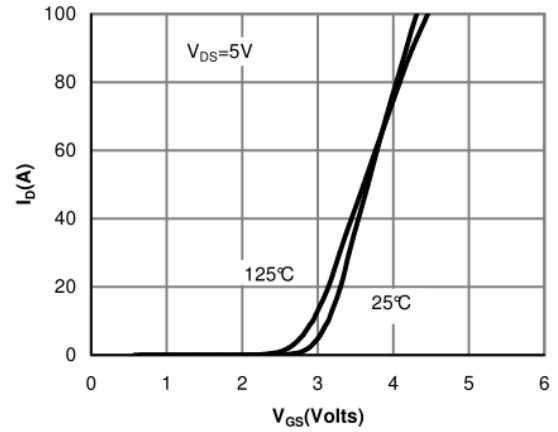


Figure 2: Transfer Characteristics (Note D)

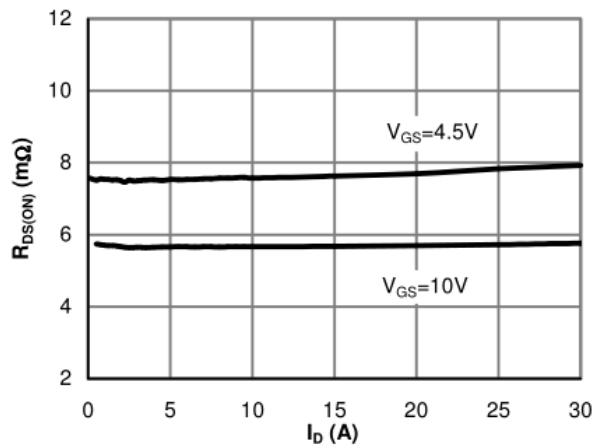


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note D)

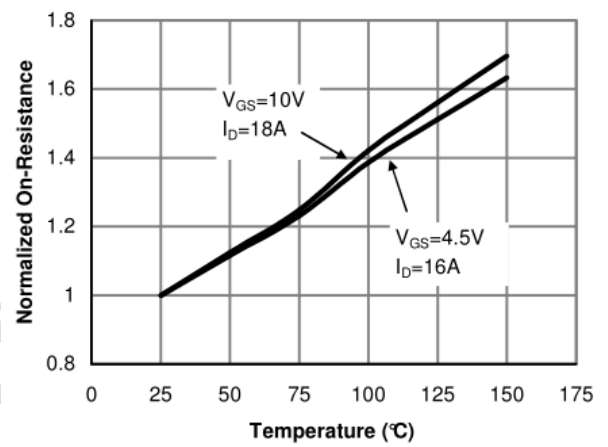


Figure 4: On-Resistance vs. Junction Temperature (Note D)

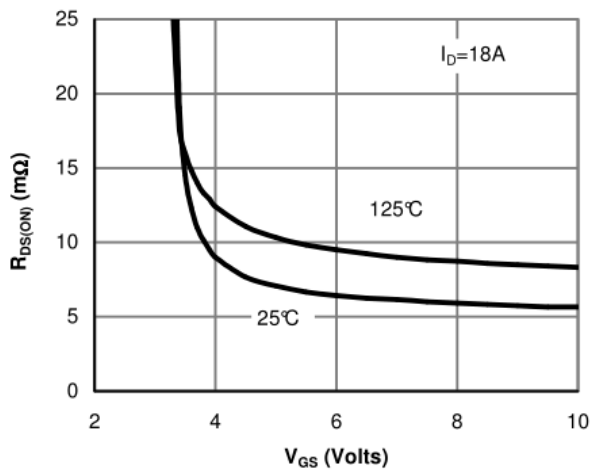


Figure 5: On-Resistance vs. Gate-Source Voltage (Note D)

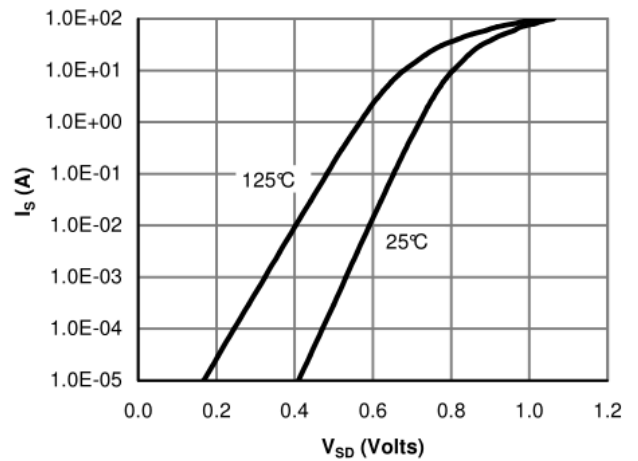


Figure 6: Body-Diode Characteristics (Note D)



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

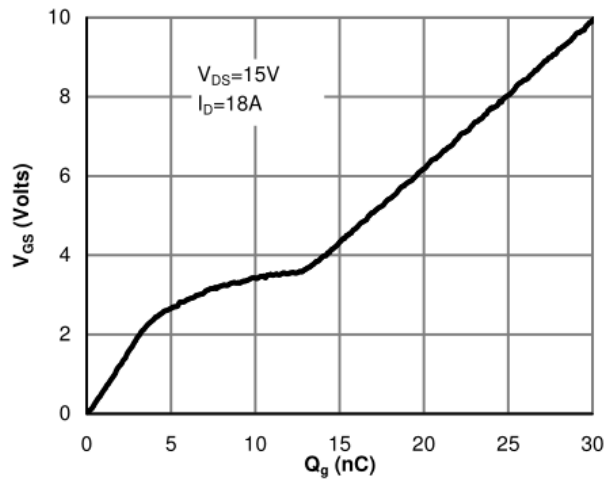


Figure 7: Gate-Charge Characteristics

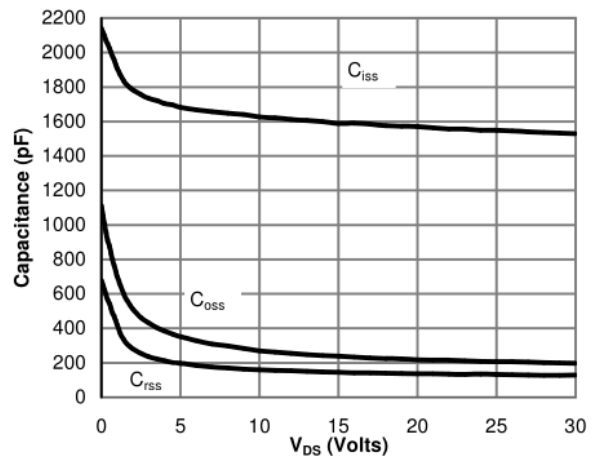


Figure 8: Capacitance Characteristics

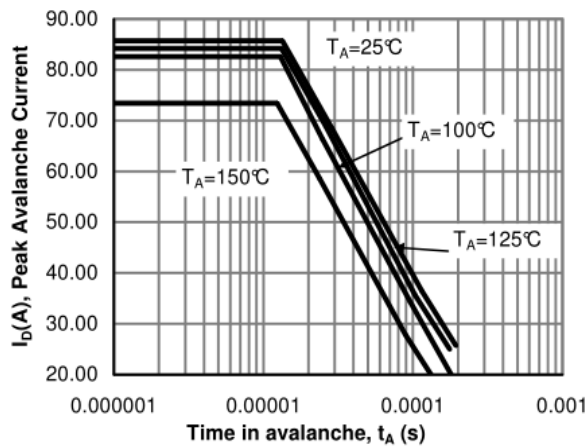


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

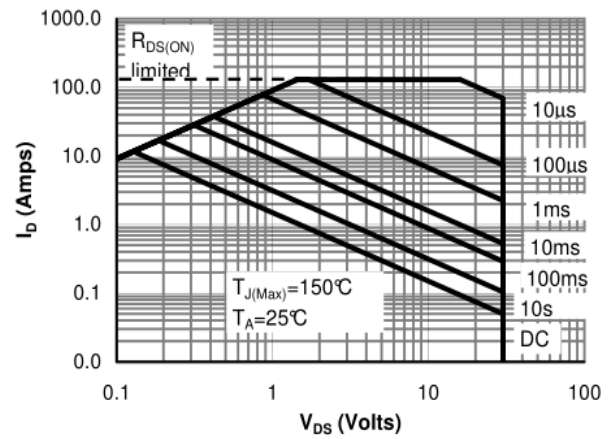


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

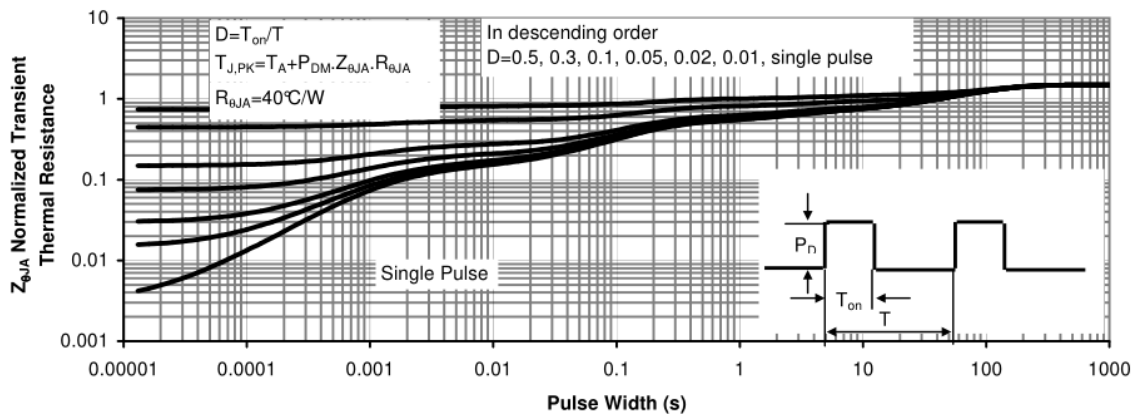
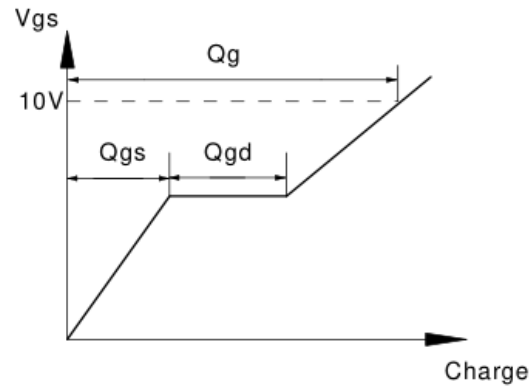
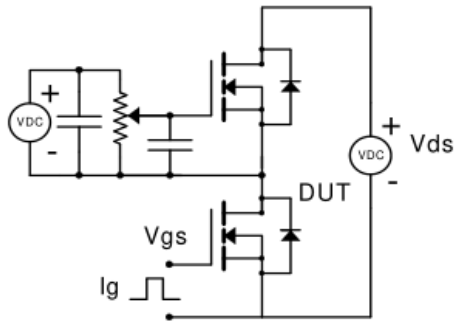


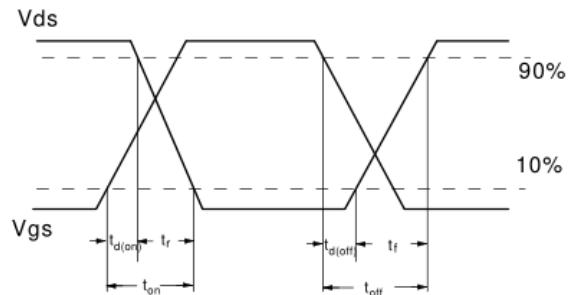
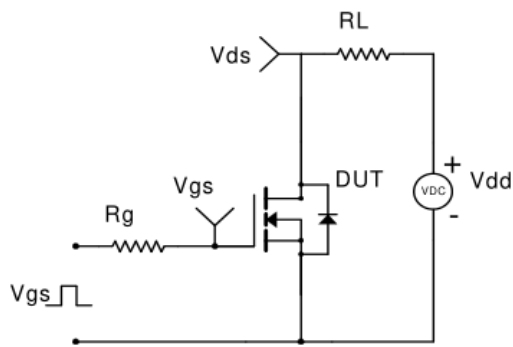
Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)



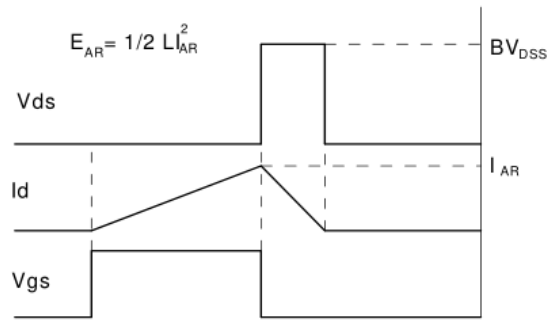
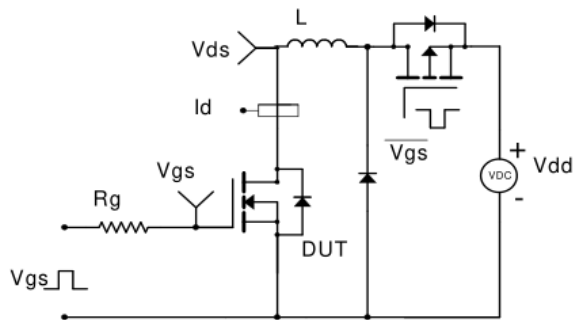
Gate Charge Test Circuit & Waveform



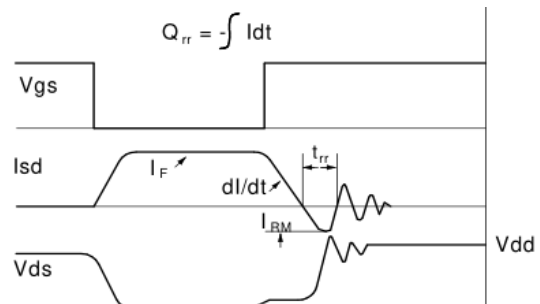
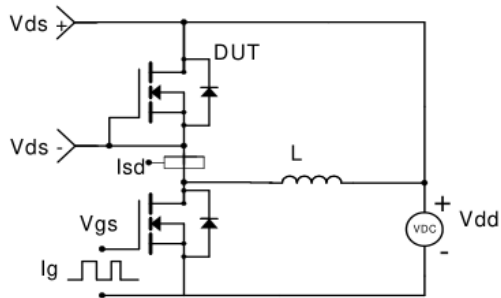
Resistive Switching Test Circuit & Waveforms

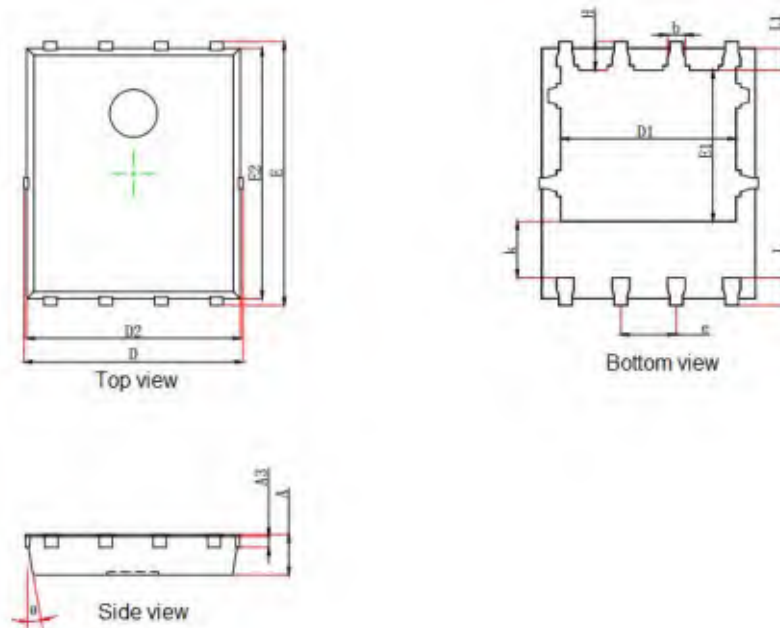


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



**Package Information****PDFN5*6-8L**

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	10°	12°	10°	12°