LMN6184DF 60V N-Channel Enhancement Mode MOSFET

Features

- $R_{DS(ON)}$=92mΩ@V_{GS}=10V
- $R_{DS(ON)}$=100mΩ@V_{GS}=4.5V
- Improved dv/dt capability
- Fast switching
- 100% EAS guaranteed.

Product Description

These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

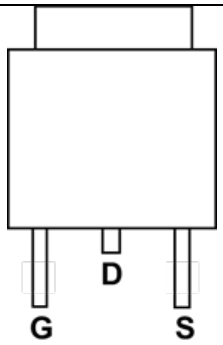
These devices are well suited for high efficiency fast switching applications.

Applications

- Motor Drive
- Power Tools
- LED Lighting

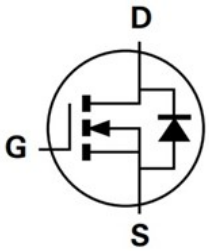
Pin Configuration

LMN6184DF (TO-252)



Transparent top view

Pin	Description
1	Gate
2	Drain
3	Source



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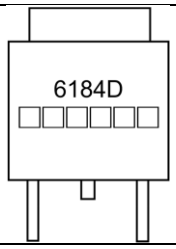
Ordering Information

Ordering Information					
Part Number	P/N	PKG code	Pb Free code	Package	Quantity
LMN6184DF	LMN4184	D	F	TO-252	2500 PCS

Marking Information

Part Marking	Part Number
	6184D

Absolute Maximum Ratings

(T_C=25ºC Unless otherwise noted)

Symbol	Parameter		Typical	Unit
V_{DSS}	Drain-Source Voltage		60	V
V_{GSS}	Gate-Source Voltage		±20	V
I_D	Continuous Drain Current[1]	T_C=25℃	10	A
		T_C=100℃	6	
		T_A=25℃	3	
		T_A=70℃	2	
I_{DM}	Pulsed Drain Current[2]		20	A
I_{AS}	Single Pulse Avalanche Current		11.2	A
E_{AS}	Single Pulse Avalanche Energy[3]		6.3	mJ
P_D	Total Power Dissipation[4]	T_C=25℃	20.8	W
		T_C=100℃	8.3	
		T_A=25℃	2	
		T_A=70℃	1.2	
T_J	Operating Junction Temperature		-55 to +150	°C
T_{STG}	Storage Temperature Range		-55 to +150	°C
$R_{\theta JC}$	Thermal Resistance, Junction to Case[1]		6	°C /W
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient[1]		62	°C /W

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Electrical Characteristics

(T_C=25ºC Unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	60			V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	1		3	V
I_{GSS}	Gate Leakage Current	V_{DS}=0V, V_{GS}=±20V			±100	nA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=60V, V_{GS}=0V			1	uA
$R_{DS(on)}$	Drain-Source On-Resistance[2]	V_{GS}=10V, I_D=6A		85	92	mΩ
		V_{GS}=4.5V, I_D=3A		90	100	
g_{FS}	Forward Transconductance	V_{DS}=10V, I_D=3A		3.6		S
Dynamic						
Q_g	Total Gate Charge	V_{DS}=48V, V_{GS}=4.5V, I_D=10A		4.9		nC
Q_{gs}	Gate-Source Charge			1.8		
Q_{gd}	Gate-Drain Charge			2.2		
C_{iss}	Input Capacitance	V_{DS}=15V, V_{GS}=0V, f=1MHz		511		pF
C_{oss}	Output Capacitance			38		
C_{rss}	Reverse Transfer Capacitance			25		
$t_{d(on)}$	Turn-On Time[2,3]	V_{DD}=30V, I_D=3A, V_{GS}=4.5V, R_G=3.3Ω		6		ns
t_r				9		
$t_{d(off)}$	Turn-Off Time[2,3]			18		
t_f				5		
Diode characteristics						
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V, I_S=10A			1.4	V
I_S	Continuous Source Current[1]	V_G=V_D=0V, Force Current			10	A
trr	Reverse Recovery Time	I_S=3A, V_{GS}=0V dI/dt=100A/μs		19		nS
Qrr	Reverse Recovery Charge			28		nC

Note:

1. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width ≦ 300us, duty cycle ≦ 2%
3. The EAS data shows Max. rating. The test condition is VDD=25V, VGS=10V, L=0.1mH, IAS=11.2A
4. The power dissipation is limited by 150℃ junction temperature
5. The data is theoretically the same as ID and IDM, in real applications, should be limited by total power dissipation.

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Typical Performance Characteristics

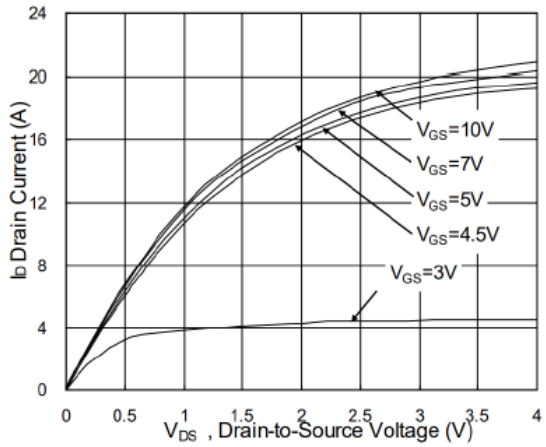

Fig 1. Output Characteristics

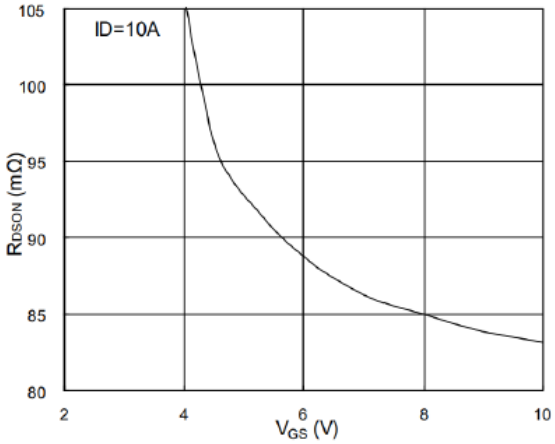

Fig. 2 On-Resistance vs. Gate Source

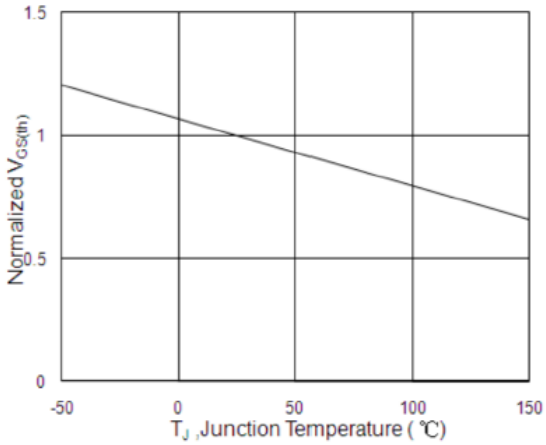

Fig. 3 Normalized Gate Threshold Voltage

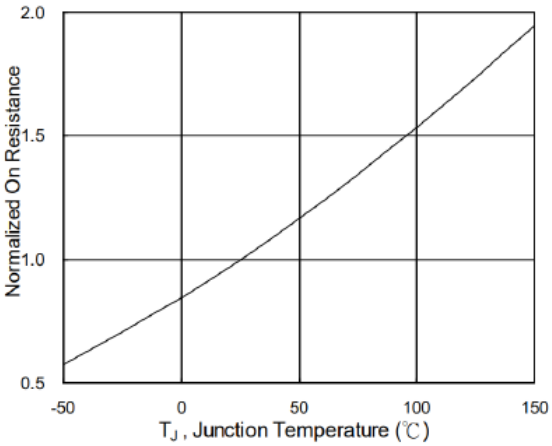

Fig. 4 Normalized On-Resistance

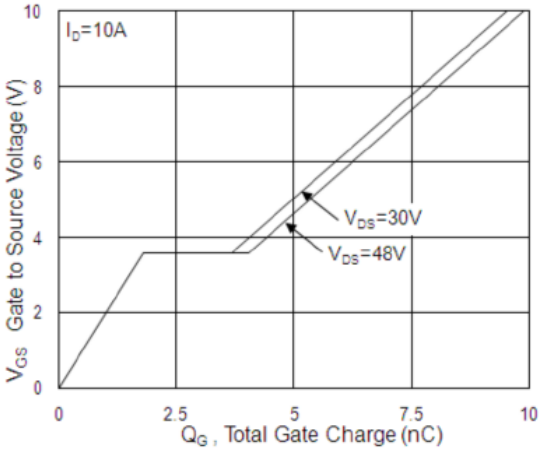

Fig. 5 Gate Charge Characteristics

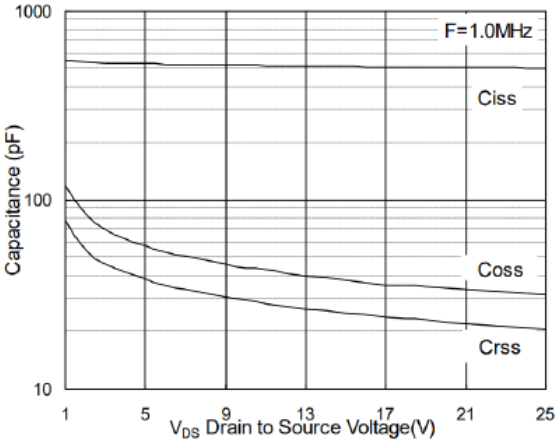

Fig. 6 Typical Capacitance

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Typical Performance Characteristics

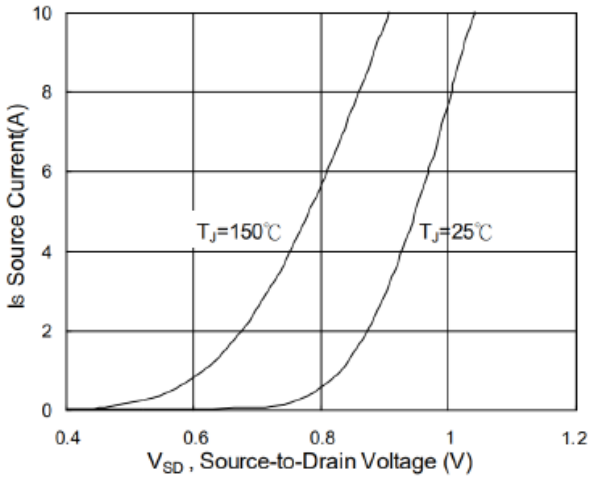

Fig. 7 Diode Forward Characteristics

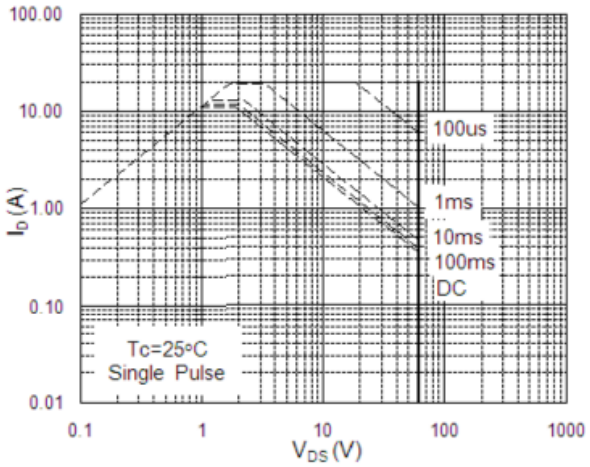

Fig. 8 Safe Operating Area

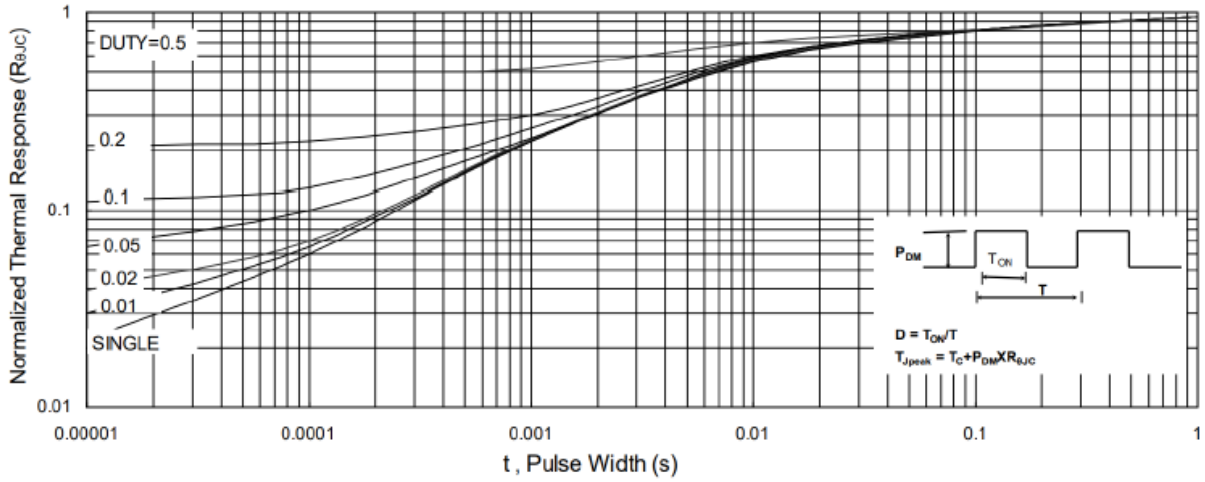

Fig. 9 Transient Thermal Impedance

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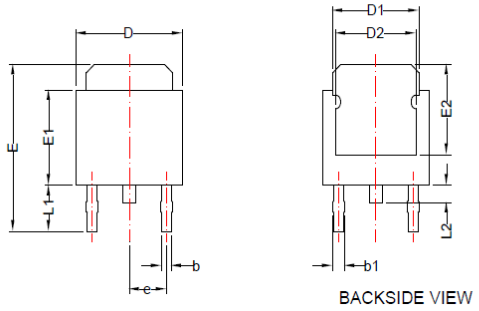
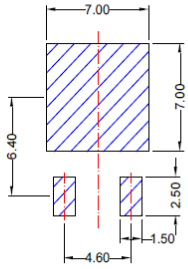
Package Dimension:

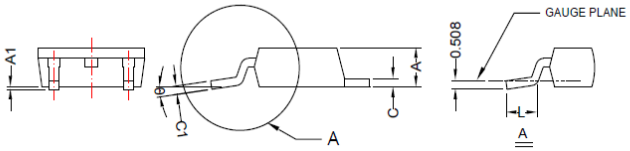
TO-252

Package Dimension



Recommended Land Pattern





Dimensions				
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	2.18	2.40	0.086	0.094
A1	0.00	0.15	0.000	0.006
b	0.50	0.90	0.020	0.035
c	0.45	0.89	0.018	0.035
c1	0.40	0.61	0.016	0.024
D	6.35	6.80	0.250	0.268
D1	4.95	5.50	0.195	0.217
D2	3.81	-	0.150	-
E	9.40	10.41	0.370	0.410
E1	5.33	5.80	0.210	0.228
E2	4.57	-	0.180	-
e	2.286 BSC		0.090 BSC	
L	1.40	1.78	0.055	0.070
L1	2.40	3.00	0.094	0.118
θ	0°	8°	0°	8°

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