

Description

The LMFZ7N60 is a new generation of high voltage N-Channel enhancement mode power MOSFETs and is obtained through an extreme optimization layout design, in addition to pushing on-resistance significantly down, special care is taken to ensure a very good dv/dt capability, provide superior switching performance, withstand high energy pulse in the avalanche, and increases packing density.

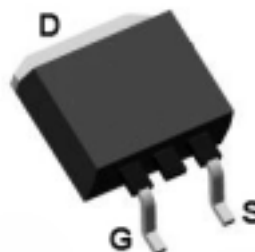
General Features

- Extremely high dv/dt capability
- Low Gate Charge Qg results in Simple Drive Requirement
- 100% avalanche tested
- Gate charge minimized
- Very low intrinsic capacitances
- Very good manufacturing repeatability

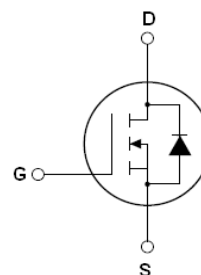
Application

- High current, high speed switching
- Ideal for off-line power supply, adaptor, PFC

Dimensions TO-263



Pin Configuration



Package Marking and Ordering Information

Device	Device Marking	Device Package	Reel Size	Tape width	Quantity
LMFZ7N60	-	TO-263	-	-	50 units

Absolute Maximum Ratings (TC=25°C unless otherwise noted)

	Parameter	Max.	Units
ID@Tc=25 C	Continuous Drain Current, VGS@10V	7.2	A
ID@Tc=100C	Continuous Drain Current, VGS@10V	4.8	
IDM	Pulsed Drain Current ①	28.8	
PD@TC=25C	Power Dissipation	145	W
	Linear derating Factor	0.8	W/C
VGS	Gate-to-Source Voltage	±30	V
EAS	Single Pulse Avalanche Energy ②	586	mJ
IAR	Avalanche Current ①	4	A
EAR	Repetitive Avalanche Energy ①	15	mJ
dv/dt	Peak Diode Recovery dv/dt ③	4.5	V/ns
TJ TSTG	Operating Junction and Storage Temperature Range	-55 to +150	°C

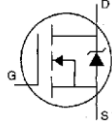
Thermal Resistance

	Parameter	Min.	Typ.	Max.	Units
R θ JC	Junction-to-case	—	—	0.86	C/W
R θ CS	Case-to-Sink, Flat, Greased Surface	—	0.50	—	
R θ JA	Junction-to-Ambient	—	—	62.5	

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

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
V(BR)DSS	Drain-to-Source Breakdown Voltage	600	—	—	V	VGS=0V, ID=250μA
$\Delta V(BR)DSS / \Delta T_J$	Breakdown Voltage Temp.Coefficient	—	0.6	—	V/C	Reference to 25°C, ID=250μA
RDS(on)	Static Drain-to-Source On-resistance	—	0.9	1.1	Ω	VGS=10V, ID=3.8A ④
VGS(th)	Gate Threshold Voltage	2.0	—	4.0	V	VDS=VGS, ID=250μA
gfs	Forward Transconductance	—	6.4	—	S	VDS=40V, ID=3.8A
IDSS	Drain-to-Source Leakage current	—	—	1	uA	VDS=600V, VGS=0V
		—	—	10		VDS=480V, VGS=0V, T _J =150°C
IGSS	Gate-to-Source Forward leakage	—	—	0.5	uA	VGS=30V
	Gate-to-Source Reverse leakage	—	—	-0.5		VGS=-30V
Qg	Total Gate Charge	—	28.5	15	nC	ID=7.5 VDS=480V VGS=10V
Qgs	Gate-to-Source charge	—	7	—		
Qgd	Gate-to-Drain("Miller") charge	—	14.6	—		
td(on)	Turn-on Delay Time	—	29	70	nS	VDD=300 ID=7.5A RG=25Ω
tr	Rise Time	—	78	160		
td(off)	Turn-Off Delay Time	—	65	130		
tf	Fall Time	—	60	128		
Ciss	Input Capacitance	—	1000	1350	pF	f=1.0MHZ
Coss	Output Capacitance	—	125	165		
Crss	Reverse Transfer Capacitance	—	16	21		

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current (Body Diode)	—	—	7.2	A	MOSFET symbol showing the integral reverse p-n junction diode. 
ISM	Pulsed Source Current (Body Diode) ①	—	—	28.8		
VSD	Diode Forward Voltage	—	—	1.3	V	T _J =25°C, IS=7.2A, VGS=0V ④
Trr	Reverse Recovery Time	—	300	—	nS	T _J =25°C, IF=7.2A
Qrr	Reverse Recovery Charge	—	1.8	—	uC	di/dt=100A/μs ④

Notes:

- ① Repetitive rating; pulse width limited by maximum junction temperature
- ② L = 23.5mH, IAS =6.5A, VDD = 50V, RG = 25Ω, Starting, T_J = 25°C
- ③ ISD≤4A, di/dt≤200A/μs, VDD≤V(BR)DSS, T_J≤25°C
- ④ Pulse width≤300μS; duty cycle≤2%

Typical Electrical and Thermal Characteristics

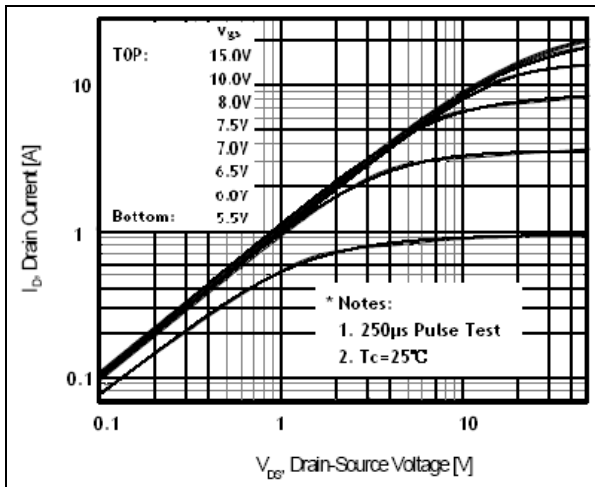


Figure 1 On-Region Characteristics

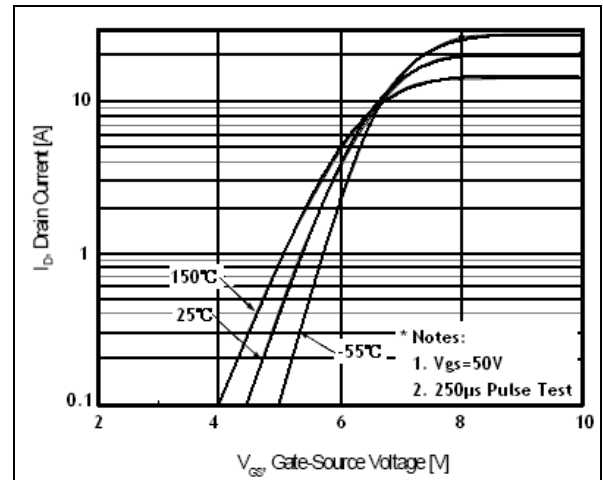


Figure 2 Transfer Characteristics

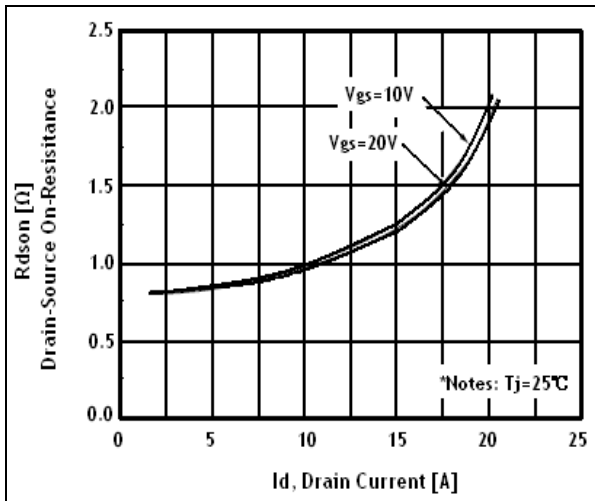


Figure 3 On-Resistance Variation vs. Drain Current and Gate Voltage

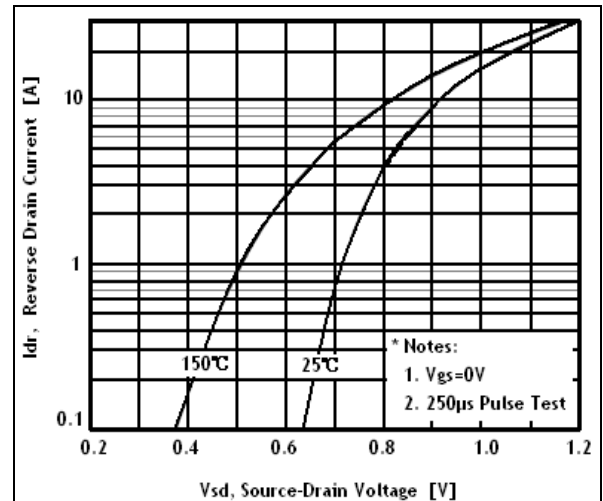


Figure 4 Body diode forward Voltage Variation vs. Source Current and temperature

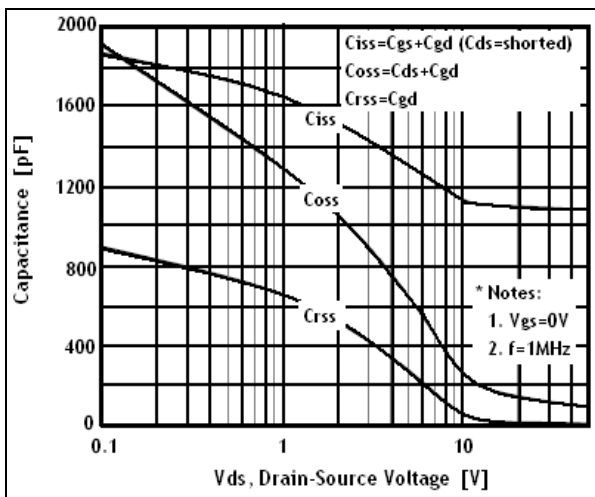


Figure 5 Capacitance Characteristics

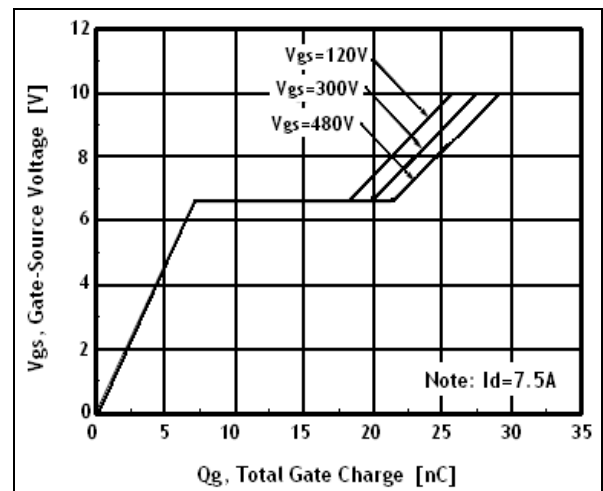


Figure 6 Gate Charge Characteristics

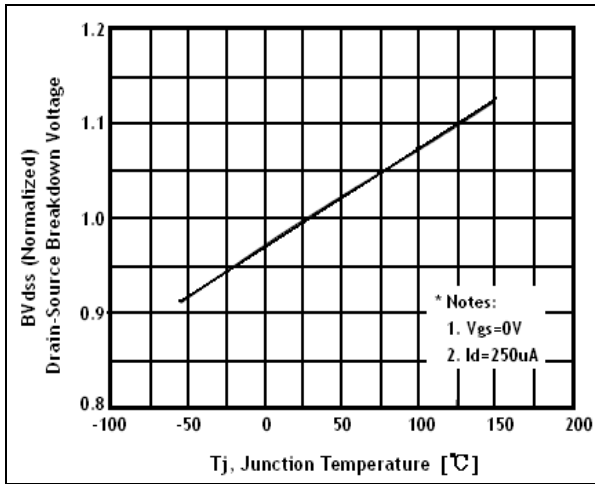


Figure 7 Breakdown Voltage Variation vs. Temperature

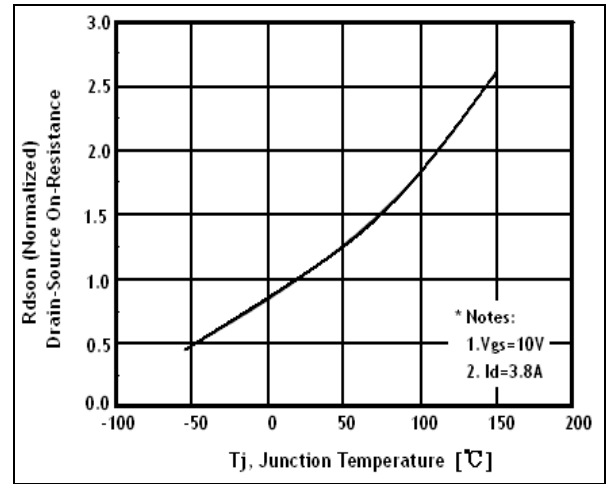


Figure 8 On-Resistance Variation vs. Temperature

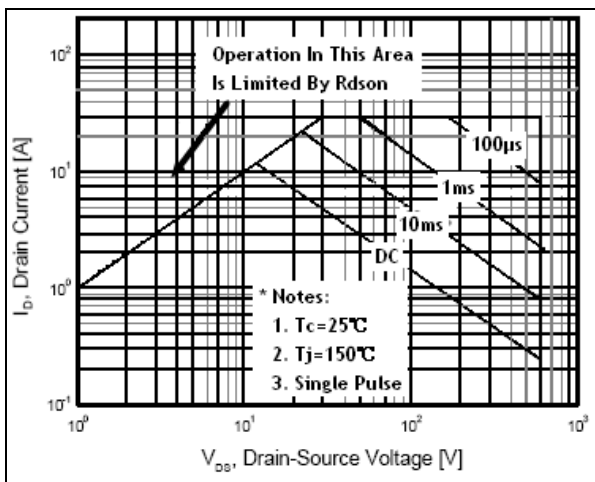


Figure 9 Maximum Safe Operation Area

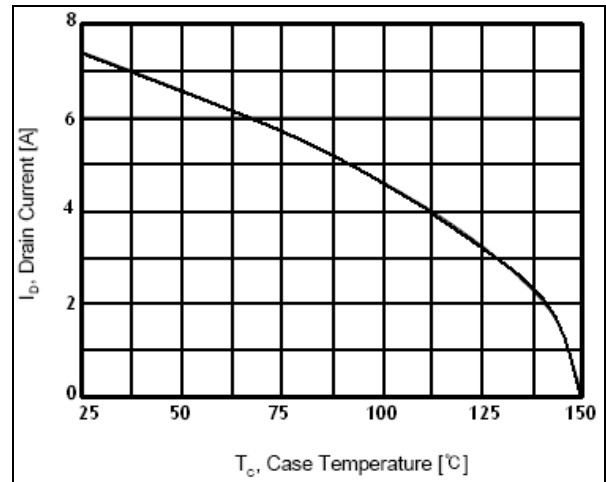


Figure 10 Maximum Drain Current vs. Case Temperature

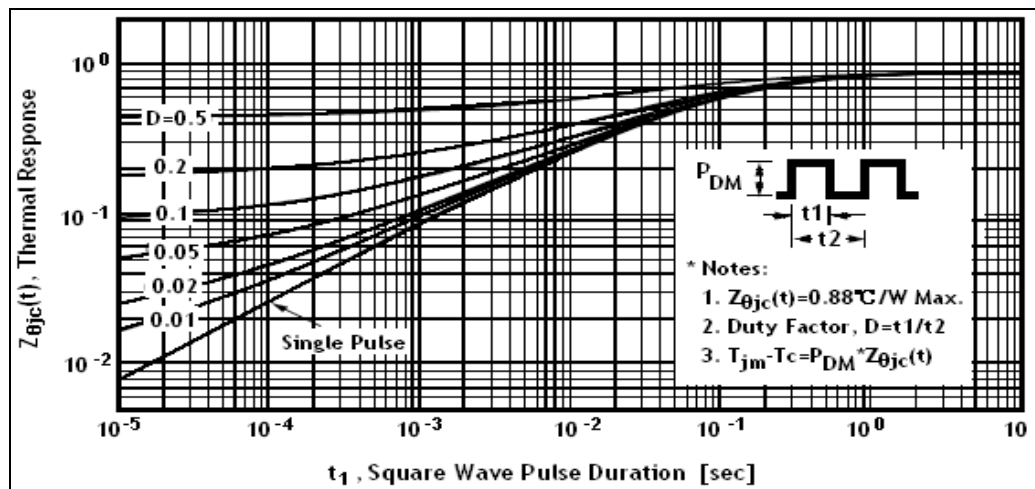
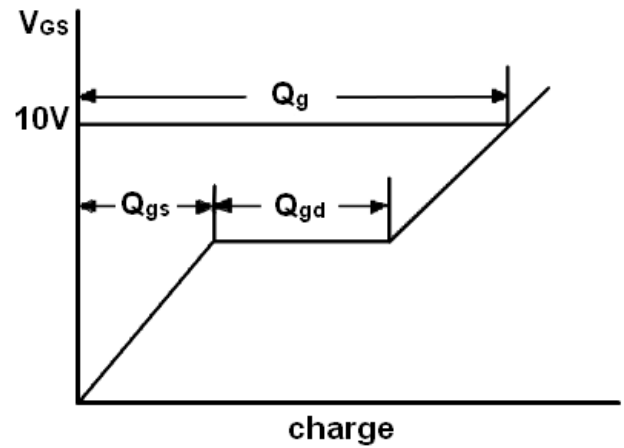
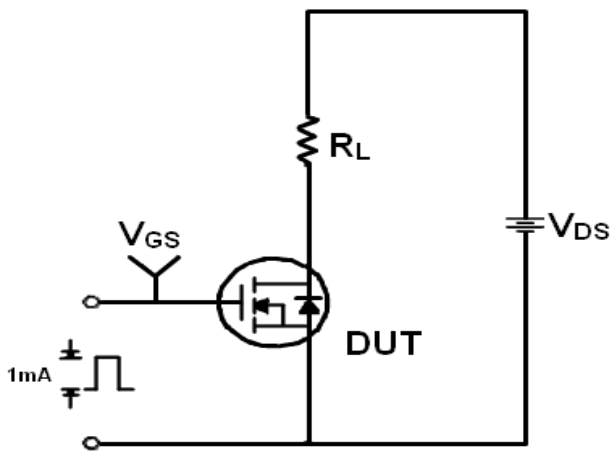
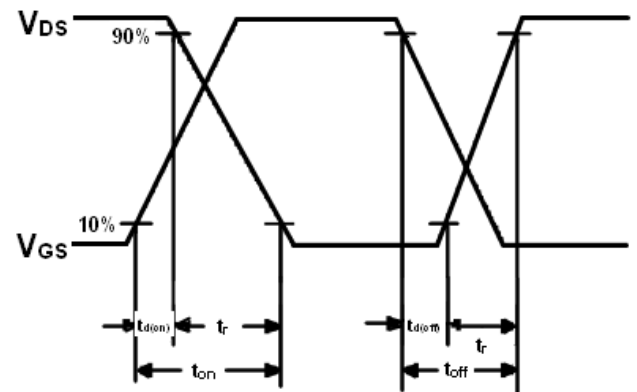
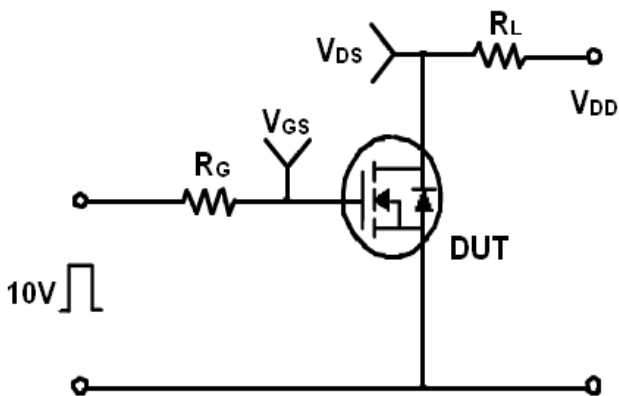


Figure 12 Transient Thermal Response Curve

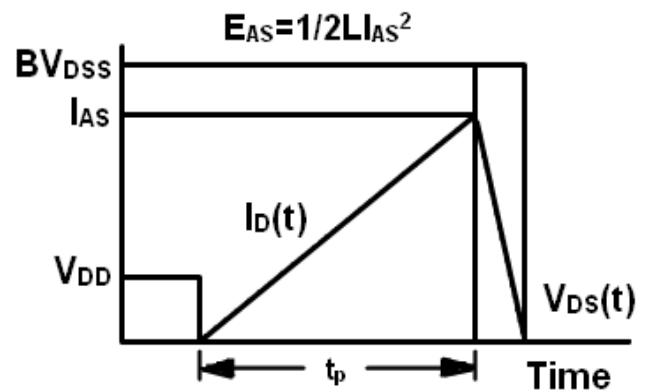
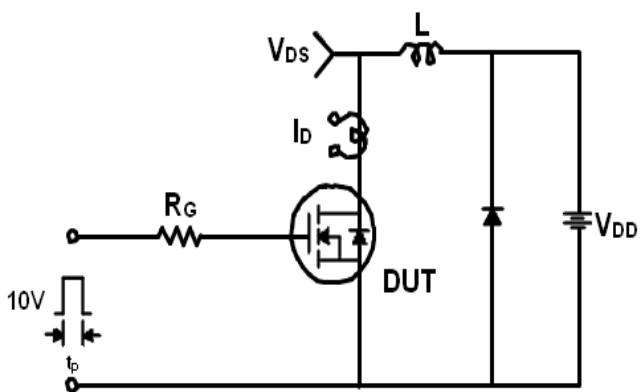
Test Circuit and Waveform



Gate Charge Test Circuit & Waveform

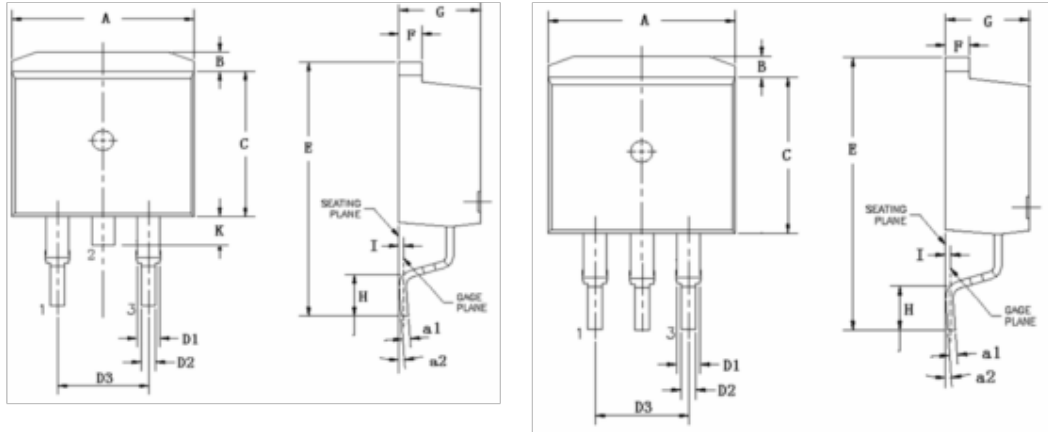


Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform

TO263 PACKAGE OUTLINE DIMENSION



Symbol	Dimension In Millimeters		Dimension In Inches	
	Min	Max	Min	Max
A	9.660	10.280	0.380	0.405
B	1.020	1.320	0.040	0.052
C	8.590	9.400	0.338	0.370
D1	1.140	1.400	0.045	0.055
D2	0.700	0.950	0.028	0.037
D3	5.080 (TYP)		0.200 (TYP)	
E	15.090	15.390	0.594	0.606
F	1.150	1.400	0.045	0.055
G	4.300	4.700	0.169	0.185
H	2.290	2.790	0.090	0.110
I	0.250 (TYP)		0.010 (TYP)	
K	1.300	1.600	0.051	0.063
a1	0.450	0.650	0.018	0.026
a2	0 ^o	8 ^o	1 ^o	8 ^o