



Dual channel 30V N-Channel MOSFET

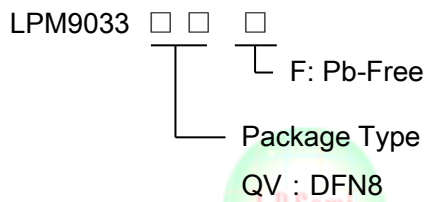
General Description

The LPM9033 is a dual channel MOSFET, which uses advanced trench technology to provide excellent $R_{DS(ON)}$ with low gate charge. Each channel has all the features. This is an all purpose device that is suitable for use in a wide range of power conversion applications.

Features

- ◆ 100% EAS Guaranteed
- ◆ Green Device Available
- ◆ Super Low Gate Charge
- ◆ Excellent CdV/dt effect decline
- ◆ Advanced high cell density Trench technology

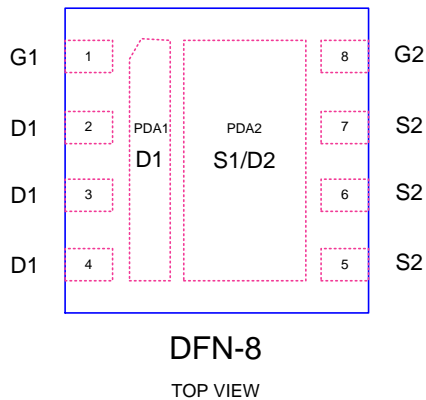
Order Information



Applications

- ◇ Driver for Relay, Solenoid, Motor, LED etc.
- ◇ DC-DC converter circuit
- ◇ Power Switch
- ◇ Load Switch
- ◇ Charging

Pin Configurations



Pin Description

Pin Number	Pin Description
1	G1
2	D1
3	D1
4	D1
5	S2
6	S2
7	S2
8	G2
PDA1	D1
PAD2	S1/D1

Marking Information

Device	Marking	Package	Shipping
LPM9033QVF	LPS 9033 YWX	DFN-8	5K/REEL



Absolute Maximum Ratings

Channel 1 and channel 2 have the same maximum ratings

Parameter		Symbol	10 Sec	Steady State	Unit
Drain-Source Voltage		V_{DS}	30		V
Gate-Source Voltage		V_{GS}	± 20		
Continuous Drain Current	TA=25°C	I_D	13.5	10	A
	TA=70°C		10.8	8	
Pulsed Drain Current		I_{DM}	120		
Avalanche Current		I_{AR}	23		
Repetitive avalanche energy L=0.3mH		E_{AR}	79		mJ
Power Dissipation	TA=25°C	P_D	3.1	1.7	W
	TA=70°C		2.0	1.1	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150		°C

Thermal resistance ratings

Parameter		Symbol	TYP	MAX	Unit
Junction-to-Case Thermal Resistance	$t \leq 10s$	$R_{\theta JA}$	31	40	°C/W
Junction-to-Case Thermal Resistance	Steady State		59	75	°C/W
Maximum Junction-to-Lead	Steady State	$R_{\theta JL}$	16	24	°C/W



Electrical Characteristics

Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise noted)
Channel 1 and channel 2 have the same electrical characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	30			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=40\text{V}$, $V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			1 5	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=25\mu\text{A}$	1.7	2.2	3	V
$I_{D(ON)}$	On state drain current	$V_{GS}=10\text{V}$, $V_{DS}=5\text{V}$	120			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$, $I_D=10\text{A}$ $T_J=125^\circ\text{C}$		8.2	10	m Ω
		$V_{GS}=4.5\text{V}$, $I_D=8\text{A}$		10	12.5	
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}$, $I_D=10\text{A}$		75		S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}$, $V_{GS}=0\text{V}$		0.72	1	V
I_S	Maximum Body-Diode Continuous Current				2.5	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance			1500	1950	pF
C_{oss}	Output Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=20\text{V}$, $f=1\text{MHz}$		215		pF
C_{rss}	Reverse Transfer Capacitance			135		pF
R_g	Gate resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$	2	3.5	5	Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}$, $V_{DS}=20\text{V}$, $I_D=10\text{A}$		27.2	37	nC
$Q_g(4.5\text{V})$	Total Gate Charge			13.6	18	nC
Q_{gs}	Gate Source Charge			4.5		nC
Q_{gd}	Gate Drain Charge			6.4		nC
$t_{D(on)}$	Turn-On DelayTime	$V_{GS}=10\text{V}$, $V_{DS}=20\text{V}$, $R_L=2\Omega$, $R_{GEN}=3\Omega$		6.4		ns
t_r	Turn-On Rise Time			17.2		ns
$t_{D(off)}$	Turn-Off DelayTime			29.6		ns
t_f	Turn-Off Fall Time			16.8		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=10\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		30	40	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=10\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		19		nC



Typical Characteristics

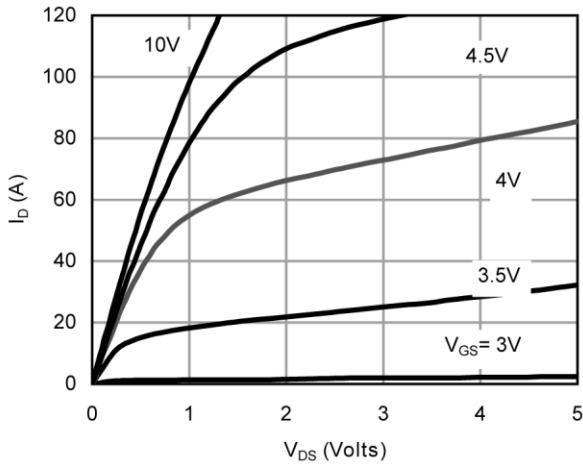


Figure 1: On-Region Characteristics

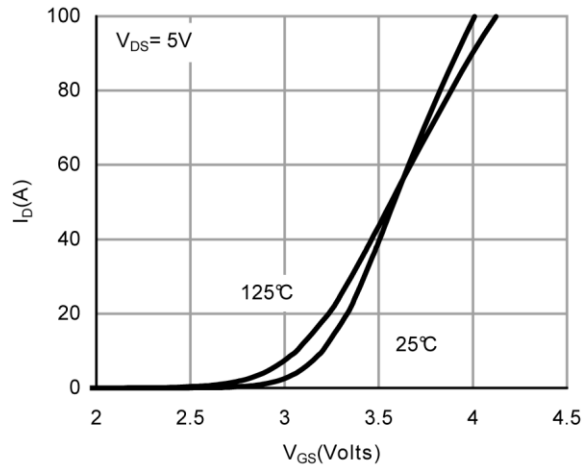


Figure 2: Transfer Characteristics

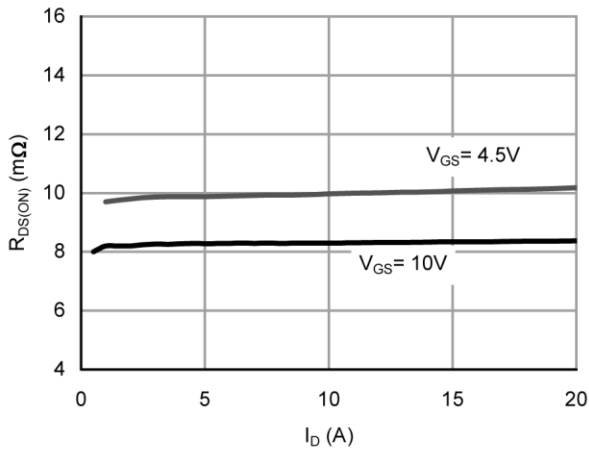


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

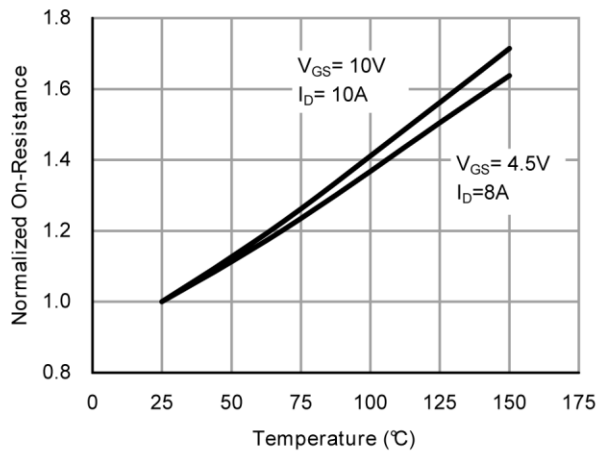


Figure 4: On-Resistance vs. Junction Temperature

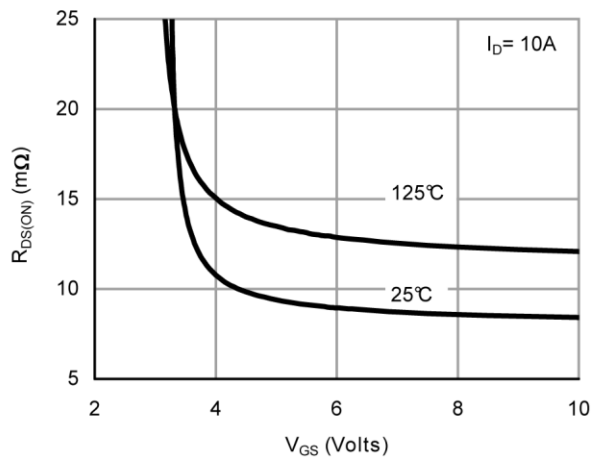


Figure 5: On-Resistance vs. Gate-Source Voltage

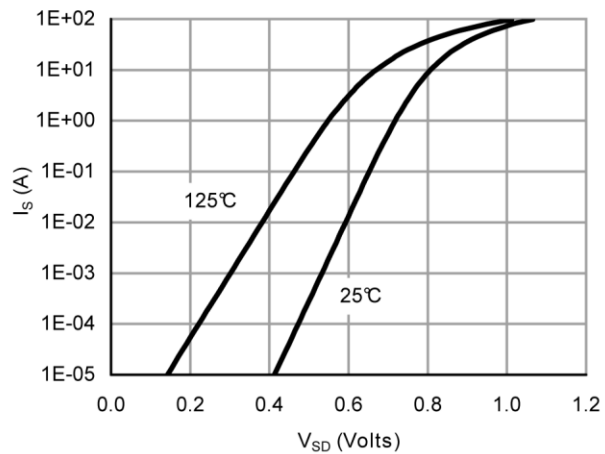


Figure 6: Body-Diode Characteristics

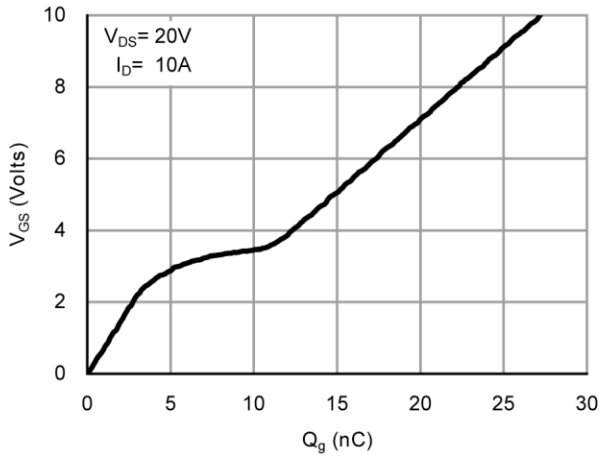


Figure 7: Gate-Charge Characteristics

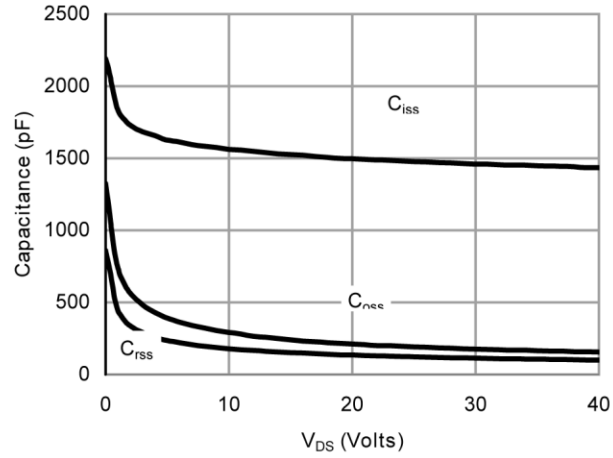


Figure 8: Capacitance Characteristics

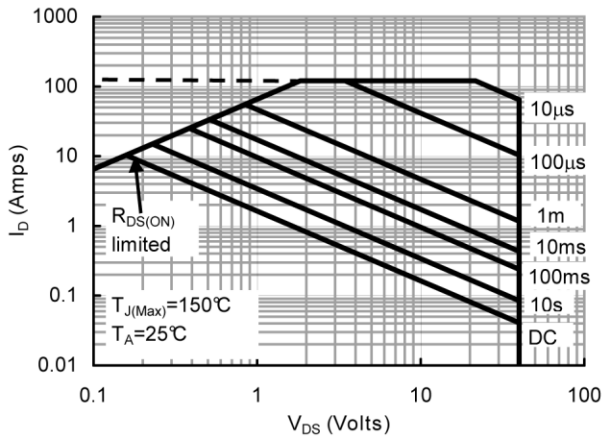


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

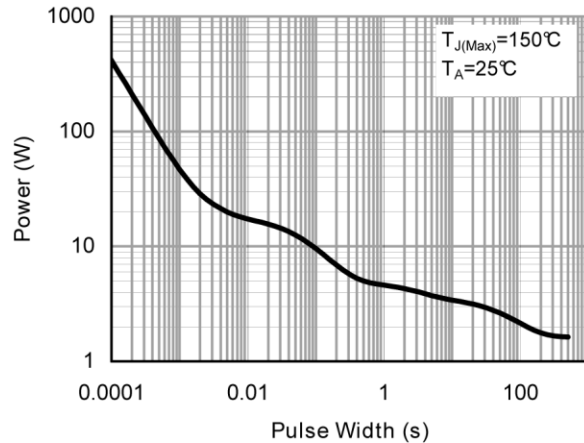


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

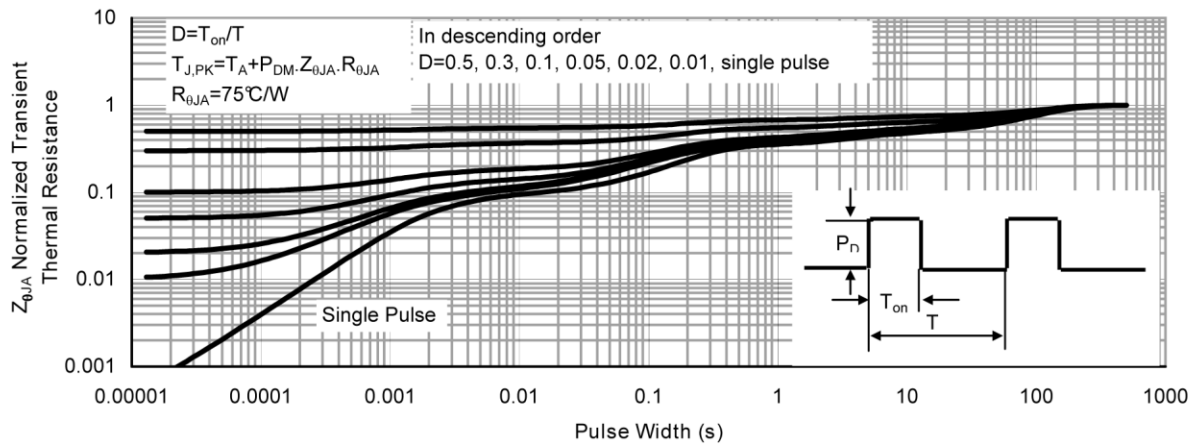
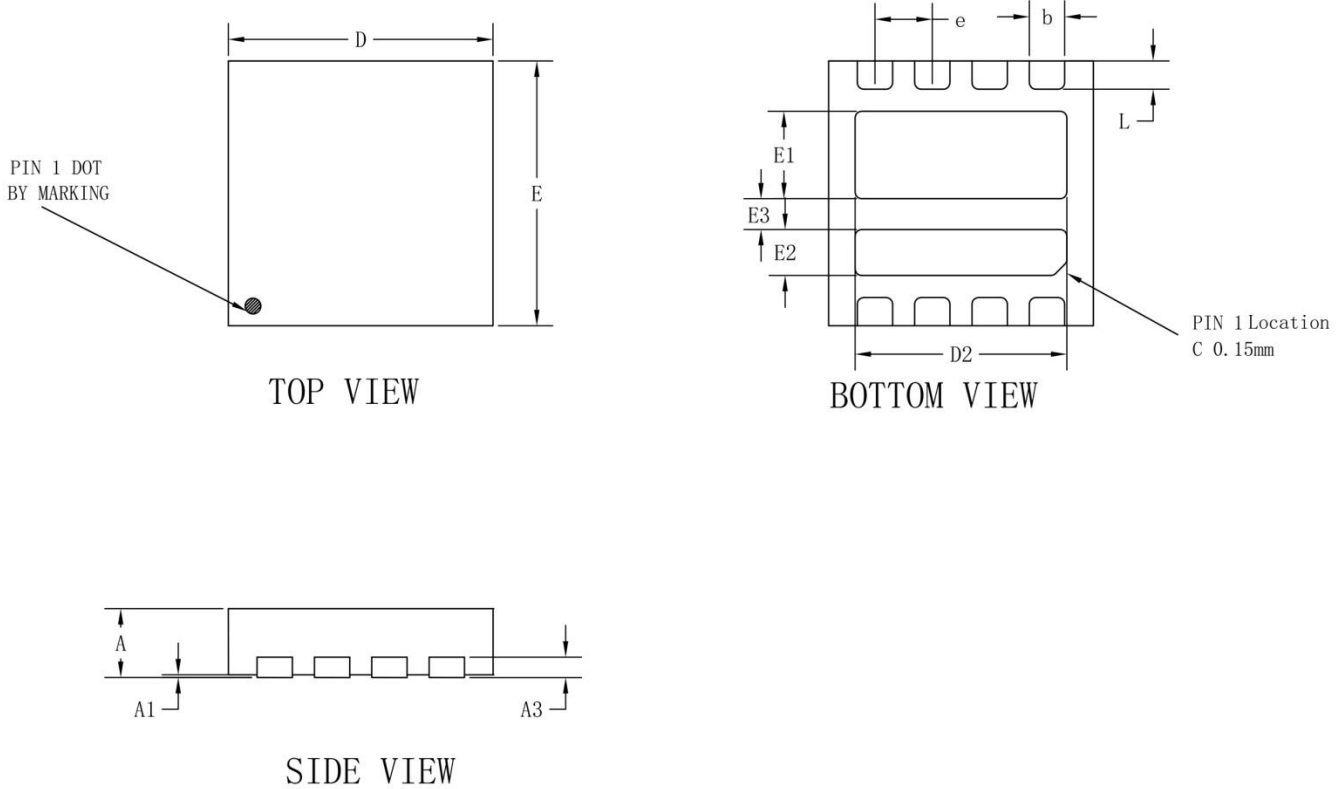


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)



Packaging Information

DFN8 3*3



COMMON DIMENSIONS (MM)			
PKG.	W: VERY VERY THIN		
REF.	MIN.	NOM.	MAX.
A	0.70	0.75	0.80
A1	0.00	-	0.05
A3	0.20 REF.		
D	2.95	3.00	3.05
E	2.95	3.00	3.05
D2	2.30	2.40	2.50
E2	0.42	0.52	0.62
E1	0.89	0.99	1.09
E3		0.35	
b	0.35	0.40	0.45
L	0.27	0.32	0.37
e	0.65 BSC		