

Description

The DMP2040UFDF-7 is the new generation trench P-ch

MOSFET has been designed to minimize the on-state resistance ($R_{DS(ON)}$) yet maintain superior switching performance, making it ideal for high efficiency power management applications

Features

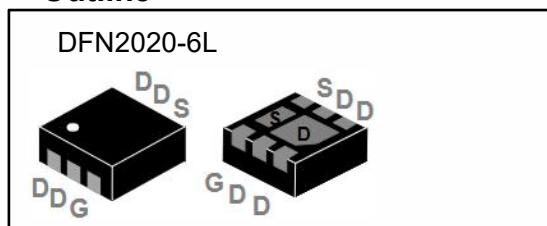
- High - speed switching
- Excellent gate charge x $R_{DS(ON)}$ product (FOM)
- for extremely low $R_{DS(ON)}$
- Lead-Free, Halogen-Free; RoHS Compliant

Applications

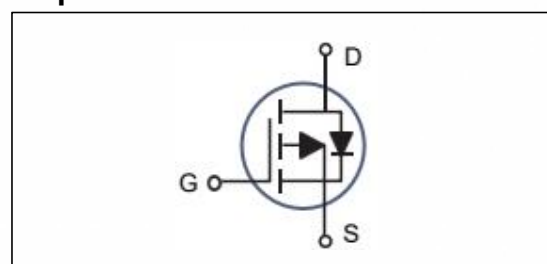
- PWM Application
- Power Management
- Load switch

V_{DSS}	-20V
I_D	-20A
$R_{DS(ON)}$	9.5mΩ @ $V_{GS}=-4.5V$
$R_{DS(ON)}$	12.5mΩ @ $V_{GS}=-2.5V$

Outline



Equivalent



Packaging specifications

Part No.	Package	Marking	Basic ordering unit.(pcs)
DMP2040UFDF-7	DFN2020-6L		3000

Absolute Maximum Ratings

Parameter		Symbol	Limit	Units
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	±12	V
Drain Current-Continuous ^(Note2)	$T_C=25^{\circ}C$	I_D	-20	A
	$T_C=70^{\circ}C$		-15	A
-Pulsed ^(Note 1- Note 2)		I_{DM}	-80	A
Maximum Power Dissipation	$T_C=25^{\circ}C$	P_D	7.8	W
	$T_C=70^{\circ}C$		6.1	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C
Thermal Resistance Junction-Ambient		$R_{\theta JA}$	62	°C /W
Thermal Resistance Junction-Case		$R_{\theta JC}$	24	°C/W

Electrical Characteristics ($T_C=25\text{ }^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V , I _D =-250uA	-20			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-20V , V _{GS} =0V			-1	uA
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±12V , V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =-250uA	-0.4	-0.6	-1.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-4.5V , I _D =-8A		9.5	11.5	mΩ
		V _{GS} =-2.5V , I _D =-5A		12.5	14.5	mΩ
Forward Transconductance	g _{FS}	V _{GS} =-10V , I _D =-2A		11.5		S
DYNAMIC CHARACTERISTICS Note4						
Input Capacitance	C _{ISS}	V _{DS} =-10V , V _{GS} =0 V , f =1.0MHz		1980		pF
Output Capacitance	C _{OSS}			300		pF
Reverse Transfer Capacitance	C _{RSS}			280		pF
Total Gate Charge	Q _g	V _{DS} =-10V , I _D =-2A , V _{GS} =-4.5V		18		nC
Gate-Source Charge	Q _{gs}			3.2		nC
Gate-Drain Charge	Q _{gd}			4.3		nC
SWITCHING CHARACTERISTICS Note4						
Turn-On Delay Time	t _{D(ON)}	V _{DD} =-10V , I _D =-1A , V _{GS} =-4.5V , R _{GEN} =3Ω		1.3		ns
Rise Time	tr			6.2		ns
Turn-Off Delay Time	t _{D(OFF)}			9.5		ns
Fall Time	tf			2.6		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Diode Forward Voltage	V _{SD}	V _{GS} =0V , I _S =-2A			-1.2	V

Notes:

- 1、Pulse Test Width < 300us,Duty Cycle< 2%
- 2、Drain current limited by maximum junction temperature.
- 3、tating $T_j=25^{\circ}\text{C}$, $L=0.1mH$, $V_{DD}=-15V$
- 4、Guaranteed by design,not subject to production testing.

Typical Performance Characteristics

Fig.1 Continuous Drain Current vs. T_C
 T_C , Case Temperature ($^{\circ}\text{C}$)

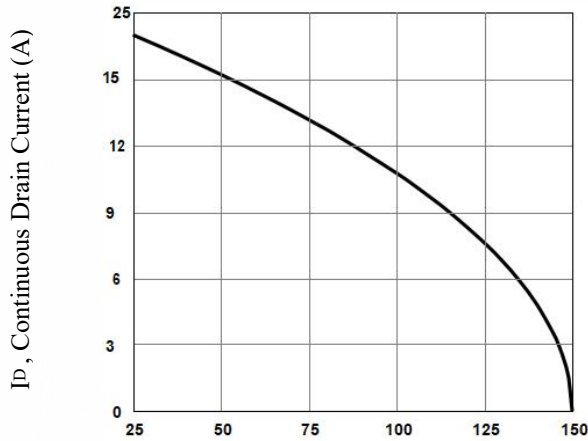


Fig.2 Normalized $R_{DS(on)}$ vs. T_J
 T_J , Junction Temperature ($^{\circ}\text{C}$)

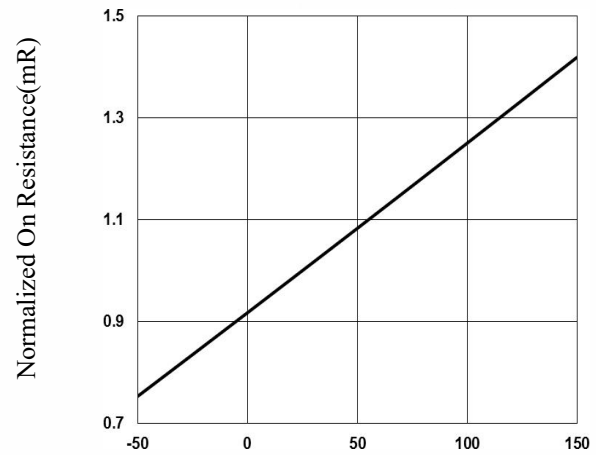


Fig.3 Normalized V_{th} vs. T_J
 T_J , Junction Temperature ($^{\circ}\text{C}$)

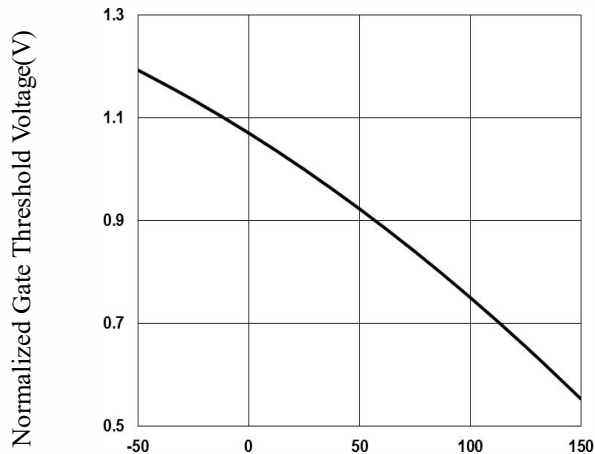


Fig.4 Gate Charge Waveform
 Q_g , Gate Charge (nC)

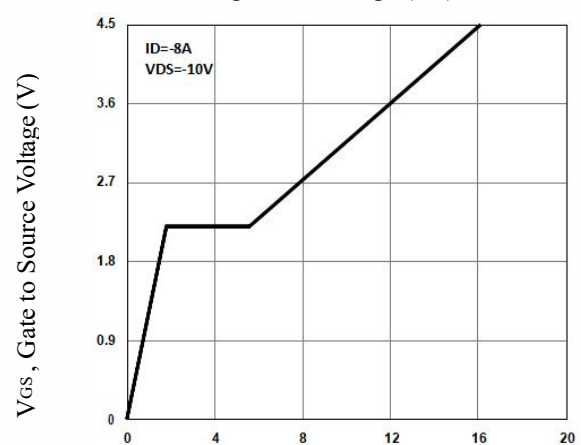


Fig.5 Normalized Transient Impedance
Square Wave Pulse Duration (s)

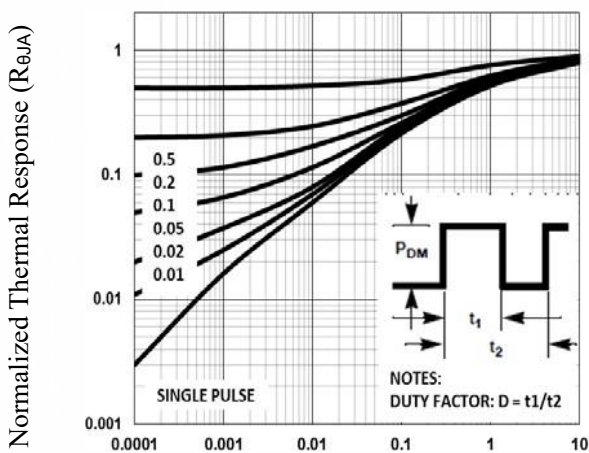


Fig.6 Maximum Safe Operation Area
 V_{DS} , Drain to Source Voltage (V)

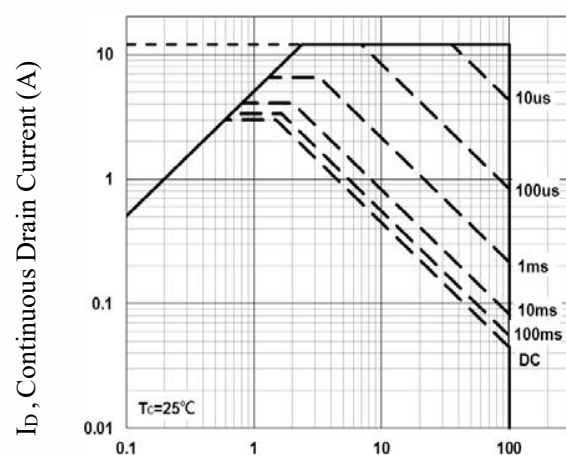


Figure 7a. Switching Test Circuit

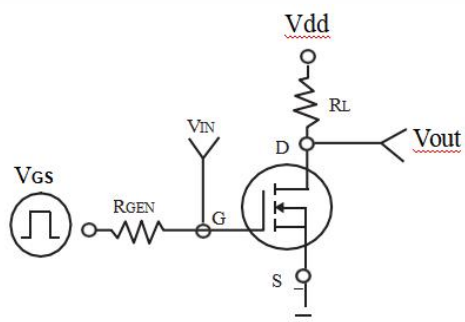


Figure 7b. Switching Waveforms

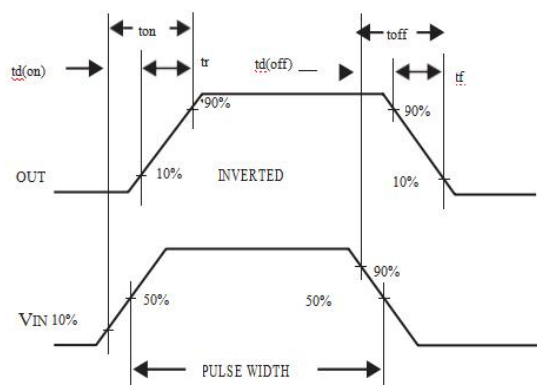


Figure 8 a.Unclamped Inductive Test Circuit

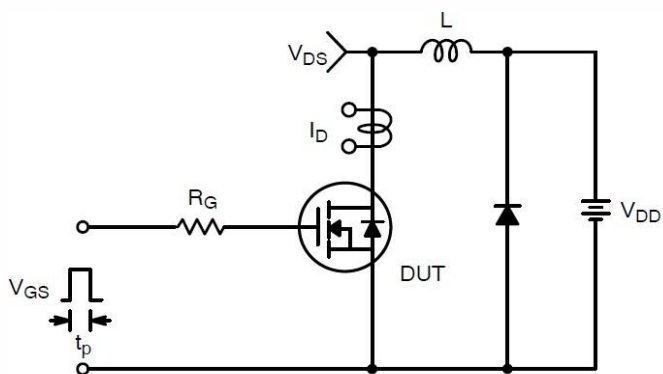
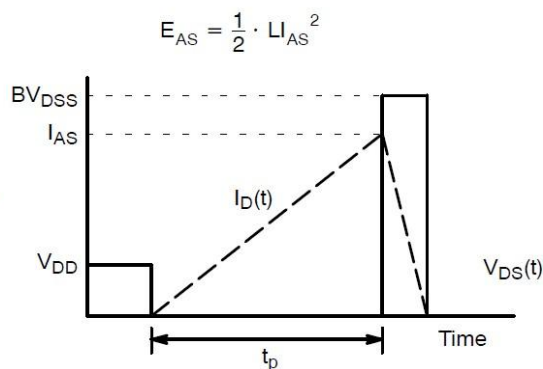
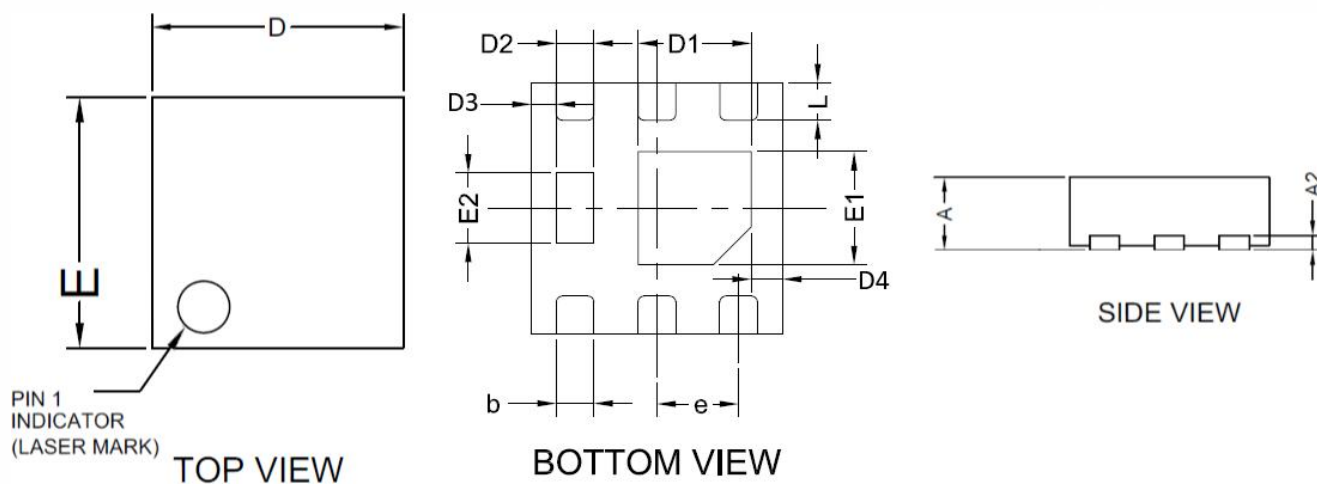


Figure 8 b.Unclamped Inductive Waveforms



DFN2x2-6L PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	0.800	0.500	0.031	0.019
A2	0.250	0.145	0.010	0.006
b	0.350	0.250	0.014	0.010
D	2.100	1.900	0.083	0.075
D1	1.050	0.800	0.041	0.031
D2	0.430	0.250	0.017	0.010
D3	0.200BSC		0.008BSC	
D4	0.200BSC		0.008BSC	
E	2.100	1.900	0.083	0.075
E1	1.250	0.800	0.049	0.031
E2	0.750	0.460	0.029	0.018
e	0.650BSC		0.026BSC	
L	0.350	0.225	0.014	0.009