

Description

The SI7431DP-T1-GE3 is the new generation trench P-ch MOSFET has been designed to minimize the on-state resistance (RDS(ON)) yet maintain superior switching performance, making it ideal for high efficiency power management applications

V _{DSS}	-200V
I _D	-16A
R _{DS(ON)}	125mΩ@ V _{GS} =-10V

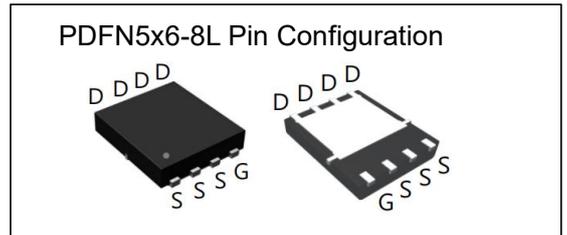
Features

- Low On Resistance
- Low Gate Charge
- Fast Switching Characteristic
- **100% UIS Tested**
- **100% Avalanche Tested**
- Lead-Free, Halogen-Free; RoHS Compliant

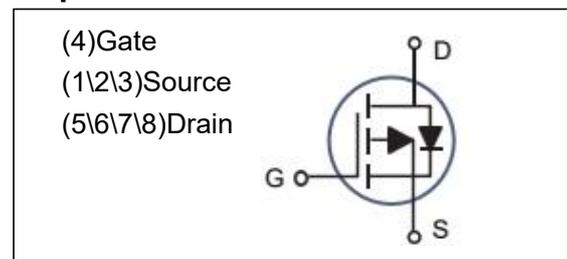
Applications

- LED Applications
- Load Switch
- Power Management

Outline



Equivalent



Packaging specifications

Part No.	Package	Marking	Basic ordering unit.(pcs)
SI7431DP-T1-GE3	PDFN5x6-8L	SI7431DP-T1-GE3	5000

Absolute Maximum Ratings

Parameter	Symbol	Limit	Units	
Drain-Source Voltage	V _{DS}	-200	V	
Gate-Source Voltage	V _{GS}	±20	V	
Drain Current-Continuous ^(Note2)	I _D	T _C =25°C	-16	A
		T _C =100°C	-10.1	A
Pulsed Drain Current	I _{DM}	-64	A	
Avalanche Energy @ L=0.5mH	E _{AS}	100	mJ	
Maximum Power Dissipation	P _D	T _C =25°C	96	W
		T _C =100°C	38	W
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55 to 150	°C	
Thermal Resistance Junction-Ambient	R _{θJA}	45	°C /W	
Thermal Resistance Junction-Case	R _{θJC}	1.3	°C/W	

Electrical Characteristics (T_C=25 °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	-200			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-160V , V _{GS} =0V			-1	uA
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±20V , V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =-250uA	2	-3	-4	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-10V , I _D =-10A		125	145	mΩ
Forward Transconductance	g _{FS}	V _{DS} =-15V , I _D =-3A		11		S
DYNAMIC CHARACTERISTICS <small>Note4</small>						
Input Capacitance	C _{ISS}	V _{DS} =-100V ,		2600		pF
Output Capacitance	C _{OSS}	V _{GS} =0 V ,		130		pF
Reverse Transfer Capacitance	C _{RSS}	f =1.0MHz		80		pF
Total Gate Charge	Q _g	V _{DS} =-75V , I _D =-3A , V _{GS} =-10V		52		nC
Gate-Source Charge	Q _{gs}			16		nC
Gate-Drain Charge	Q _{gd}			14		nC
SWITCHING CHARACTERISTICS <small>Note4</small>						
Turn-On Delay Time	t _{D(ON)}	V _{DD} =-75V , I _D =-3A , V _{GS} =-10V , R _{GEN} =6Ω		35		ns
Rise Time	t _r			28		ns
Turn-Off Delay Time	t _{D(OFF)}			79		ns
Fall Time	t _f			40		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Diode Forward Voltage	V _{SD}	V _{GS} =0V , I _S =-10A			-1.2	V

Notes:

- 1、 Pulse Test Width < 300us,Duty Cycle< 2%
- 2、 Drain current limited by maximum junction temperature.
- 3、 Starting T_j=25°C ,L=0.5mH,V_{DD}=-75V,V_{GS}=-10V ,R_G=25Ω
- 4、 Guaranteed by design,not subject to production testing.

Typical Performance Characteristics

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



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

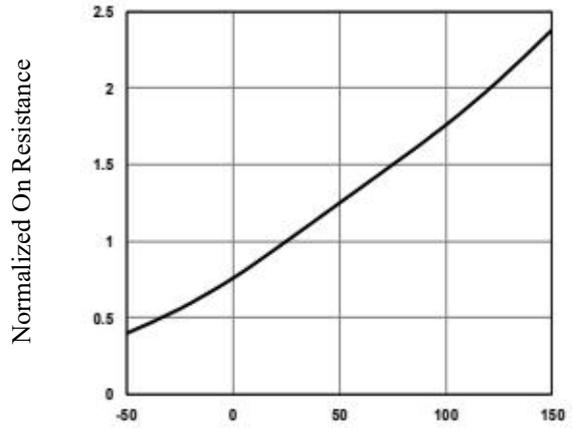


Fig.3 Normalized V_{th} vs. T_J
 T_J , Junction Temperature ($^{\circ}\text{C}$)

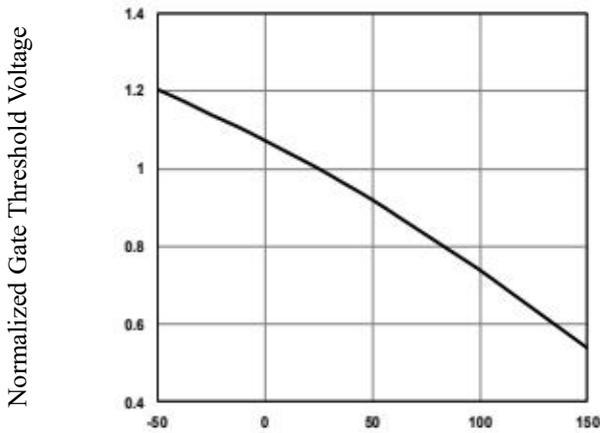


Fig.4 Gate Charge Waveform
 Q_g , Gate Charge (nC)

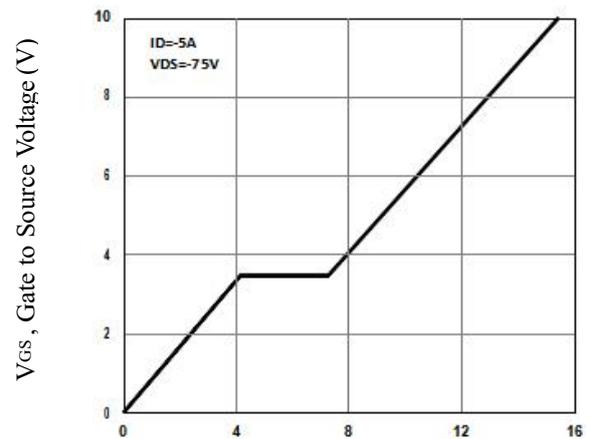


Fig.5 Typical Output Characteristics
 V_{DS} , Drain to Source Voltage (V)

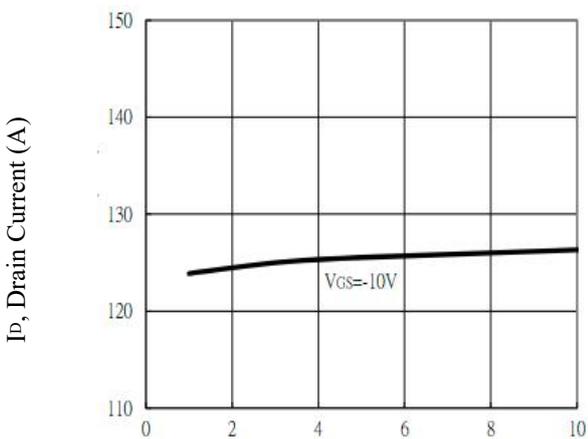


Fig.6 Turn-On Resistance vs. I_D
 Drain Current (A)

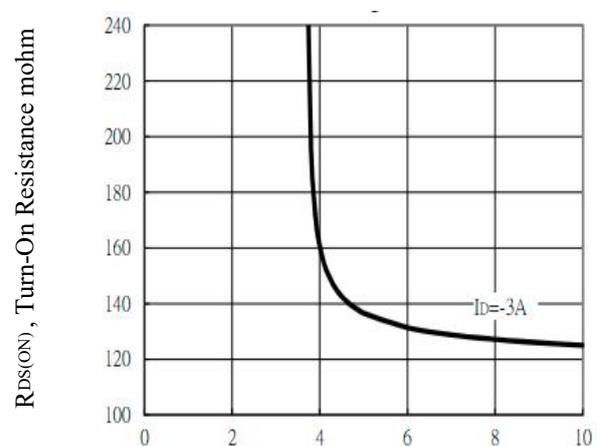


Fig.7 Capacitance Characteristics

V_{DS} , Drain to Source Voltage (V)

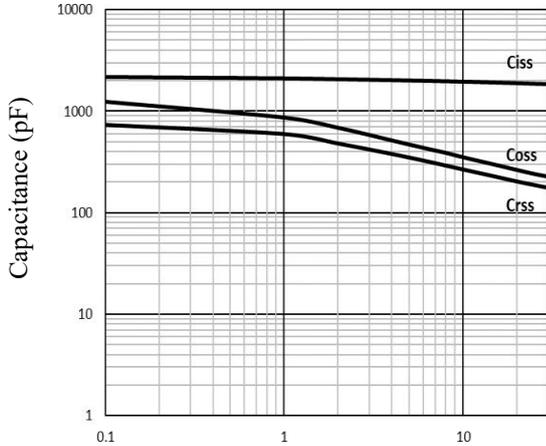


Fig.9 Maximum Safe Operation Area

V_{DS} , Drain to Source Voltage (V)

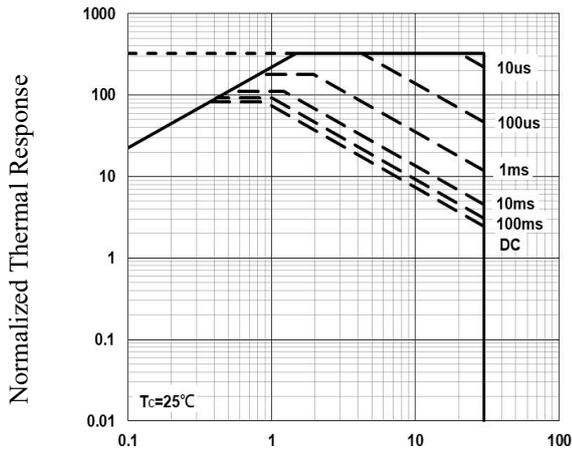


Fig.8 Normalized Transient Impedance

Square Wave Pulse Duration (s)

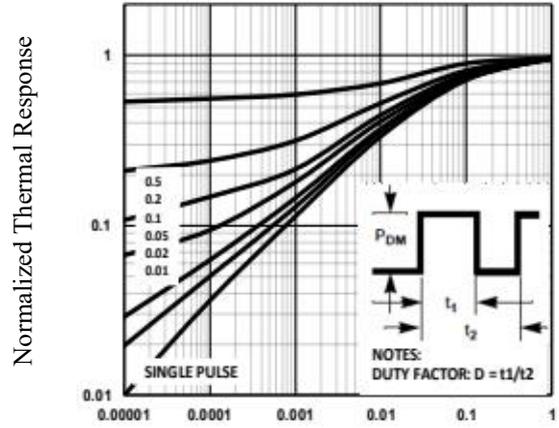


Fig.10 Body Diode Forward Voltage

Variation with Source Current

V_{SD} , Body Diode Forward Voltage(V)

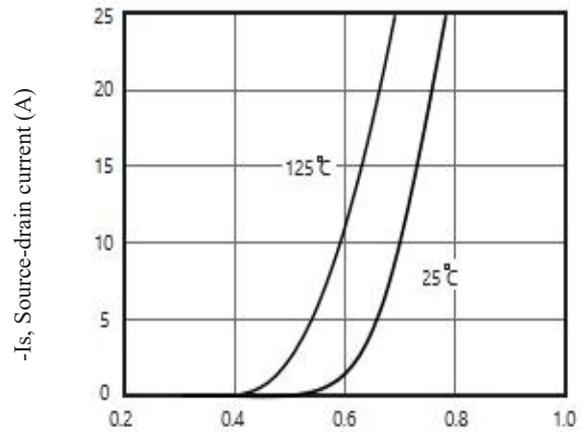


Figure 11a. Switching Test Circuit

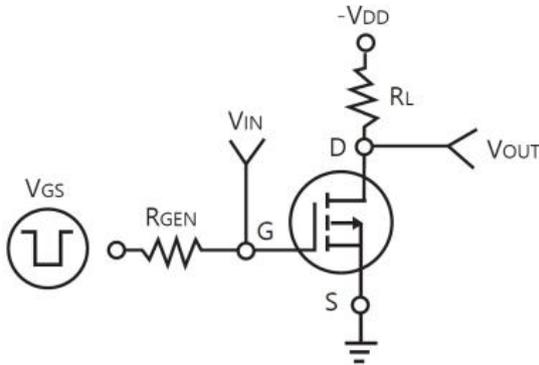


Figure 11b. Switching Waveforms

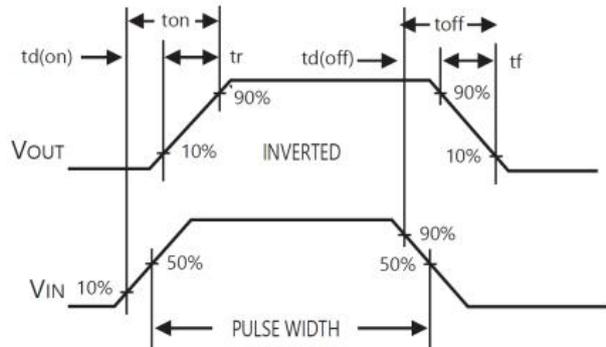


Figure 12a. Unclamped Inductive Test Circuit

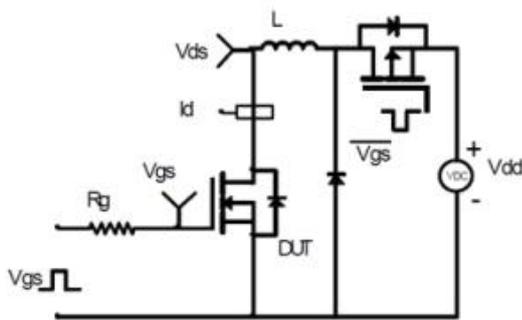
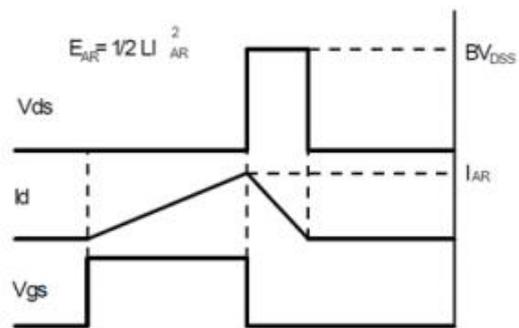


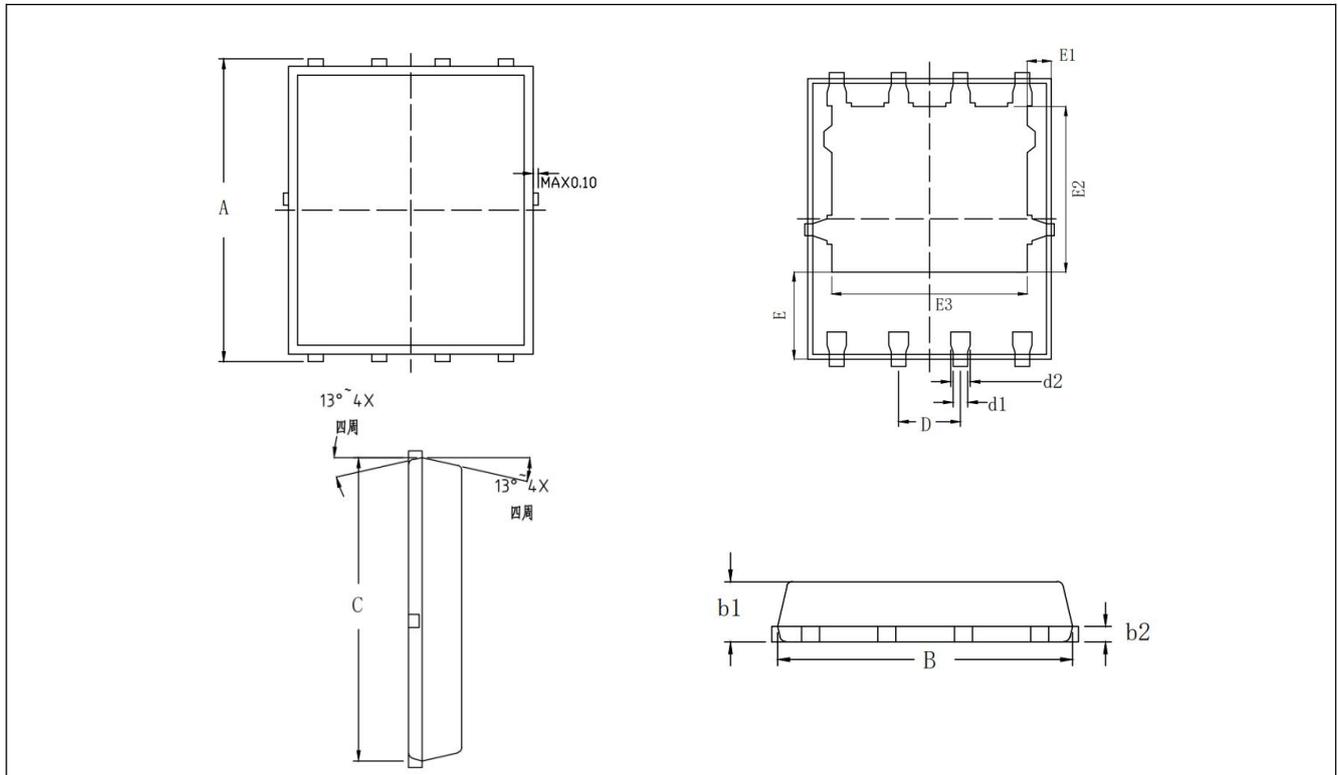
Figure 12b. Unclamped Inductive Waveforms



NOTICE

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PDFN5x6-8L Package Information



COMMON DIMENSION(MM)

PKG		PDFN5x6	
SYMBOL	MIN	TYP	MAX
A	6.000	6.100	6.200
B	4.875	4.900	4.925
b1	0.975	1.000	1.025
b2	0.246	0.254	0.262
C	5.775	5.800	5.825
D	1.245	1.270	1.295
d1	0.275	0.300	0.325
d2	0.375	0.400	0.425
E	1.725	1.775	1.825
E1	0.395	0.445	0.495
E2	3.425	3.475	3.525
E3	3.960	4.010	4.060