

Description

The TPCA8045-H is the new generation Split Gate trench N-channel 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

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

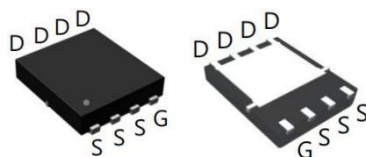
Applications

- White LED boost converters
- Load Switch
- Industrial DC/DC Conversion Circuits
- Motor Drive

V_{DSS}	40V
I_D	150A
$R_{DS(ON)}$	$1.6m\Omega @ V_{GS}=10V$
$R_{DS(ON)}$	$2.5m\Omega @ V_{GS}=4.5V$

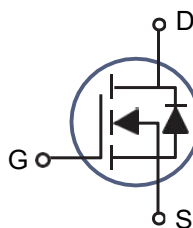
Outline

PDFN5x6-8L Pin Configuration



Equivalent

(4)Gate
(1\2\3)Source
(5\6\7\8)Drain



Packaging specifications

Part No.	Package	Marking	Basic ordering unit.(pcs)
TPCA8045-H	PDFN5x6-8L		5000

Absolute Maximum Ratings

Parameter		Symbol	Limit	Units
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current-Continuous ^(Note2)	$T_C=25^\circ C$	I_D	150	A
	$T_C=100^\circ C$		60	A
Pulsed Drain Current		I_{DM}	450	A
Avalanche Energy @ $L=0.5mH$		E_{AS}	324	mJ
Maximum Power Dissipation	$T_C=25^\circ C$	P_D	83	W
	$T_C=100^\circ C$		33	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^\circ C$
Thermal Resistance Junction-Ambient		$R_{\theta JA}$	40	$^\circ C/W$
Thermal Resistance Junction-Case		$R_{\theta JC}$	1.5	$^\circ C/W$

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	40			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =32V , 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	1.0	1.7	2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V , I _D =15A		1.6	2.2	mΩ
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =4.5V , I _D =10A		2.5	3.2	mΩ
Forward Transconductance	g _{FS}	V _{DS} =20V , I _D =10A		33		S
DYNAMIC CHARACTERISTICS Note4						
Input Capacitance	C _{ISS}	V _{DS} =20V , V _{GS} =0 V , f =1.0MHz		3250		pF
Output Capacitance	C _{OSS}			1150		pF
Reverse Transfer Capacitance	C _{RSS}			65		pF
Gate resistance	R _g	V _{GS} =0V,V _{DS} =0V, f=1MHz		1.3		Ω
Total Gate Charge	Q _g	V _{DS} =20V , I _D =10A , V _{GS} =10V		52		nC
Gate-Source Charge	Q _{gs}			10		nC
Gate-Drain Charge	Q _{gd}			8		nC
SWITCHING CHARACTERISTICS Note4						
Turn-On Delay Time	t _{D(ON)}	V _{DD} =20V , I _D =10A , V _{GS} =10V , R _{GEN} =6Ω		18		ns
Rise Time	tr			16		ns
Turn-Off Delay Time	t _{D(OFF)}			60		ns
Fall Time	tf			10		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}=20V,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

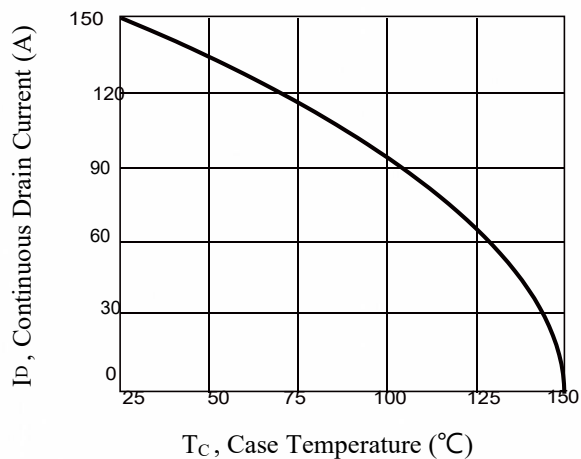


Fig.2 Normalized RDSON vs. TJ

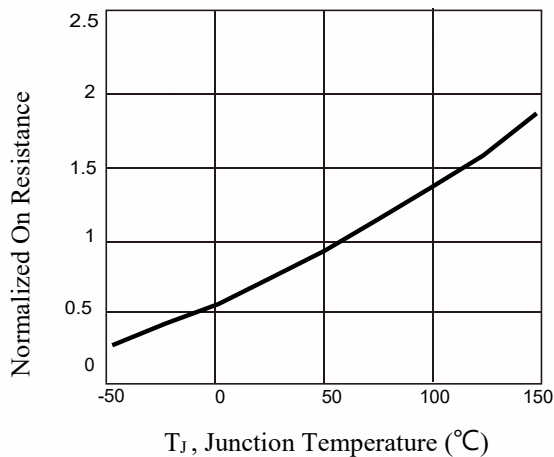


Fig.3 Normalized Vth vs. TJ

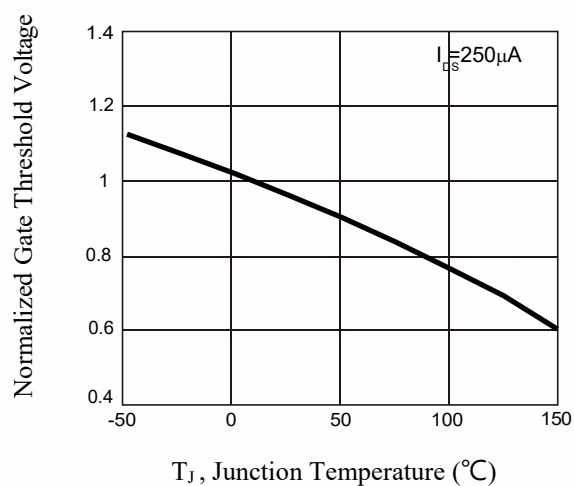


Fig.4 Gate Charge Waveform

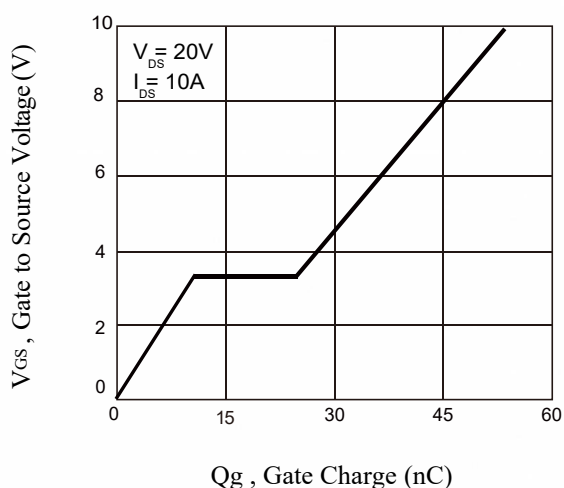


Fig.5 Typical Output Characteristics

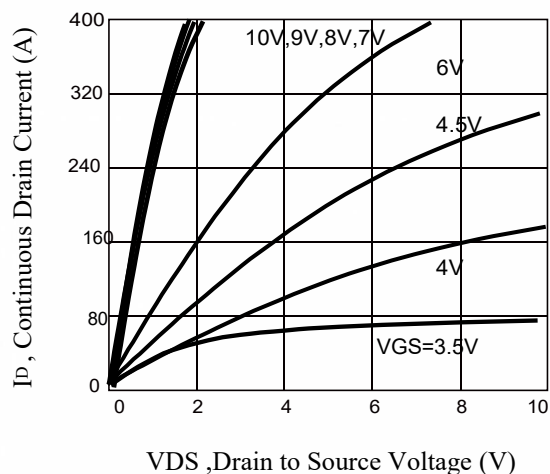


Fig.6 Turn-On Resistance vs. ID

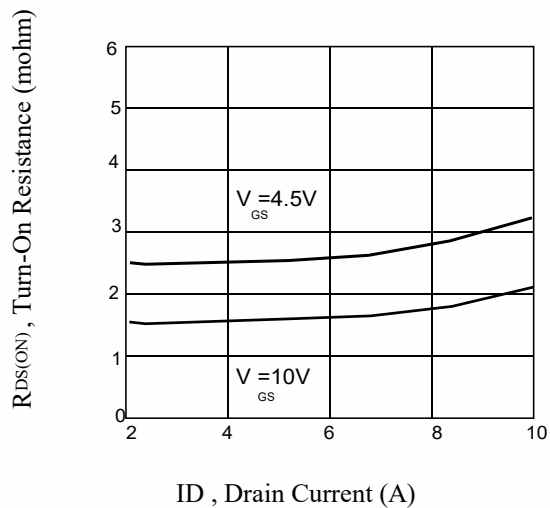


Fig.7 Capacitance

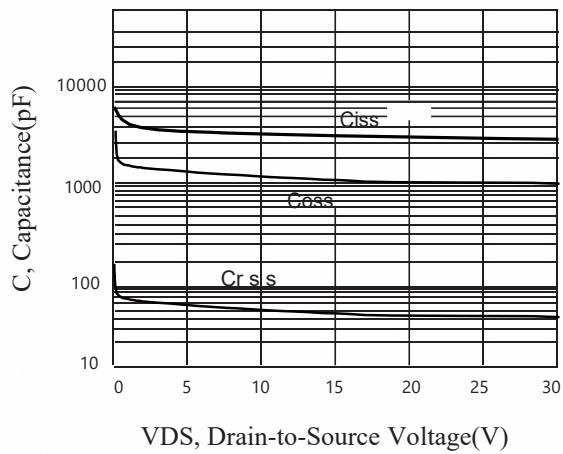


Fig.8 Typical Source-Drain Diode Forward Voltage

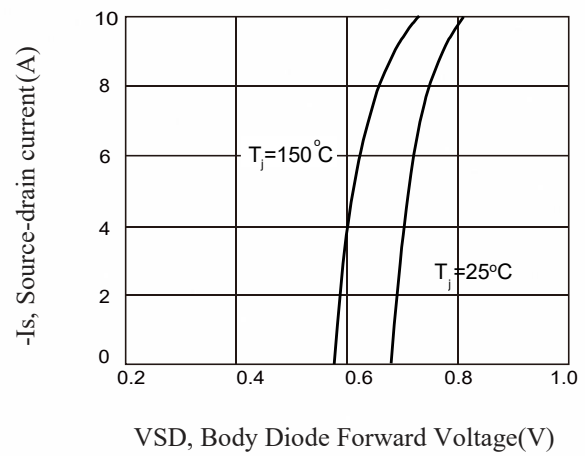


Fig.9 Normalized Transient Impedance

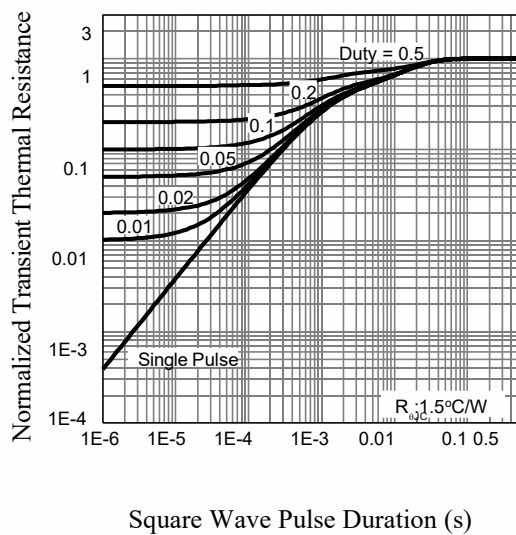


Fig.10 Maximum Safe Operation Area

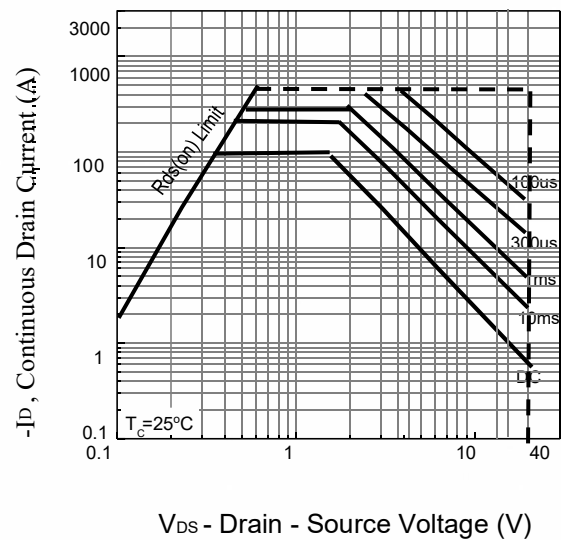


Figure11b. Switching Test Circuit

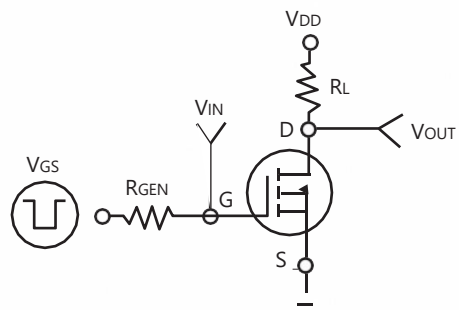


Figure11b. Switching Waveforms

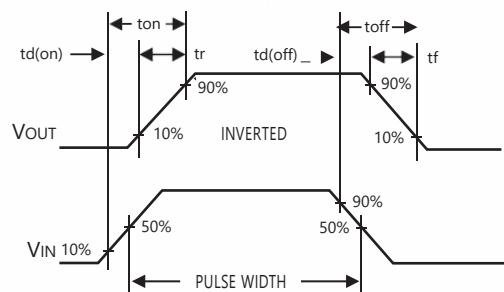


Figure 12a.Unclamped Inductive Test Circuit

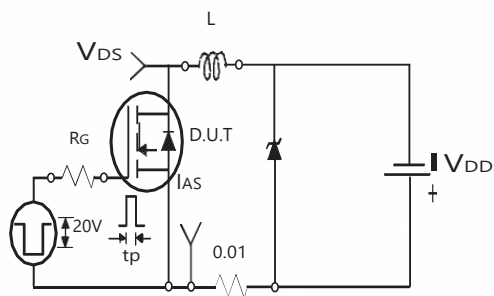
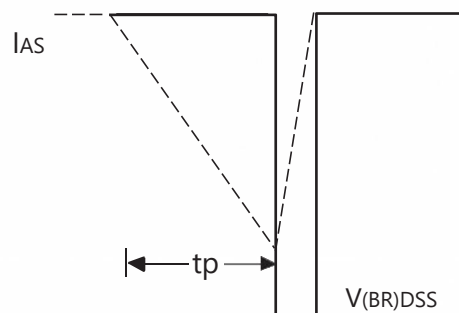


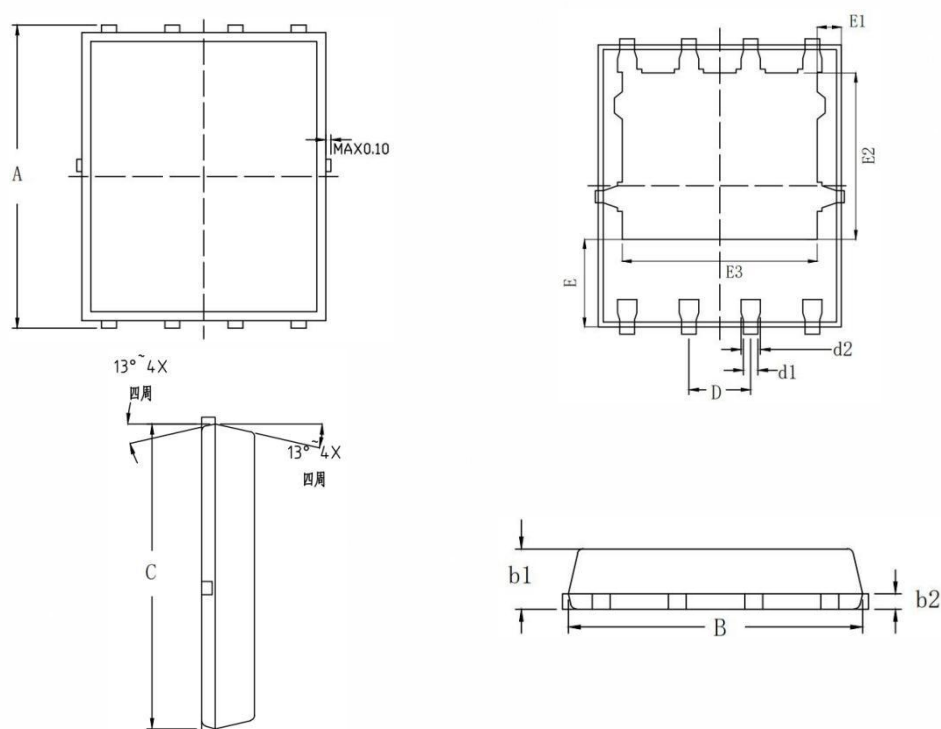
Figure 12b.Unclamped Inductive Waveform



NOTICE

NKGL reserves the to make modifications,enhancements,improvements,corrections or other changes without further notice to any product herein.NKGL does not assume any liability arising out of the application or use of any product described herein.

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