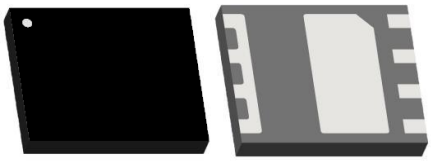
E-mode 650V,7.5A,400mΩ GaN HEMT

Description

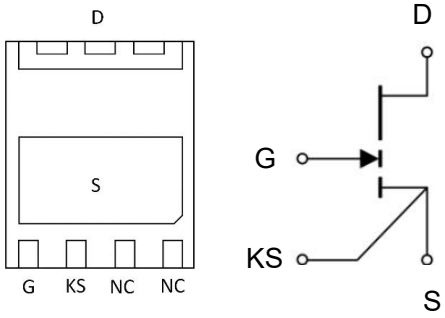
TK65C400 is an enhancement mode GaN-on-silicon transistor. GaN is a wide band gap semiconductor with high power density. The gallium nitride transistor is characterized by no body diode, so the reverse recovery charge is zero.

Features

- **650 V enhancement mode power switch**
- **$R_{DS(on)}$ =400 mΩ**
- **$I_{DS(max)}$ = 7.5 A**
- **Easy gate drive requirements (0 V to 6 V)**
- **Very high switching frequency (> 10 MHz)**
- **Fast and controllable fall and rise times**
- **Zero reverse recovery loss**



DFN5x6



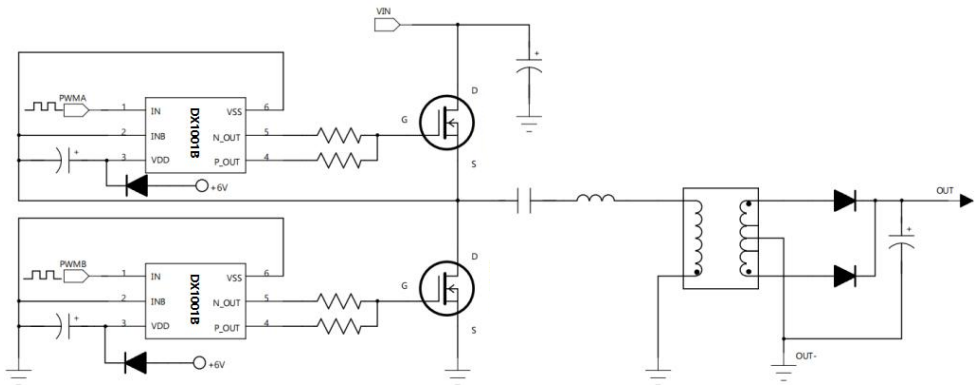
Bottom View

Applications

- Fast Battery Charging
- LED lighting drivers
- Power Factor Correction
- LLC Converters
- Wireless Power Transfer

Device Information

Part Number	Marking Code	Package	Packing
TK65C400	65C400	DFN5x6	Tape 4000pcs/reel



Typical application circuit of LLC

Absolute Maximum Ratings (Tc=25℃ unless otherwise specified)

Parameter	Symbol	Value	Unit	Condition
Drain-Source voltage	V_{DS}	650	V	
Gate-source voltage	V_{GS}	-10 to 6	V	
Continuous drain current*	I_D	7.5	A	Tc=25℃
		5	A	Tc=100℃
Operation and storage temperature	T_j	-55 to 150	℃	
	T_{stg}	-55 to 150	℃	

*** An Estimated Value**

Electrical Characteristics (Tc=25℃ unless otherwise specified)

Typical Performance – Static

Parameter	Symbol	Values			Unit	Test condition
		Min.	Type.	Max.		
Drain source breakdown voltage	BV_{DS}	650	/	/	V	VGS=0V, ID=20μA
Total drain leakage current	I_{DSS}	/	0.3	10	μA	VDS=650V, VGS=0V, Tj=25℃
		/	5	75	μA	VDS=650V, VGS=0V, Tj=150℃
Gate-to-source current	I_{GSS}	/	2	/	μA	VDS=0V, VGS=6V, Tj=25℃
Static drain-source on-resistance	$R_{DS(ON)}$	/	350	400	mΩ	VGS=6V, ID=3A, Tj=25℃
		/	650	/	mΩ	VGS=6V, ID=3A, Tj=150℃
Gate threshold voltage	$V_{GS(th)}$	1.2	1.6	2.0	V	VDS=VGS, ID=3.5mA,

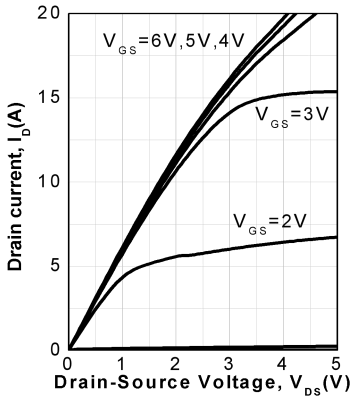
Typical Performance – Dynamic

Parameter	Symbol	Values			Unit	Test condition
		Min	Type	Max		
Input capacitance	C_{ISS}	/	32	/	pF	V_{DS}=400V, V_{GS}=0V, f=1MHz
Output capacitance	C_{OSS}	/	9	/	pF	
Reverse transfer capacitance	C_{RSS}	/	0.3	/	pF	
Output capacitance, energy related	$C_{OSS(er)}$	/	15	/	pF	V_{DS}=0V to 400V,V_{GS}=0V
Output capacitance time related	$C_{OSS(tr)}$	/	21	/	pF	
Total gate charge	Q_G	/	1.3	/	nC	V_{DS}=400V, V_{GS}=0V to 6V
Gate-drain charge	Q_{GD}	/	0.6	/	nC	
Gate-source charge	Q_{GS}	/	0.33	/	nC	
Gate Resistance	R_G	/	2.88	/	Ω	*f* = *f*res, Open drain

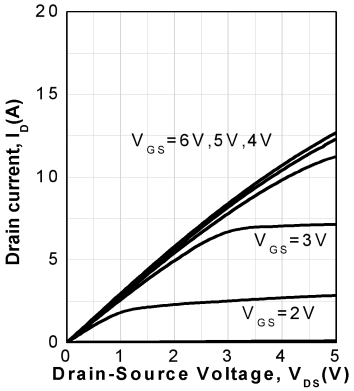
Thermal characteristics（DFN5x6）

Parameter	Symbol	Values	Unit	Note/Test Condition
Thermal resistance, junction-ambient	R_{thJA}	37.1	°C/W	
Thermal resistance, junction-case	R_{thJC}	1.9	°C/W	
Maximum reflow soldering temperature	T_{sold}	260	°C	MSL3

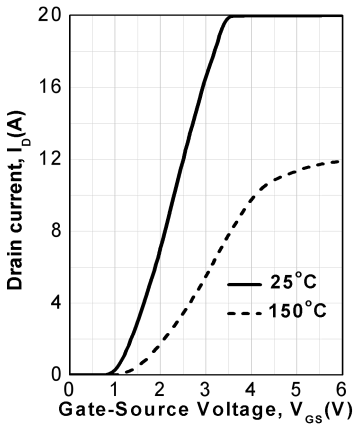
Characteristic Curve



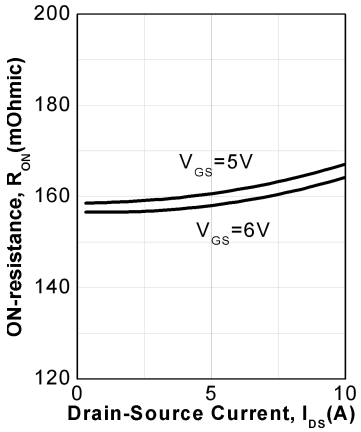
Typical output characteristics @ Tj=25℃



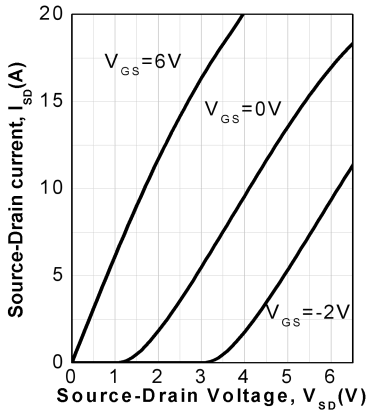
Typical output characteristics @ Tj=150℃



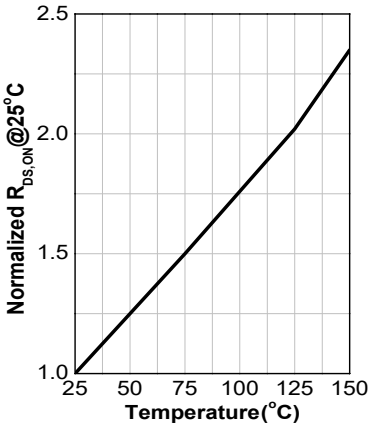
Typical transfer characteristics @ VDS=5V



ON-resistance for various drain current @ 25℃



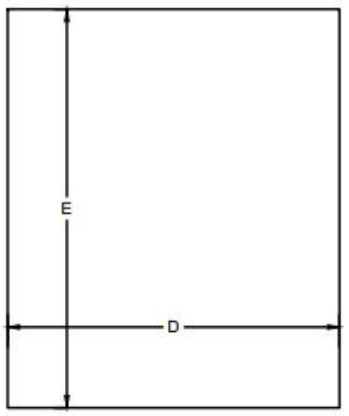
Typical reverse conduction characteristics



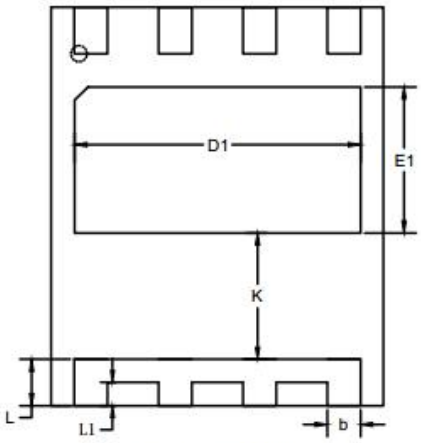
Normalized ON-resistance at various temperatures

Package Outline Dimensions

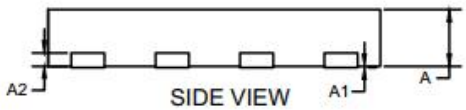
Dimensions(mm)			
Symbol	**Min.**	**Nom.**	**Max.**
A	0.8	0.85	0.9
A1	-	0.02	0.05
A2		0.2(REF)	
b	0.45	0.50	0.55
D	4.90	5.00	5.10
D1	4.20	4.30	4.40
E	5.90	6.00	6.10
E1	2.10	2.20	2.30
e		1.27	
k	1.9	-	-
L	0.65	0.7	0.75



TOP VIEW



BOTTOM VIEW



SIDE VIEW