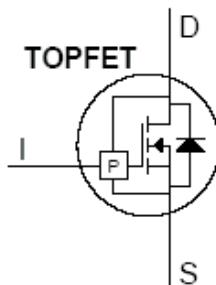
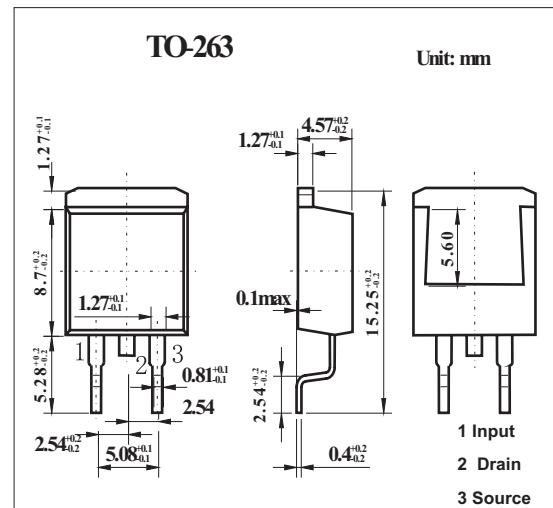


PowerMOS transistor Logic level TOPFET KUK109-50DL

■ Features

- Vertical power DMOS output stage
- Low on-state resistance
- Overload protection against over temperature
- Overload protection against short circuit load
- Latched overload protection reset by input
- 5 V logic compatible input level
- Control of power MOSFET and supply of overload protection circuits derived from input
- Lower operating input current permits direct drive by micro-controller
- ESD protection on input pin
- Overvoltage clamping for turn off of inductive loads



■ Absolute Maximum Ratings Ta = 25°C

Parameter	Symbol	Rating	Unit
Continuous drain source voltage*2	V _{DS}	50	V
Continuous input voltage	V _{IS}	0 to 6	V
Continuous drain current *1	I _D	26	A
Continuous drain current T _{mb} ≤ 100°C; V _{IS} = 5 V	I _D	16	A
Repetitive peak on-state drain current *1	I _{DRM}	100	A
Total power dissipation	P _D	75	W
Storage temperature	T _{stg}	-55 to 150	°C
Continuous junction temperature*3	T _j	150	°C
Lead temperature	T _{sold}	250	°C
Protection supply voltage*4	V _{ISP}	4	V
Protected drain source supply voltage V _{IS} = 5 V	V _{DDP(T)}	50	V
Protected drain source supply voltage V _{IS} = 5 V	V _{DDP(P)}	20	V

KUK109-50DL**■ Absolute Maximum Ratings Ta = 25°C**

Parameter	Symbol	Rating	Unit
Instantaneous overload dissipation T _{mb} = 25°C	P _{DSM}	1.3	kW

* 1 T_{mb} ≤ 25 °C; V_{IS} = 5 V

*2 Prior to the onset of overvoltage clamping. For voltages above this value, safe operation is limited by the overvoltage clamping energy.

*3 A higher T_j is allowed as an overload condition but at the threshold T_{j(TO)} the over temperature trip operates to protect the switch.

*4 The input voltage for which the overload protection circuits are functional.

■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Testconditons	Min	Typ	Max	Unit
Repetitive peak clamping current	I _{DROM}	V _{IS} = 0 V			26	A
Non-repetitive clamping energy	E _{DSM}	T _{mb} ≤ 25°C; I _{DM} = 26 A; V ≤ 20 V;			625	mJ
Repetitive clamping energy	E _{DRM}	T _{mb} ≤ 95°C; I _{DM} = 8 A; V _{DD} ≤ 20 V; f = 250 Hz			40	mJ
Electrostatic discharge capacitor voltage	V _C	Human body model; C = 250 pF; R = 1.5 kΩ			2	kV
Drain-source clamping voltage	V _{(CL)DSS}	V _{IS} = 0 V; I _D = 10 mA	50			V
Drain-source clamping voltage	V _{(CL)DSS}	V _{IS} = 0 V; I _{DM} = 2 A; t _p ≤ 300 μs; d ≤ 0.01			70	V
Zero input voltage drain current	I _{DSS}	V _{DS} = 12 V; V _{IS} = 0 V		0.5	10	mA
Zero input voltage drain current	I _{DSS}	V _{DS} = 50 V; V _{IS} = 0 V		1	20	mA
Zero input voltage drain current	I _{DSS}	V _{DS} = 40 V; V _{IS} = 0 V; T _j = 125°C		10	100	mA
Drain-source on-state resistance*1	R _{DS(ON)}	V _{IS} = 5 V; I _{DM} = 13 A; t _p ≤ 300 μs; d ≤ 0.01		45	60	mW
Overload threshold energy	E _{DS(TO)}	T _{mb} =25°C; L≤10mH; RL=10mΩ; V _{DD} =13V; V _{IS} =5V		0.4		J
Response time	t _{d sc}	T _{mb} =25°C; L≤10mH; RL=10mΩ; V _{DD} =13V; V _{IS} =5V		0.8		ms
Drain current*2	I _{D(SC)}	T _{mb} =25°C; L≤10mH; RL=10mΩ; V _{DD} =13V; V _{IS} =5V		45		A
Peak drain current*3	I _{DM(SC)}	T _{mb} =25°C; L≤10mH; RL=10mΩ; V _{IS} =5V; V _{DD} =13V		105		A
Threshold junction temperature	T _{j(TO)}	V _{IS} = 5 V; from I _D ≥ 1 A	150			°C
Forward transconductance	g _f	V _{DS} = 10 V; I _{DM} = 13 A t _p ≤ 300 μs; d ≤ 0.01	10	16		S
Input threshold voltage	V _{IS(TO)}	V _{DS} = 5 V; I _D = 1 mA	1.0	1.5	2.0	V
Input supply current	I _{IS}	normal operation; V _{IS} = 5 V V _{IS} = 4 V	100	200	350	mA
Protection reset voltage*1	V _{ISR}	T _j = 25°C T = 150°C	2.0	2.6	3.5	V
Input supply current	I _{ISL}	protection latched; V _{IS} = 5 V V _{IS} = 3.5 V	1.0			
Input breakdown voltage	V _{(BR)IS}	I _I = 10 mA		330	650	mA
Input series resistance to gate of power MOSFET	R _{IG}	T _j = 25°C T _j = 150°C		240	430	mA
Turn-on delay time	t _{d on}	V _{DD} = 13 V; V _{IS} = 5 V		6		V
Rise time	t _r	resistive loadg R _L = 2.1Ω		17		μs
Turn-off delay time	t _{d off}	V _{DD} = 13 V; V _{IS} = 0 V		75		μs
Fall time	t _f	resistive load R _L = 2.1Ω		60		μs
				70		μs

KUK109-50DL■ Electrical Characteristics $T_a = 25^\circ\text{C}$

Parameter	Symbol	Testconditons	Min	Typ	Max	Unit
Continuous forward current	I_S	$T_{mb} \leqslant 25^\circ\text{C}; V_{IS} = 0 \text{ V}$			26	A
Forward voltage	V_{SD0}	$I_S = 26 \text{ A}; V_{IS} = 0 \text{ V}; t_p = 300 \mu\text{s}$		1.0	1.5	V
Reverse recovery time	t_{rr}	not applicable				
Internal drain inductance	L_d	Measured from upper edge of tab to centre of die		2.5		nH
Internal source inductance	L_s	Measured from source lead soldering point to source bond pad		7.5		nH

*1 Continuous input voltage. The specified pulse width is for the drain current.

*2 Continuous drain-source supply voltage. Pulsed input voltage.

*3 Continuous input voltage. Momentary short circuit load connection.