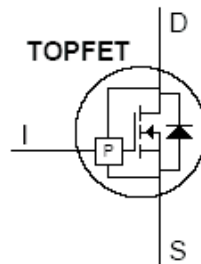
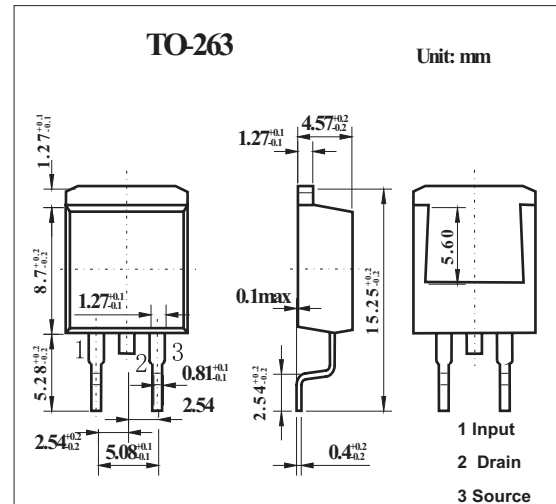


## PowerMOS transistor Logic level TOPFET

## KUK110-50GL

## ■ 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 input level
- Low threshold voltage also allows 5 V control
- Control of power MOSFET
- and supply of overload protection circuits derived from input
- ESD protection on input pin
- Overvoltage clamping for turn off of inductive loads

■ Absolute Maximum Ratings  $T_a = 25^\circ\text{C}$ 

Parameter	Symbol	Rating	Unit
Continuous off-state drain source voltage <sup>1</sup> $V_{IS} = 0\text{ V}$	$V_{DSS}$	50	V
Continuous input voltage	$V_{IS}$	6	V
Continuous drain current *	$I_D$	45	A
Continuous drain current $T_{mb} \leq 100^\circ\text{C}$ ; $V_{IS} = 5\text{ V}$	$I_D$	28	A
Repetitive peak on-state drain current *	$I_{DRM}$	180	A
Total power dissipation $T_{mb} \leq 25^\circ\text{C}$	$P_D$	125	W
Storage temperature	$T_{stg}$	-55 to 150	$^\circ\text{C}$
Continuous junction temperature <sup>2</sup>	$T_j$	150	$^\circ\text{C}$
Lead temperature	$T_{sold}$	250	$^\circ\text{C}$
Protection supply voltage <sup>3</sup> for valid protection	$V_{ISP}$	4	V
Protected drain source supply voltage $V_{IS} = 5\text{ V}$	$V_{DDP(T)}$	50	V
Protected drain source supply voltage <sup>4</sup> $V_{IS} = 5\text{ V}$	$V_{DDP(P)}$	24	V
Instantaneous overload dissipation $T_{mb} = 25\text{ }^\circ\text{C}$	$P_{DSM}$	2.1	kW

\*  $T_{mb} \leq 25^\circ\text{C}$ ;  $V_{IS} = 5\text{ V}$

## KUK110-50GL

## ■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Testconditions	Min	Typ	Max	Unit	
Repetitive peak clamping current	$I_{DROM}$	$V_{IS} = 0\text{ V}$			45	A	
Non-repetitive clamping energy	$E_{DSM}$	$T_{mb} \leq 25^\circ\text{C}$ ; $I_{DM} = 25\text{ A}$ ; $V \leq 25\text{ V}$ ; inductive load			1	J	
Repetitive clamping energy	$E_{DRM}$	$T_{mb} \leq 85^\circ\text{C}$ ; $I_{DM} = 16\text{ A}$ ; $V_{DD} \leq 20\text{ V}$ ; $f = 250\text{ Hz}$			80	mJ	
Electrostatic discharge capacitor voltage	$V_C$	Human body model; $C = 250\text{ pF}$ ; $R = 1.5\text{ k}\Omega$			2	kV	
Drain-source clamping voltage	$V_{(CL)DSS}$	$V_{IS} = 0\text{ V}$ ; $I_D = 10\text{ mA}$	50			V	
Drain-source clamping voltage	$V_{(CL)DSS}$	$V_{IS} = 0\text{ V}$ ; $I_{DM} = 4\text{ A}$ ; $t_p \leq 300\text{ }\mu\text{s}$ ; $\delta \leq 0.01$			70	V	
Zero input voltage drain current	$I_{DSS}$	$V_{DS} = 12\text{ V}$ ; $V_{IS} = 0\text{ V}$		0.5	10	$\mu\text{A}$	
Zero input voltage drain current	$I_{DSS}$	$V_{DS} = 50\text{ V}$ ; $V_{IS} = 0\text{ V}$		1	20	$\mu\text{A}$	
Zero input voltage drain current	$I_{DSS}$	$V_{DS} = 40\text{ V}$ ; $V_{IS} = 0\text{ V}$ ; $T_J = 125^\circ\text{C}$		10	100	$\mu\text{A}$	
Drain-source on-state resistance	$R_{DS(ON)}$	$I_{DM} = 25\text{ A}$ ; $V_{IS} = 5\text{ V}$ ; $t_p \leq 300\text{ }\mu\text{s}$ ; $\delta \leq 0.01$		30	35	$\text{m}\Omega$	
Overload threshold energy	$E_{DS(TO)}$	$T_{mb} = 25^\circ\text{C}$ ; $L \leq 10\text{ mH}$ ; $V_{DD} = 13\text{ V}$ ; $V_{IS} = 5\text{ V}$		1.1		J	
Response time	$t_{dsc}$	$T_{mb} = 25^\circ\text{C}$ ; $L \leq 10\text{ mH}$ ; $V_{DD} = 13\text{ V}$ ; $V_{IS} = 5\text{ V}$		0.8		ms	
Threshold junction temperature	$T_{J(TO)}$	$V_{IS} = 5\text{ V}$ ; from $I_D \geq 2\text{ A}$	150			$^\circ\text{C}$	
Input threshold voltage	$V_{IS(TO)}$	$V_{DS} = 5\text{ V}$ ; $I_D = 1\text{ mA}$	1.0	1.5	2.0	V	
Input supply current	$I_{IS}$	$V_{IS} = 5\text{ V}$ ; normal operation		0.2	0.35	mA	
Protection reset voltage	$V_{ISR}$		2.0	2.6	3.5	V	
Protection reset voltage	$V_{ISR}$	$T_J = 150^\circ\text{C}$	1.0				
Input supply current	$I_{ISL}$	$V_{IS} = 5\text{ V}$ ; protection latched	2	3.8	10	mA	
Input clamp voltage	$V_{(BR)IS}$	$I_I = 10\text{ mA}$	6			V	
Input series resistance	$R_{IG}$	to gate of power MOSFET		1.5		$\text{k}\Omega$	
Forward transconductance	$g_{fs}$	$V_{DS} = 10\text{ V}$ ; $I_{DM} = 25\text{ A}$ $t_p \leq 300\text{ }\mu\text{s}$ ; $\delta \leq 0.01$	17	28		S	
Drain current <sup>1</sup>	$I_{D(SC)}$	$V_{DS} = 13\text{ V}$ ; $V_{IS} = 5\text{ V}$		60		A	
Turn-on delay time	$t_{don}$	$V_{DD} = 13\text{ V}$ ; $V_{IS} = 5\text{ V}$		2		$\mu\text{s}$	
Rise time	$t_r$	resistive load $R_L = 1.1\text{ }\Omega$		8			
Turn-off delay time	$t_{doff}$	$V_{DD} = 13\text{ V}$ ; $V_{IS} = 0\text{ V}$		8			
Fall time	$t_f$	resistive load $R_L = 1.1\text{ }\Omega$		8			
Turn-on delay time	$t_{don}$	$V_{DD} = 13\text{ V}$ ; $V_{IS} = 5\text{ V}$		3.7			
Rise time	$t_r$	inductive load $I_{DM} = 11\text{ A}$		3.7			
Turn-off delay time	$t_{doff}$	$V_{DD} = 13\text{ V}$ ; $V_{IS} = 0\text{ V}$		13			
Fall time	$t_f$	inductive load $I_{DM} = 11\text{ A}$		1.4			
Continuous forward current	$I_S$	$T_{mb} \leq 25^\circ\text{C}$ ; $V_{IS} = 0\text{ V}$			50		A
Forward voltage	$V_{SDS}$	$I_S = 50\text{ A}$ ; $V_{IS} = 0\text{ V}$ ; $t_p = 300\text{ }\mu\text{s}$		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	
Junction to mounting base	$R_{th\ j-mb}$			0.8	1.0	K/W	
Junction to ambient	$R_{th\ j-a}$	minimum footprint FR4 PCB		50		K/W	

**KUK110-50GL**

## ■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Testconditons	Min	Typ	Max	Unit
Continuous forward current	I <sub>s</sub>	T <sub>mb</sub> ≤ 25°C; V <sub>is</sub> = 0 V			26	A
Forward voltage	V <sub>sDO</sub>	I <sub>s</sub> = 26 A; V <sub>is</sub> = 0 V; t <sub>p</sub> = 300 μs		1.0	1.5	V
Reverse recovery time	t <sub>rr</sub>	not applicable				
Internal drain inductance	L <sub>d</sub>	Measured from upper edge of tab to centre of die		2.5		nH
Internal source inductance	L <sub>s</sub>	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.