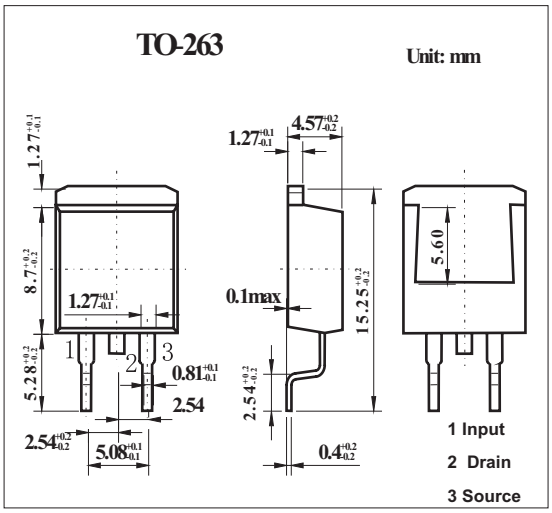
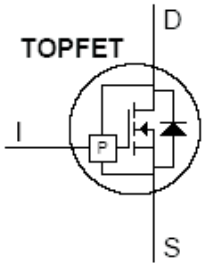
PowerMOS transistor Logic level TOPFET

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 Ta = 25℃

Parameter	Symbol	Rating	Unit
Continuous off-state drain source voltage1 V_{IS} = 0 V	V_{DSS}	50	V
Continuous input voltage	V_{IS}	6	V
Continuous drain current *	I_D	45	A
Continuous drain current T_{mb} ≤ 100℃; V_{IS} = 5 V	I_D	28	A
Repetitive peak on-state drain current *	I_{DRM}	180	A
Total power dissipation T_{mb} ≤ 25℃	P_D	125	W
Storage temperature	T_{stg}	-55 to 150	℃
Continuous junction temperature2	T_j	150	℃
Lead temperature	T_{sold}	250	℃
Protection supply voltage3 for valid protection	V_{ISP}	4	V
Protected drain source supply voltage V_{IS} = 5 V	$V_{DDP(T)}$	50	V
Protected drain source supply voltage4 V_{IS} = 5 V	$V_{DDP(P)}$	24	V
Instantaneous overload dissipation T_{mb} = 25 □C	P_{DSM}	2.1	kW

* T_{mb}≤ 25℃; V_{IS} = 5 V

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■ Electrical Characteristics Ta = 25℃

Parameter	Symbol	Testconditons	Min	Typ	Max	Unit
Repetitive peak clamping current	I_{DROM}	V_{IS} = 0 V			45	A
Non-repetitive clamping energy	E_{DSM}	T_{mb}≤ 25℃; I_{DM} = 25 A;V ≤ 25 V; inductive load			1	J
Repetitive clamping energy	E_{DRM}	T_{mb} ≤ 85℃; I_{DM} = 16 A;V_{DD} ≤ 20 V; f = 250 Hz			80	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} = 4 A; t_p ≤ 300μ s;δ ≤ 0.01			70	V
Zero input voltage drain current	I_{DSS}	V_{DS} = 12 V; V_{IS} = 0 V		0.5	10	μA
Zero input voltage drain current	I_{DSS}	V_{DS} = 50 V; V_{IS} = 0 V		1	20	μA
Zero input voltage drain current	I_{DSS}	V_{DS} = 40 V; V_{IS} = 0 V; T_j = 125℃		10	100	μA
Drain-source on-state resistance	$R_{DS(ON)}$	I_{DM} = 25 A; V_{IS} = 5 V;t_p ≤ 300 μs; δ ≤ 0.01		30	35	mΩ
Overload threshold energy	$E_{DS(TO)}$	T_{mb} = 25℃; L ≤ 10 mH;V_{DD} = 13 V; V_{IS} = 5 V		1.1		J
Response time	$t_{d\ sc}$	T_{mb} = 25℃; L ≤ 10 mH;V_{DD} = 13 V; V_{IS} = 5 V		0.8		ms
Threshold junction temperature	$T_{j(TO)}$	V_{IS} = 5 V; from I_D ≥ 2A	150			℃
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}	V_{IS} = 5 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℃	1.0			
Input supply current	I_{ISL}	V_{IS} = 5 V; protection latched	2	3.8	10	mA
Input clamp voltage	$V_{(BR)IS}$	I_I = 10 mA	6			V
Input series resistance	R_{IG}	to gate of power MOSFET		1.5		kΩ
Forward transconductance	g_{fs}	V_{DS} = 10 V; I_{DM} = 25 A tp ≤ 300 μs;δ ≤ 0.01	17	28		S
Drain current1	$I_{D(SC)}$	V_{DS} = 13 V; V_{IS} = 5 V		60		A
Turn-on delay time	$t_{d\ on}$	V_{DD} = 13 V; V_{IS} = 5 V		2		μs
Rise time	t_r	resistive load R_L = 1.1Ω		8		
Turn-off delay time	$t_{d\ off}$	V_{DD} = 13 V; V_{IS} = 0 V		8		
Fall time	t_f	resistive load R_L = 1.1 Ω		8		
Turn-on delay time	$t_{d\ on}$	V_{DD} = 13 V; V_{IS} = 5 V		3.7		
Rise time	t_r	inductive load IDM = 11 A		3.7		
Turn-off delay time	$t_{d\ off}$	V_{DD} = 13 V; V_{IS} = 0 V		13		
Fall time	t_f	inductive load I_{DM} = 11 A		1.4		
Continuous forward current	I_S	T_{mb} ≤ 25℃; V_{IS} = 0 V			50	A
Forward voltage	V_{SDS}	I_S = 50 A; V_{IS} = 0 V; t_p = 300 μs		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	$R_{th\ j\text{-}mb}$			0.8	1.0	K/W
Junction to ambient	$R_{th\ j\text{-}a}$	minimum footprint FR4 PCB		50		K/W

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Parameter	Symbol	Testconditons	Min	Typ	Max	Unit
Continuous forward current	I_S	$T_{mb} \leqslant 25℃$; V_{IS} = 0 V			26	A
Forward voltage	V_{SDO}	I_S = 26 A; V_{IS} = 0 V; t_p = 300 μs		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.