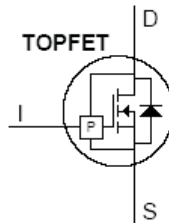
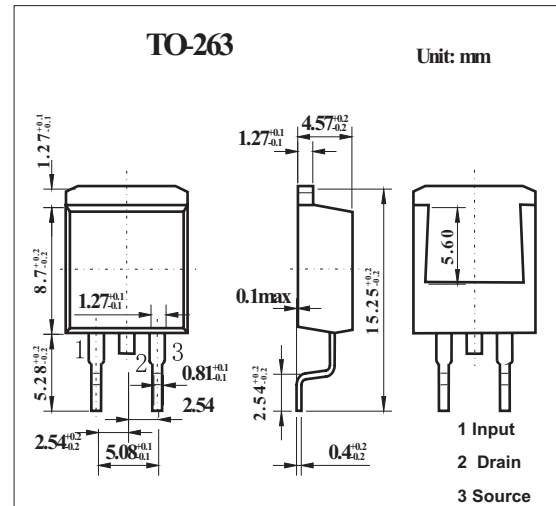


PowerMOS transistor Logic level TOPFET

KUK108-50DL

■ 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 $T_a = 25^\circ\text{C}$

Parameter	Symbol	Condition	Rating	Unit
Continuous drain source voltage*1	V_{DS}		50	V
Continuous input voltage	V_{IS}		6	V
Continuous drain current	I_D	$T_{mb} \leq 25^\circ\text{C}; V_{IS} = 5\text{ V}$	13.5	A
Continuous drain current	I_D	$T_{mb} \leq 100^\circ\text{C}; V_{IS} = 5\text{ V}$	8.5	A
Repetitive peak on-state drain current	I_{DRM}	$T_{mb} \leq 25^\circ\text{C}; V_{IS} = 5\text{ V}$	54	A
Total power dissipation	P_D	$T_{mb} \leq 25^\circ\text{C}$	40	W
Storage temperature	T_{stg}		-55 to +150	$^\circ\text{C}$
Continuous junction temperature*2	T_j		150	$^\circ\text{C}$
Lead temperature	T_{sold}		250	$^\circ\text{C}$
Protection supply voltage*3	V_{ISP}		4	V
Protected drain source supply voltage	$V_{DDP(T)}$	$V_{IS} = 5\text{ V}$	50	V
Protected drain source supply voltage*4	$V_{DDP(P)}$	$V_{IS} = 5\text{ V}$	24	V
Instantaneous overload dissipation	P_{DSM}	$T_{mb} = 25^\circ\text{C}$	0.6	kW
Repetitive peak clamping current	I_{DROM}	$V_{IS} = 0\text{ V}$	15	A
Non-repetitive clamping energy	E_{DSM}	$T_{mb} \leq 25^\circ\text{C}; I_{DM} = 15\text{ A}; V_{DD} \leq 20\text{ V};$	200	mJ
Repetitive clamping energy	E_{DRM}	$T_{mb} \leq 95^\circ\text{C}; I_{DM} = 8\text{ A}; V_{DD} \leq 20\text{ V}; f = 250\text{ Hz}$	20	mJ
Electrostatic discharge capacitor voltage	V_C	$C = 250\text{ pF}; R = 1.5\text{ k}\Omega$	2	kV

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■ Absolute Maximum Ratings Ta = 25°C

Parameter	Symbol	Condition	Rating	Unit
Junction to mounting base	R _{th j-mb}		2.5 to 3.1	K/W
Junction to ambient	R _{th j-a}		50	K/W
Continuous forward current	I _s	T _{mb} ≤ 25 °C; V _{is} = 0 V	15	A

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

*2 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

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

*4 The short circuit load protection is able to save the device providing the instantaneous on-state dissipation is less than the limiting value for PDSM, which is always the case when V_{DS} is less than V_{DDP(P)} maximum.

■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
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} = 1 A; t _p ≤ 300 ms; d ≤ 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 °C		10	100	μA
Drain-source on-state resistance*1	R _{DS(ON)}	V _{is} = 5 V; I _{DM} = 7.5 A; t _p ≤ 300 μs; δ ≤ 0.01		85	125	mΩ
Overload threshold energy	E _{DS(TO)}	V _{DD} = 13 V; V _{is} = 5 V; L ≤ 10 μH; R _L = 10 mΩ		0.2		J
Response time	t _{d sc}	V _{DD} = 13 V; V _{is} = 5 V; L ≤ 10 μH; R _L = 10 mΩ		0.8		ms
Drain current*2	I _{D(SC)}	V _{DD} = 13 V; V _{is} = 5 V; L ≤ 10 μH; R _L = 10 mΩ		25		A
Peak drain current*3	I _{DM(SC)}	V _{is} = 5 V; V _{DD} = 13 V; L ≤ 10 μH; R _L = 10 mΩ		60		A
Threshold junction temperature	T _j (TO)	V _{is} = 5 V; from I _D ≥ 0.5 A*4	150			°C
Forward transconductance	g _{fs}	V _{DS} = 10 V; I _{DM} = 7.5 A t _p ≤ 300 ms; d ≤ 0.01	5	9		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}	V _{is} = 5 V	100	200	350	μA
		V = 4 V		160	270	μA
Protection reset voltage*5	V _{ISR}	T _j = 25 °C	2.0	2.6	3.5	V
		T = 150 °C	1.0			
Input supply current	I _{isL}	V _{is} = 3.5 V		330	650	μA
		V _{is} = 5 V		240	430	μA
Input breakdown voltage	V _{(BR)IS}	I _I = 10 mA	6			V
Input series resistance to gate of power MOSFET	R _{IG}	T _j = 25 °C		33		kΩ
		T _j = 150 °C		50		kΩ
Turn-on delay time	t _{d on}	V _{DD} = 13 V; V _{is} = 5 V		8		μs
Rise time	t _r	R _L = 4 Ω		40		μs
Turn-off delay time	t _{d off}	V _{DD} = 13 V; V _{is} = 0 V		40		μs
Fall time	t _f	R _L = 4 Ω		35		μs

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■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Testconditons	Min	Typ	Max	Unit
Forward voltage	V _{S_{DO}}	I _s = 15 A; V _{is} = 0 V; t _p = 300 ms		1.0	1.5	V
Reverse recovery time	t _{rr}					
Internal drain inductance	L _d			2.5		nH
Internal source inductance	L _s			7.5		nH

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

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

*3Continuous input voltage. Momentary short circuit load connection. (The higher peak current is due to the effect of capacitance C_{gd}).

*4The over temperature protection feature requires a minimum on-state drain source voltage for correct operation.
The specified minimum I_D ensures this condition.

*5The input voltage below which the overload protection circuits will be reset.