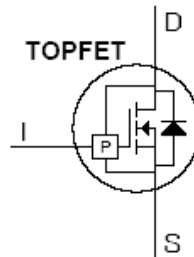
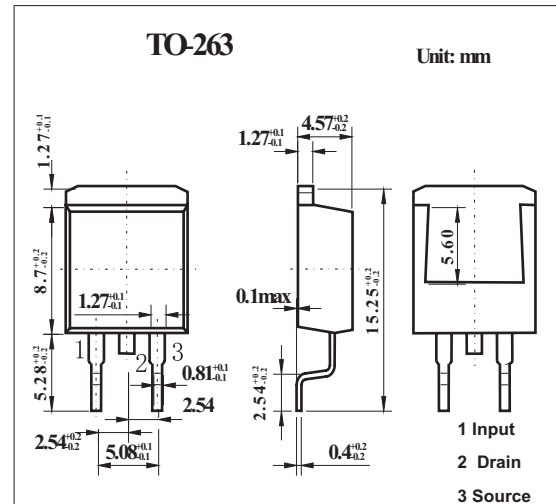


## Logic level TOPFET

## KUK129-50DL

## ■ Features

- TrenchMOS output stage
- Current limiting
- Overload protection
- Overtemperature protection
- Protection latched reset by input
- 5 V logic compatible input level
- Control of output stage and supply of overload protection circuits derived from input
- Low operating input current permits direct drive by micro-controller
- ESD protection on all pins
- Overvoltage clamping for turn off of inductive loads

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

Parameter	Symbol	Rating	Unit
Continuous drain source voltage <sup>1</sup>	$V_{DS}$	50	V
Continuous drain current $V_{IS} = 5\text{ V}$ ; $T_{mb} = 25^\circ\text{C}$	$I_D$	selflimited	A
Continuous drain current $V_{IS} = 5\text{ V}$ ; $T_{mb} \leq 125^\circ\text{C}$	$I_D$	16	A
Continuous input current	$I_i$	-5 to 5	mA
Repetitive peak input current $t_p \leq 1\text{ ms}$	$I_{IRM}$	-10 to 10	mA
Total power dissipation $T_{mb} \leq 25^\circ\text{C}$	$P_D$	65	W
Storage temperature	$T_{stg}$	-55 To 175	$^\circ\text{C}$
Continuous junction temperature <sup>2</sup> normal operation	$T_j$	150	$^\circ\text{C}$
Case temperature during soldering	$T_{sold}$	260	$^\circ\text{C}$
Electrostatic discharge capacitor voltage *2	$V_C$	2	kV

\*1  $\delta \leq 0.1$ ,  $t_p = 300\ \mu\text{s}$

\*2  $C = 250\ \text{pF}$ ;  $R = 1.5\ \text{k}\Omega$

## KUK129-50DL

## ■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Testconditons	Min	Typ	Max	Unit
Non-repetitive clamping energy	E <sub>DSM</sub>	I <sub>DM</sub> = 16 A; V <sub>DD</sub> ≤ 20 V; T <sub>mb</sub> ≤ 25°C			200	mJ
Repetitive clamping energy	E <sub>DRM</sub>	I <sub>DM</sub> = 16 A; V <sub>DD</sub> ≤ 20 V; T <sub>mb</sub> ≤ 95°C; f = 250 Hz			32	mJ
Drain source voltage	V <sub>DS</sub>	4 V ≤ V <sub>IS</sub> ≤ 5.5 V	0		35	V
Drain-source clamping voltage	V <sub>(CL)DSS</sub>	V <sub>IS</sub> = 0 V; I <sub>D</sub> = 10 mA	50			V
		V <sub>IS</sub> = 0 V; I <sub>DM</sub> = 2 A; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.01	50	60	70	V
Drain source leakage current	I <sub>DSS</sub>	V <sub>DS</sub> = 40 V			100	μA
		V <sub>DS</sub> = 40 V; T <sub>mb</sub> = 25°C		0.1	10	μA
Drain-source resistance	R <sub>DS(ON)</sub>	V <sub>IS</sub> ≥ 4.4 V; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.01; I <sub>DM</sub> = 6 A			95	mΩ
		V <sub>IS</sub> ≥ 4.4V; t <sub>p</sub> ≤ 300μs; δ ≤ 0.01; I <sub>DM</sub> = 6A; T <sub>mb</sub> = 25°C		36	50	mΩ
		V <sub>IS</sub> ≥ 4 V; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.01; I <sub>DM</sub> = 6 A			100	mΩ
		V <sub>IS</sub> ≥ 4V; t <sub>p</sub> ≤ 300μs; δ ≤ 0.01; I <sub>DM</sub> = 6A; T <sub>mb</sub> = 25°C		39	55	mΩ
Drain current limiting	I <sub>D</sub>	V <sub>DS</sub> = 13 V; V <sub>IS</sub> = 5 V; T <sub>mb</sub> = 25°C	16	24	32	A
		V <sub>DS</sub> = 13 V; 4.4 V ≤ V <sub>IS</sub> ≤ 5.5 V	12		36	A
		V <sub>DS</sub> = 13 V; 4 V ≤ V <sub>IS</sub> ≤ 5.5 V	8		36	A
Overload power threshold	P <sub>D(TO)</sub>	device trips if P <sub>D</sub> > P <sub>D(TO)</sub> ; V <sub>IS</sub> = 5 V; T <sub>mb</sub> = 25°C	40	120	160	W
Characteristic time	T <sub>DSC</sub>		200	350	600	μs
Threshold junction temperature	T <sub>j(TO)</sub>		150	170		°C
Input threshold voltage	V <sub>IS(TO)</sub>	V <sub>DS</sub> = 5 V; I <sub>D</sub> = 1 mA	0.6		2.4	V
		V <sub>DS</sub> = 5 V; I <sub>D</sub> = 1 mA; T <sub>mb</sub> = 25°C	1.1	1.6	2.1	V
Input supply current	I <sub>IS</sub>	normal operation; V <sub>IS</sub> = 5 V	100	220	400	μA
		normal operation; V <sub>IS</sub> = 4 V	80	195	330	
Input supply current	I <sub>ISL</sub>	protection latched; V <sub>IS</sub> = 5 V	200	400	650	
		protection latched; V <sub>IS</sub> = 3 V	130	250	430	
Protection reset voltage	V <sub>ISR</sub>	reset time t <sub>r</sub> ≥ 100 μs	1.5	2	2.9	V
Latch reset time	t <sub>tr</sub>	V <sub>IS1</sub> = 5 V, V <sub>IS2</sub> < 1 V	10	40	100	μs
Input clamping voltage	V <sub>(CL)IS</sub>	I <sub>I</sub> = 1.5 mA	5.5		8.5	V
Input series resistance to gate of power MOSFET	R <sub>IG</sub>	I <sub>I</sub> = 1.5 mA; T <sub>mb</sub> = 25°C		33		kΩ
Turn-on delay time	t <sub>d on</sub>	V <sub>IS</sub> = 5 V		15	30	μs
Rise time	t <sub>r</sub>			30	60	
Turn-off delay time	t <sub>d off</sub>	V <sub>IS</sub> = 0 V		70	140	
Fall time	t <sub>f</sub>			35	70	
Junction to mounting base	R <sub>th j-mb</sub>			1.75	1.92	K/W
Junction to ambient	R <sub>th j-a</sub>	minimum footprint FR4 PCB		50		K/W