# Logic level TOPFET

KUK114-50L

■ Features

- ● Vertical power DMOS output stage
- ● Low on-state resistance
- ● Logic and protection supply from separate pin
- ● Low operating supply current
- ● Overload protection against over temperature
- ● Overload protection against short circuit load
- ● Latched overload protection reset by protection supply
- ● Protection circuit condition indicated by flag pin
- ● 5 V logic compatible input level
- ● Separate input pin for higher frequency drive
- ● ESD protection on input, flag and protection supply pins
- ● Over voltage clamping for turn off of inductive loads
- ● Both linear and switching operation are possible

TO-263 Unit: mm

1 Input
2 Drain
3 Source
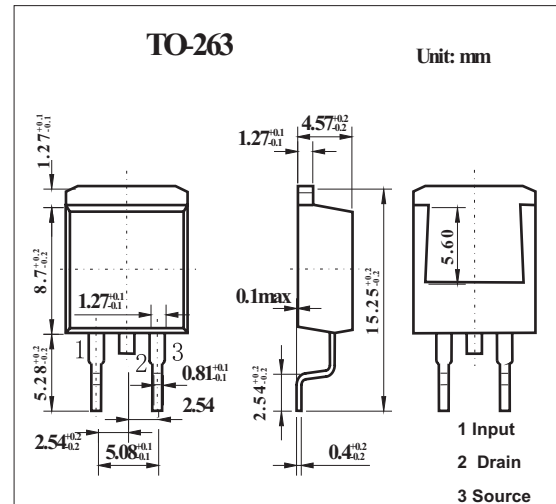
■ Absolute Maximum Ratings Ta = 25℃

Parameter	Conditions	Symbol	Rating		Unit
Continuous off-state drain source voltage	$V_{IS} = 0$ V	V_{DSS}	50		V
Continuous input voltage		V_{IS}	11		V
Continuous flag voltage		V_{FS}	11		V
Continuous supply voltage		V_{PS}	11		V
	$V_{IS} =$		7	5	V
Continuous drain current	$T_{mb} \leqslant 25$ ℃	I_D	15	13	A
Continuous drain current	$T_{mb} \leqslant 100$ ℃	I_D	9.5	8.5	A
Repetitive peak on-state drain current	$T_{mb} \leqslant 25$ ℃	I_{DRM}	60	54	A
Total power dissipation	$T_{mb} = 25$ ℃	P_{tot}	40		W
Storage temperature		T_{stg}	-55 to +150		℃
Junction temperature		T_j	150		℃
Lead temperature		T_{sold}	250		℃
	$V_{IS} =$		7	5	V
Protection supply voltage		V_{PSP}	4.4	4	V
Protected drain source supply voltage	$V_{IS} = 10$ V; $R_I \geqslant 2$ kΩ	$V_{DDP(T)}$	50		V
($V_{PS} = V_{PSN}$)	$V_{IS} = 5$ V; $R_I \geqslant 1$ kΩ		50		V
Protected drain source supply voltage	$V_{IS} = 10$ V; $R_I \geqslant 2$ kΩ	$V_{DDP(P)}$	25		V
($V_{PS} = V_{PSN}$; $L \leqslant 10$ μH)	$V_{IS} = 5$ V; $R_I \geqslant 1$ kΩ		45		V
Instantaneous overload dissipation		P_{DSM}	0.8		kW
Electrostatic discharge capacitor voltage	C = 250 pF; R = 1.5 KΩ	V_C	2		KV
Repetitive peak clamping drain current	$R_{IS} \geqslant 100$ Ω	I_{DRRM}	15		A

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Parameter	Conditions	Symbol	Rating	Unit
Non-repetitive inductive turn-off energy	I_{DM} = 15 A; $R_{IS} \geqslant$ 100 Ω	E_{DSM}	200	mJ
Repetitive inductive turn-off energy	$R_{IS} \geqslant$ 100 Ω; $T_{mb} \leqslant$ 95 ℃;I_{DM} = 4 A; $V_{DD} \leqslant$ 20 V;f = 250 Hz	E_{DRM}	20	mJ
Repetitive peak drain to input current	R_{IS} = 0 Ω; tp $\leqslant$ 1 ms	I_{DIRM}	50	mA
Continuous forward current	V_{IS} = V_{PS} = V_{FS} = 0 V	I_S	15	A
Junction to mounting base		$R_{th\ j-mb}$	2.5 to 3.1	K/W

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Parameter	Symbol	Testconditons	Min	Typ	Max	Unit
Drain-source clamping voltage	$V_{(CL)DSR}$	R_{IS} = 100 Ω; I_D = 10 mA	50		65	V
Drain-source clamping voltage	$V_{(CL)DSR}$	R_{IS} = 100 Ω; I_{DM} = 1 A; tp $\leqslant$ 300 μs;d $\leqslant$ 0.01	50		70	V
Zero input voltage drain current	I_{DSS}	V_{DS} = 12 V; V_{IS} = 0 V		0.5	10	μA
Drain source leakage current	I_{DSR}	V_{DS} = 50 V; R_{IS} = 100 Ω;		1	20	μA
Drain source leakage current	I_{DSR}	V_{DS} = 40 V; R_{IS} = 100 Ω;T_j = 125 ℃		10	100	μA
Drain-source on-state resistance (V_{IS}=7V)	$R_{DS(ON)}$	I_{DM} = 7.5 A;tp $\leqslant$ 300 μs; d $\leqslant$ 0.01		75	100	mΩ
(V_{IS}=5V)				95	125	mΩ
Overload threshold energy	$E_{DS(TO)}$	V_{DD} = 13 V; V_{IS} = 10 V($L \leqslant$ 10 mH;$R_I \geqslant$ 2 kΩ)		150		mJ
Response time	$t_{d\ sc}$	V_{DD} = 13 V; V_{IS} = 10 V($L \leqslant$ 10 mH;$R_I \geqslant$ 2 kΩ)		375		μs
Threshold junction temperature	$T_{j(TO)}$	V_{PS} = V_{PSN}; $R_I \geqslant$ 2 kΩ from $I_D \geqslant$ 0.65 A	150			℃
Forward transconductance	g_{fs}	V_{DS} = 10 V; I_{DM} = 7.5 A tp $\leqslant$ 300 μs;d $\leqslant$ 0.01	5	9		S
Drain current (V_{DS} = 13 V)	I_D	V_{IS} = 5 V		25		A
		V_{IS} = 10 V		40		A
Protection supply current	$I_{PS,}$	V_{PS} = 5 V		0.2	0.35	mA
Protection reset voltage	V_{PSR}		1.5	2.5	3.5	V
		T_j = 150 ℃	1.0			V
Protection clamp voltage	$V_{(CL)PS}$	I_P = 1.35 mA	11	13		V
Forward voltage	V_{SDS}	I_S = 15 A; V_{IS} = V_{PS} = V_{FS} = 0 V;tp = 300 μs		1.0	1.5	V
Reverse recovery time	t_{rr}					
Input threshold voltage	$V_{IS(TO)}$	V_{DS} = 5 V; I_D = 1 mA	1.0	1.5	2.0	V
		T_{mb} = 150 ℃	0.5			V
Input current	I_{IS}	V_{IS} = 10 V		10	100	nA
Input clamp voltage	$V_{(CL)IS}$	I_I= 1 mA	11	13		V
Input resistance	R_{ISL}	V_{PS} = 5 V I_I = 5 mA;		55		Ω
		T_{mb} = 150 ℃		95		Ω
		V_{PS} = 10 V I_I = 5 mA;		35		Ω
		T_{mb} = 150 ℃		60		Ω

KEXIN

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Parameter	Symbol	Testconditons	Min	Typ	Max	Unit
internal overvoltage clamping	R_{IS}	$R_I = \infty\ \Omega$; $V_{DS} > 30\ V$	100			Ω
internal overload protection	R_I	$R_{IS} = \infty\ \Omega$; $V_{II} = 5\ V$	1			kΩ
		$V_{II} = 10\ V$	2			kΩ
Turn-on delay time	$t_{d\ on}$	$V_{DD} = 15\ V$; V_{IS}: 0 V $\Longrightarrow$ 0 V		8		ns
Rise time	t_r			13		ns
Turn-off delay time	$t_{d\ off}$	$V_{DD} = 15\ V$; V_{IS}: 10 V $\Longrightarrow$ 0 V		100		ns
Fall time	t_f			45		ns
Input capacitance	C_{iss}	$V_{DS} = 25\ V$; $V_{IS} = 0\ V$		415	600	pF
Output capacitance	C_{oss}	$V_{DS} = 25\ V$; $V_{IS} = 0\ V$		275	400	pF
Reverse transfer capacitance	C_{rss}	$V_{DS} = 25\ V$; $V_{IS} = 0\ V$		55	80	pF
Protection supply pin capacitance	C_{pso}	$V_{PS} = 10\ V$		30		pF
Flag pin capacitance	C_{fso}	$V_{FS} = 10\ V$; $V_{PS} = 0\ V$		20		pF
Flag voltage	V_{FS}	$I_F = 1.6\ mA$		0.15	0.4	V
Flag saturation current	I_{FSS}	$V_{FS} = 10\ V$		15		mA
Flag leakage current	I_{FS}	$V_{FS} = 10\ V$			10	μA
Protection supply threshold voltage	V_{PSF}	$V_{FF} = 5\ V$; $R_F = 3\ K\Omega$	2.5	3.3	4	V
Flag clamping voltage	$V_{(CL)FS}$	$I_F = 1\ mA$; $V_{PS} = 0\ V$	11	13		V
Suitable external pull-up resistance	R_F	$V_{FF} = 5\ V$	1	10	50	kΩ
		$V_{FF} = 10\ V$	2	20	100	kΩ