MOSFETs Silicon N-Channel MOS (π-MOSⅦ)

TK8A45D

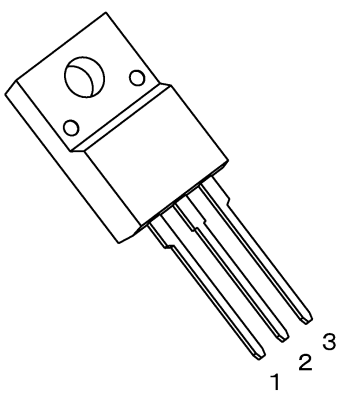
1. Applications

- Switching Voltage Regulators

2. Features

(1) Low drain-source on-resistance: $R_{DS(ON)}$ = 0.73 Ω (typ.)
(2) High forward transfer admittance: $|Y_{fs}|$ = 3.8 S (typ.)
(3) Low leakage current: I_{DSS} = 10 μA (max) (V_{DS} = 450 V)
(4) Enhancement mode: V_{th} = 2.4 to 4.4 V (V_{DS} = 10 V, I_D = 1 mA)

3. Packaging and Internal Circuit



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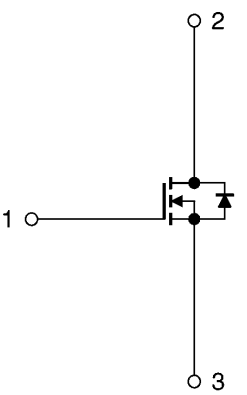


1: Gate (G)
2: Drain (D)
3: Source (S)

4. Absolute Maximum Ratings (Note) (T_a = 25°C unless otherwise specified)

Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	450	V
Gate-source voltage		V_{GSS}	±30	
Drain current (DC)	(Note 1)	I_D	8	A
Drain current (pulsed)	(Note 1)	I_{DP}	32	
Power dissipation	(T_c = 25°C)	P_D	35	W
Single-pulse avalanche energy	(Note 2)	E_{AS}	173	mJ
Avalanche current		I_{AR}	8	A
Repetitive avalanche energy	(Note 3)	E_{AR}	3.5	mJ
Channel temperature		T_{ch}	150	°C
Storage temperature		T_{stg}	-55 to 150	

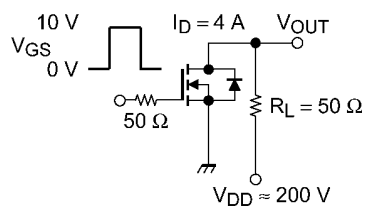
6. Electrical Characteristics

6.1. Static Characteristics (T_a = 25°C unless otherwise specified)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I_{GSS}	V_{GS} = ±30 V, V_{DS} = 0 V	—	—	±1	μA
Drain cut-off current	I_{DSS}	V_{DS} = 450 V, V_{GS} = 0 V	—	—	10	
Drain-source breakdown voltage	$V_{(BR)DSS}$	I_D = 10 mA, V_{GS} = 0 V	450	—	—	V
Gate threshold voltage	V_{th}	V_{DS} = 10 V, I_D = 1 mA	2.4	—	4.4	
Drain-source on-resistance	$R_{DS(ON)}$	V_{GS} = 10 V, I_D = 4 A	—	0.73	0.9	Ω
Forward transfer admittance	$\|Y_{fs}\|$	V_{DS} = 10 V, I_D = 4 A	1.0	3.8	—	S

6.2. Dynamic Characteristics (T_a = 25°C unless otherwise specified)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Input capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1 MHz	—	700	—	pF
Reverse transfer capacitance	C_{rss}		—	4	—	
Output capacitance	C_{oss}		—	80	—	
Switching time (rise time)	t_r	See Figure 6.2.1.	—	20	—	ns
Switching time (turn-on time)	t_{on}		—	40	—	
Switching time (fall time)	t_f		—	11	—	
Switching time (turn-off time)	t_{off}		—	60	—	



Duty ≤ 1%, t_w = 10 μs

Fig. 6.2.1 Switching Time Test Circuit

6.3. Gate Charge Characteristics (T_a = 25°C unless otherwise specified)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Total gate charge (gate-source plus gate-drain)	Q_g	V_{DD} ≈ 360 V, V_{GS} = 10 V, I_D = 8 A	—	16	—	nC
Gate-source charge	Q_{gs}		—	10	—	
Gate-drain charge	Q_{gd}		—	6	—	

6.4. Source-Drain Characteristics (T_a = 25°C unless otherwise specified)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Reverse drain current (DC) (Note 1)	I_{DR}	—	—	—	8	A
Reverse drain current (pulsed) (Note 1)	I_{DRP}	—	—	—	32	
Diode forward voltage	V_{DSF}	I_{DR} = 8 A, V_{GS} = 0 V	—	—	-1.7	V
Reverse recovery time	t_{rr}	I_{DR} = 8 A, V_{GS} = 0 V $-dI_{DR}/dt$ = 100 A/μs	—	1300	—	ns
Reverse recovery charge	Q_{rr}		—	9.1	—	μC