

2SK1609

Silicon N-Channel Power F-MOS

■ Features

- High avalanche energy capability
- V_{GS} : 30V guaranteed
- Low $R_{DS(on)}$, high-speed switching characteristic

■ Applications

- High-speed switching (switching mode regulator)
- For high-frequency power amplification

■ Absolute Maximum Ratings ($T_c = 25^\circ\text{C}$)

Parameter		Symbol	Rating	Unit
Drain-Source breakdown voltage		V_{DSS}	500	V
Gate-Source voltage		V_{GSS}	± 30	V
Drain current	DC	I_D	± 8	A
	Pulse	I_{DP}	± 16	A
Avalanche energy capability		EAS*	130	mJ
Allowable power dissipation	$T_C = 25^\circ\text{C}$	P_D	50	W
	$T_a = 25^\circ\text{C}$		2	
Channel temperature		T_{ch}	150	$^\circ\text{C}$
Storage temperature		T_{stg}	-55 to +150	$^\circ\text{C}$

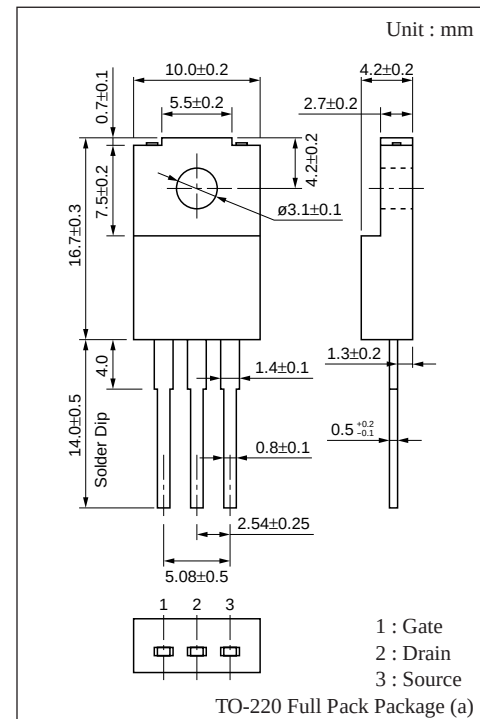
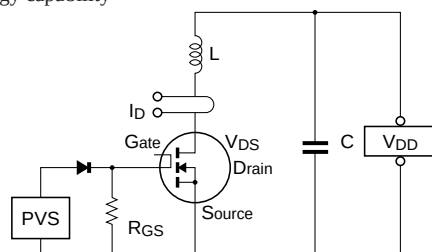
* Single pulse

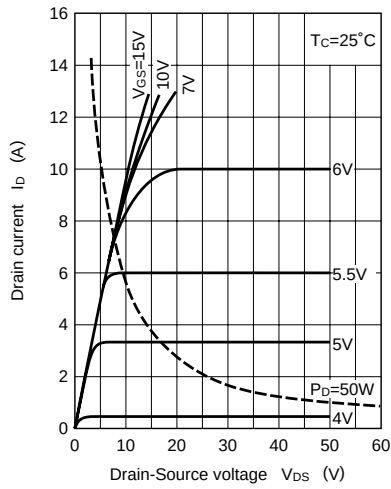
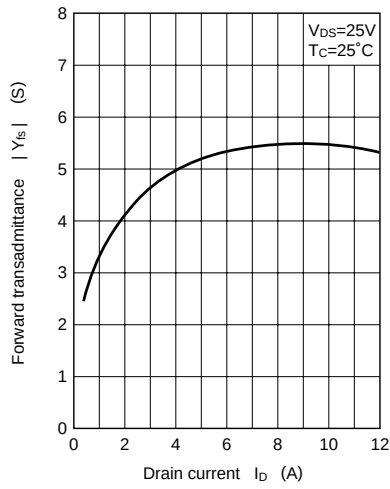
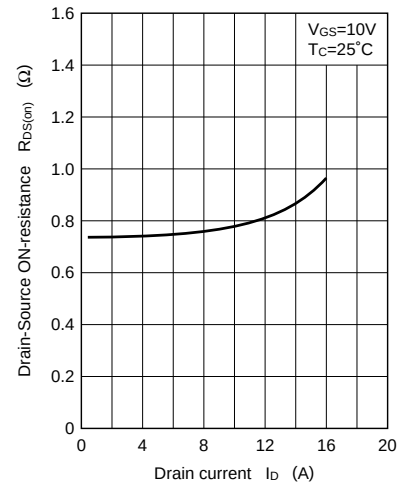
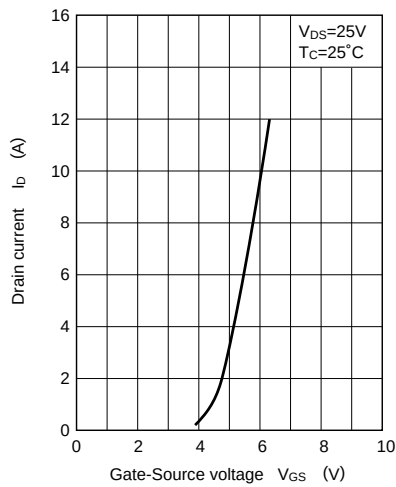
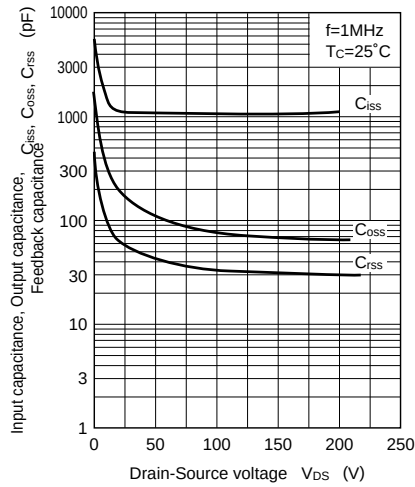
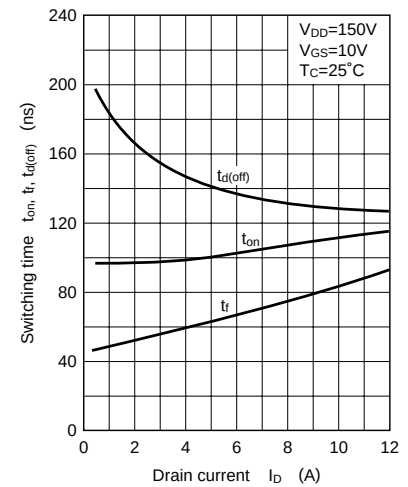
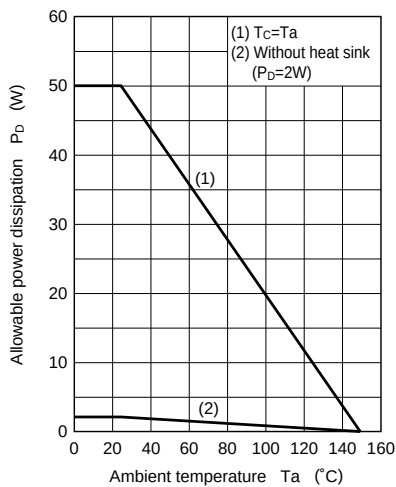
■ Electrical Characteristics ($T_c = 25^\circ\text{C}$)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source cut-off current	I_{DSS}	$V_{DS} = 400\text{V}$, $V_{GS} = 0$			0.1	mA
Gate-Source leakage current	I_{GSS}	$V_{GS} = \pm 30\text{V}$, $V_{DS} = 0$			± 1	μA
Drain-Source breakdown voltage	V_{DSS}	$I_D = 1\text{mA}$, $V_{GS} = 0$	500			V
Avalanche energy capability	EAS*	$L = 4.1\text{mH}$, $I_D = 8\text{A}$, $V_{DD} = 50\text{V}$	130			mJ
Gate threshold voltage	V_{th}	$V_{DS} = 25\text{V}$, $I_D = 1\text{mA}$	1		5	V
Drain-Source ON-resistance	$R_{DS(on)}$	$V_{GS} = 10\text{V}$, $I_D = 4\text{A}$		0.7	1	Ω
Forward transadmittance	$ Y_{fs} $	$V_{DS} = 25\text{V}$, $I_D = 4\text{A}$	3	5		S
Input capacitance	C_{iss}	$V_{DS} = 20\text{V}$, $V_{GS} = 0$, $f = 1\text{MHz}$		1200		pF
Output capacitance	C_{oss}			160		pF
Feedback capacitance	C_{rss}			70		pF
Turn-on time	t_{on}	$V_{GS} = 10\text{V}$, $I_D = 5\text{A}$ $V_{DD} \approx 150\text{V}$, $R_L = 30\Omega$		100		ns
Fall time	t_f			60		ns
Turn-off time (delay time)	$t_d(off)$			140		ns

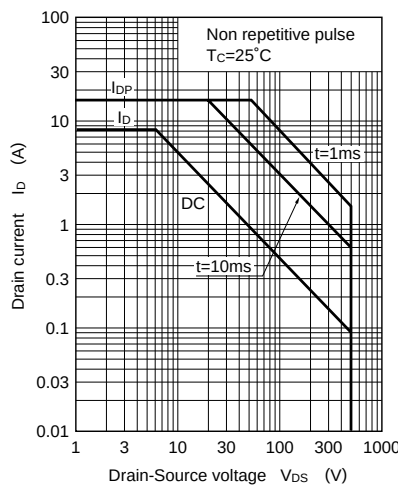
* Avalanche energy capability

Test circuit



$I_D - V_{DS}$  $|Y_{fs}| - I_D$  $R_{DS(on)} - I_D$  $I_D - V_{GS}$  $C_{iss}, C_{oss}, C_{rss} - V_{DS}$  $t_{on}, t_f, t_d(off) - I_D$  $P_D - T_a$ 

Area of safe operation (ASO)

 $EAS - T_j$ 