

# 2SK2509

## Silicon N-Channel Power F-MOS

### ■ Features

- Avalanche energy capability guaranteed
- High-speed switching
- Low ON-resistance
- No secondary breakdown

### ■ Applications

- Non-contact relay
- Solenoid drive
- Motor drive
- Control equipment
- Switching mode regulator

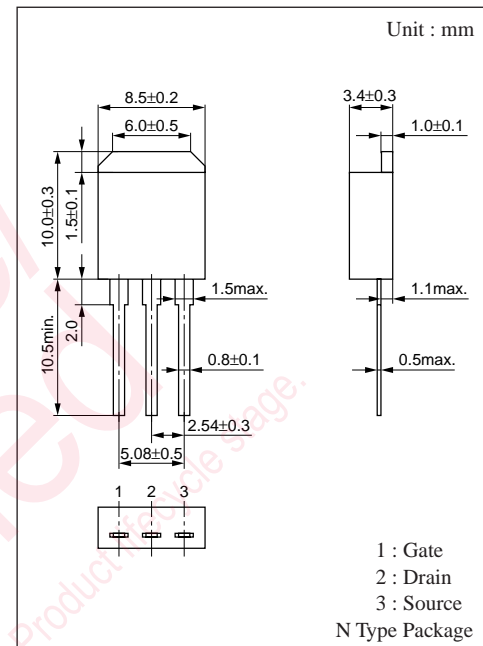
### ■ Absolute Maximum Ratings (T<sub>c</sub> = 25°C)

Parameter	Symbol	Rating	Unit
Drain-Source breakdown voltage	V <sub>DSS</sub>	500	V
Gate-Source voltage	V <sub>GSS</sub>	±30	V
Drain current	DC	I <sub>D</sub>	±2.5
	Pulse	I <sub>DP</sub>	±5
Avalanche energy capability	EAS*	15.6	mJ
Allowable power dissipation	T <sub>C</sub> = 25°C	P <sub>D</sub>	40
	T <sub>a</sub> = 25°C		1.3
Channel temperature	T <sub>ch</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	°C

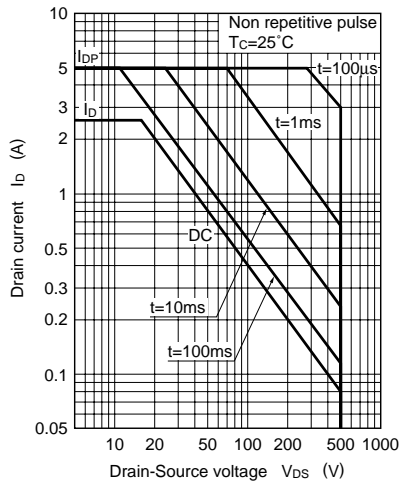
\* L= 5mH, I<sub>L</sub>= 2.5A, 1 pulse

### ■ Electrical Characteristics (T<sub>c</sub> = 25°C)

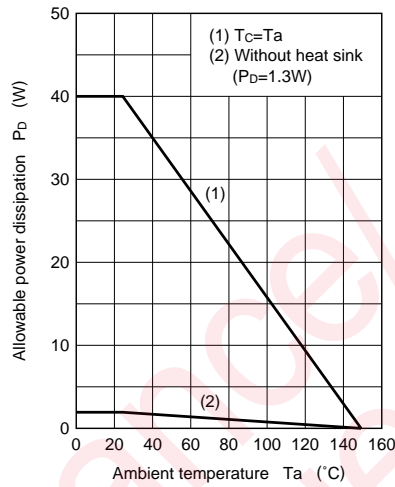
Parameter	Symbol	Condition	Min	Typ	Max	Unit	
Drain-Source cut-off current	I <sub>DSS</sub>	V <sub>DS</sub> = 400V, V <sub>GS</sub> = 0			100	μA	
Gate-Source leakage current	I <sub>GSS</sub>	V <sub>GS</sub> =±30V, V <sub>DS</sub> = 0			±1	μA	
Drain-Source breakdown voltage	V <sub>DSS</sub>	I <sub>D</sub> =1mA, V <sub>GS</sub> = 0	500			V	
Gate threshold voltage	V <sub>th</sub>	V <sub>DS</sub> = 25V, I <sub>D</sub> =1mA	2		5	V	
Drain-Source ON-resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =1.5A		3.2	4	Ω	
Forward transadmittance	Y <sub>fs</sub>	V <sub>DS</sub> = 25V, I <sub>D</sub> =1.5A	1	1.5		S	
Diode forward voltage	V <sub>DSF</sub>	I <sub>DR</sub> = 2.5A, V <sub>GS</sub> = 0			-1.5	V	
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0, f= 1MHz		330		pF	
Output capacitance	C <sub>oss</sub>				55		pF
Feedback capacitance	C <sub>rss</sub>				20		pF
Turn-on time (delay time)	t <sub>d(on)</sub>	V <sub>DD</sub> =150V, I <sub>D</sub> =1.5A V <sub>GS</sub> =10V, R <sub>L</sub> =100Ω		15		ns	
Rise time	t <sub>r</sub>			25		ns	
Fall time	t <sub>f</sub>			30		ns	
Turn-off time (delay time)	t <sub>d(off)</sub>				55		ns
Channel-Case heat resistance	R <sub>th(ch-c)</sub>					3.125	°C/W
Channel-Atmosphere heat resistance	R <sub>th(ch-a)</sub>				96.15	°C/W	



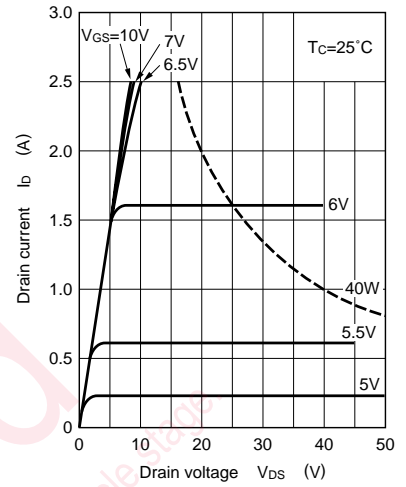
Area of safe operation (ASO)



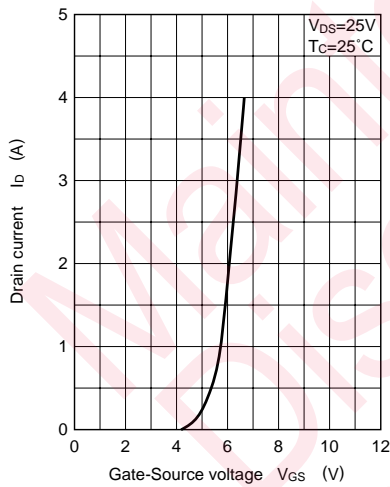
$P_D - T_a$



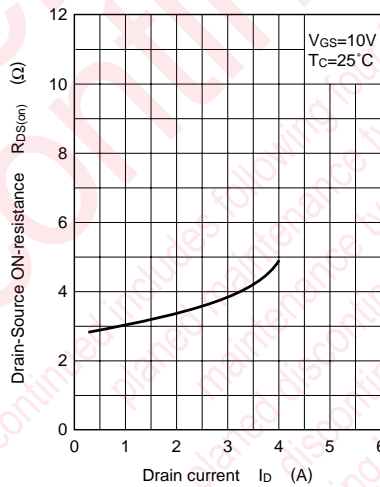
$I_D - V_{DS}$



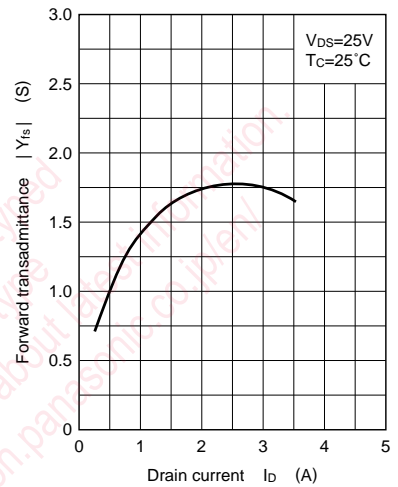
$I_D - V_{GS}$



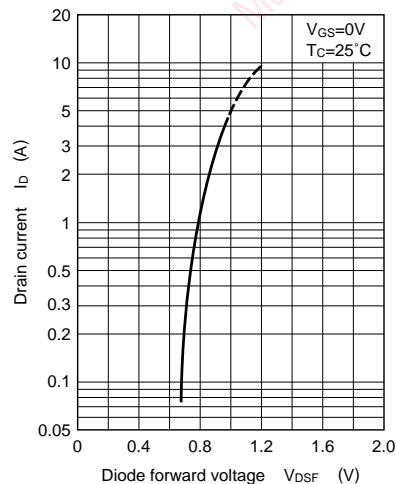
$R_{DS(on)} - I_D$



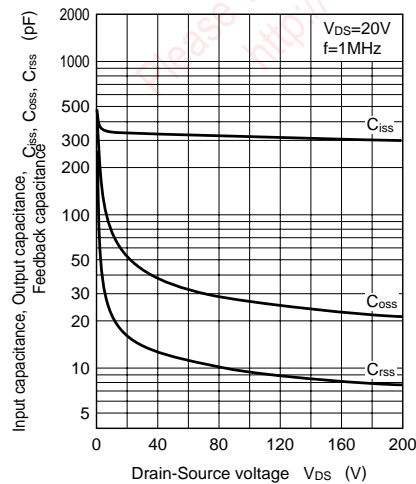
$|Y_{fs}| - I_D$



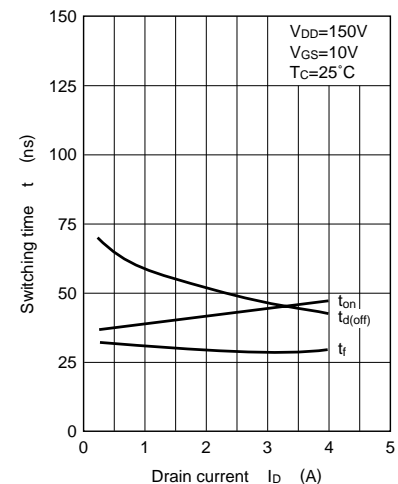
$I_{DR} - V_{DSF}$

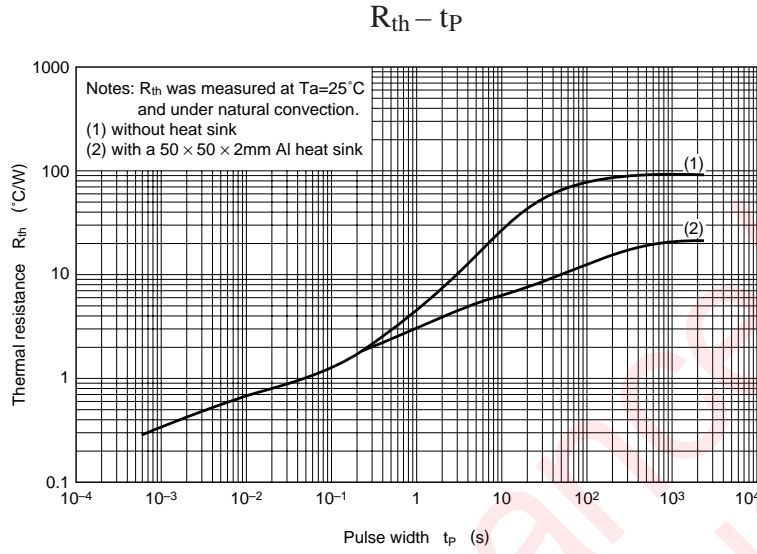


$C_{iss}, C_{oss}, C_{rss} - V_{DS}$



$t - I_D$





Maintenance/Discontinued includes following four Product lifecycle stage.  
planned maintenance type  
maintenance type  
planned discontinued type  
discontinued type  
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