2SK2509

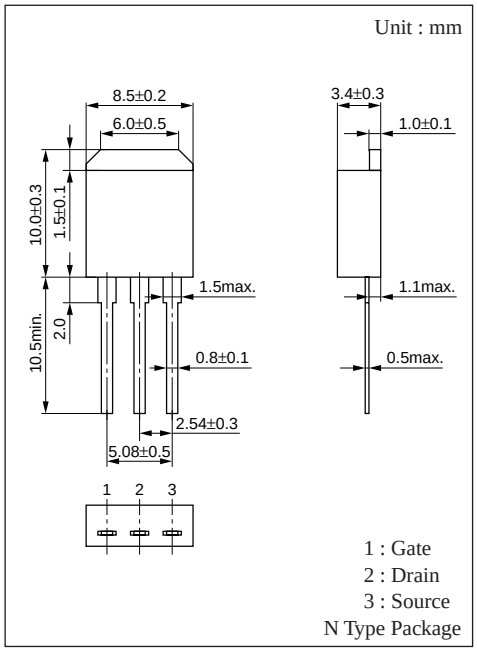
Silicon N-Channel Power F-MOS

■ 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 (Tc = 25˚C)

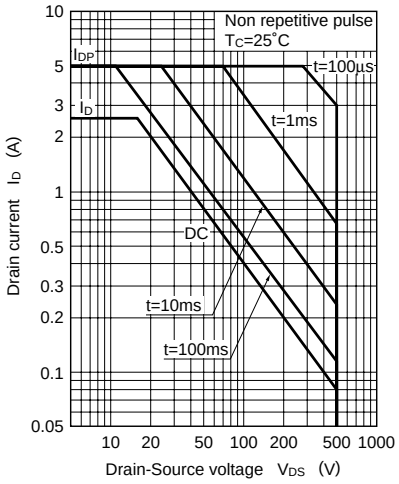
Parameter		Symbol	Rating	Unit
Drain-Source breakdown voltage		V_{DSS}	500	V
Gate-Source voltage		V_{GSS}	±30	V
Drain current	DC	I_D	±2.5	A
	Pulse	I_{DP}	±5	A
Avalanche energy capability		EAS *	15.6	mJ
Allowable power dissipation	T_C= 25˚C	P_D	40	W
	Ta= 25˚C		1.3	
Channel temperature		T_{ch}	150	˚C
Storage temperature		T_{stg}	–55 to +150	˚C

* L= 5mH, I_L= 2.5A, 1 pulse

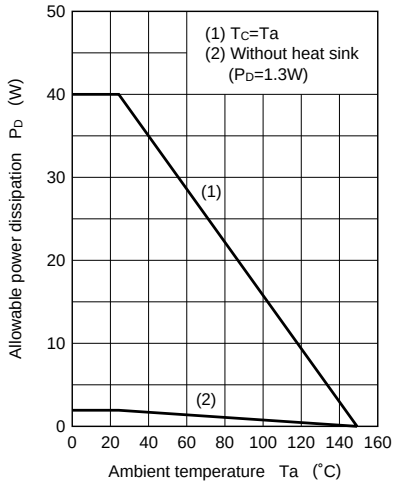
■ Electrical Characteristics (Tc = 25˚C)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source cut-off current	I_{DSS}	V_{DS}= 400V, V_{GS}= 0			100	μ A
Gate-Source leakage current	I_{GSS}	V_{GS}=±30V, V_{DS}= 0			±1	μ A
Drain-Source breakdown voltage	V_{DSS}	I_D=1mA, V_{GS}= 0	500			V
Gate threshold voltage	V_{th}	V_{DS}= 25V, I_D=1mA	2		5	V
Drain-Source ON-resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=1.5A		3.2	4	Ω
Forward transadmittance	$\|Y_{fs}\|$	V_{DS}= 25V, I_D=1.5A	1	1.5		S
Diode forward voltage	V_{DSF}	I_{DR}= 2.5A, V_{GS}= 0			–1.5	V
Input capacitance	C_{iss}	V_{DS}= 20V, V_{GS}= 0, f= 1MHz		330		pF
Output capacitance	C_{oss}			55		pF
Feedback capacitance	C_{rss}			20		pF
Turn-on time (delay time)	$t_{d(on)}$	V_{DD}=150V, I_D=1.5A, V_{GS}=10V, R_L=100Ω		15		ns
Rise time	t_r			25		ns
Fall time	t_f			30		ns
Turn-off time (delay time)	$t_{d(off)}$			55		ns
Channel-Case heat resistance	$R_{th(ch-c)}$				3.125	˚C/W
Channel-Atmosphere heat resistance	$R_{th(ch-a)}$				96.15	˚C/W

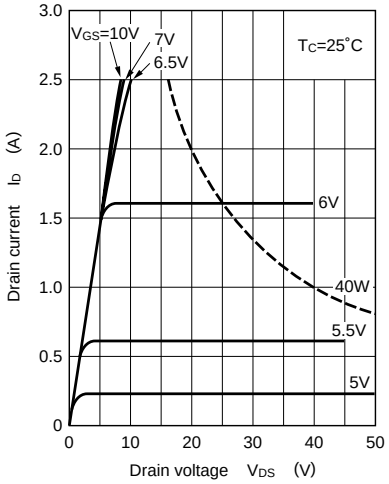
Area of safe operation (ASO)



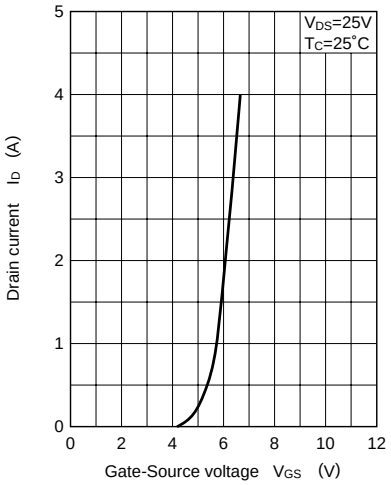
P_D – Ta



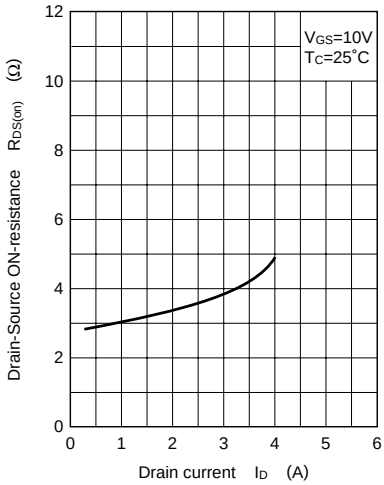
I_D – V_{DS}



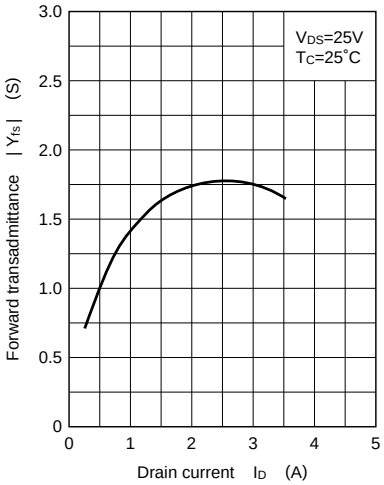
I_D – V_{GS}



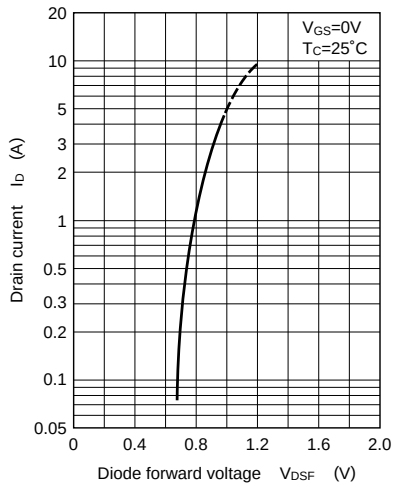
$R_{DS(on)}$ – I_D



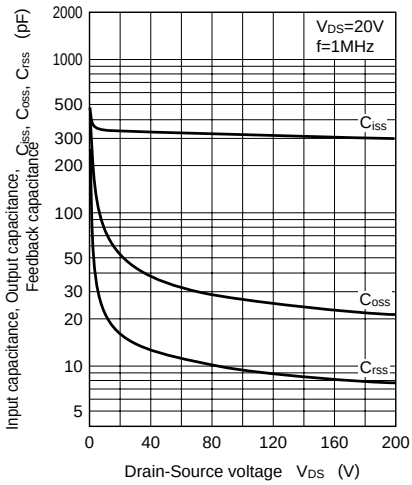
$|Y_{fs}|$ – I_D



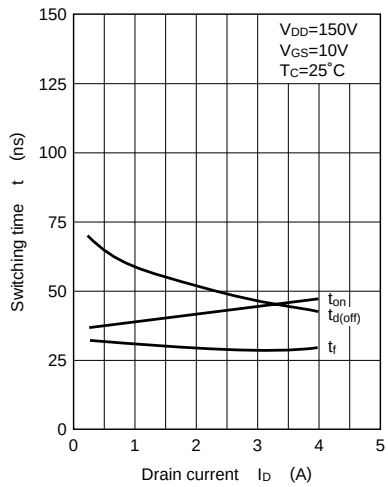
I_{DR} – V_{DSF}



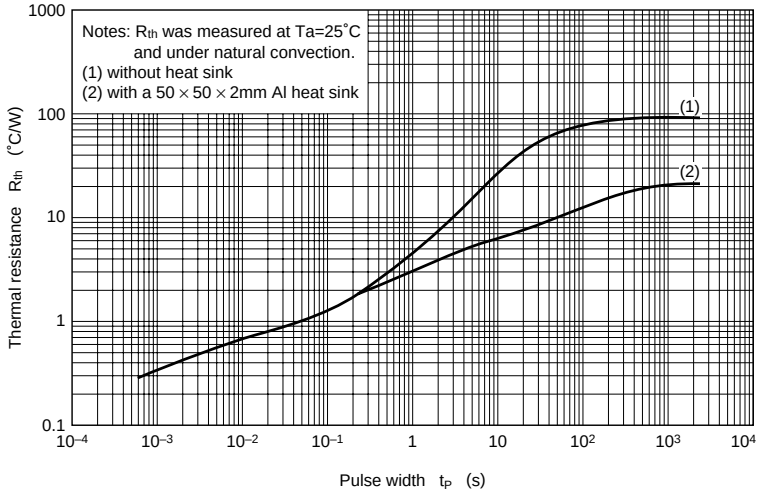
C_{iss}, C_{oss}, C_{rss} – V_{DS}



t – I_D



$R_{th} - t_P$


Notes: Rth was measured at Ta=25˚C
and under natural convection.
(1) without heat sink
(2) with a 50 × 50 × 2mm Al heat sink
(1)
(2)
Thermal resistance Rth (˚C/W)
1000
100
10
1
0.1
10–4
10–3
10–2
10–1
1
10
10²
10³
10⁴
Pulse width tP (s)