2SK2377

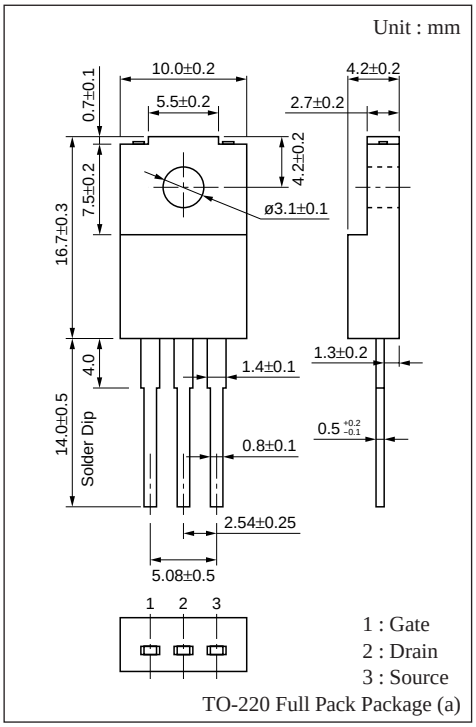
Silicon N-Channel Power F-MOS

■ Features

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

■ Applications

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



■ Absolute Maximum Ratings (Tc = 25˚C)

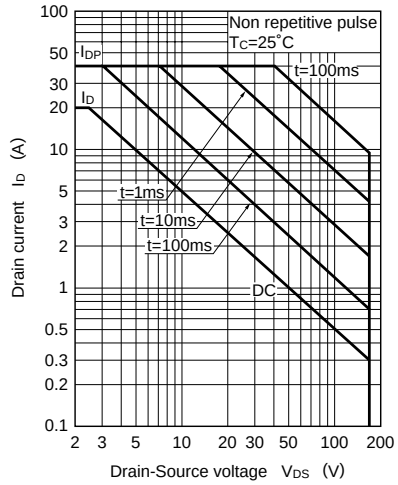
Parameter		Symbol	Rating	Unit
Drain-Source breakdown voltage		V_{DSS}	170	V
Gate-Source voltage		V_{GSS}	±20	V
Drain current	DC	I_D	±20	A
	Pulse	I_{DP}	±40	A
Avalanche energy capability		EAS *	200	mJ
Allowable power dissipation	T_C= 25˚C	P_D	50	W
	Ta= 25˚C		2	
Channel temperature		T_{ch}	150	˚C
Storage temperature		T_{stg}	–55 to +150	˚C

* L=1mH, I_L= 20A, 1 pulse

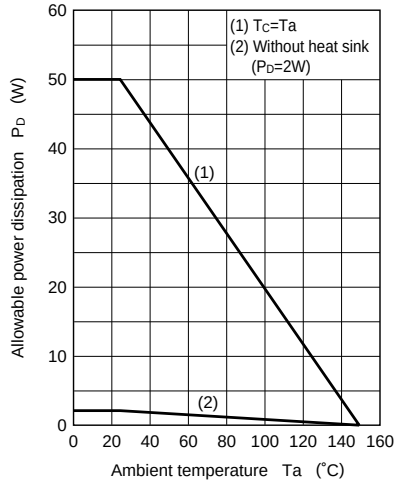
■ Electrical Characteristics (Tc = 25˚C)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source cut-off current	I_{DSS}	V_{DS}=140V, V_{GS}= 0			10	μA
Gate-Source leakage current	I_{GSS}	V_{GS}=±20V, V_{DS}= 0			±1	μA
Drain-Source breakdown voltage	V_{DSS}	I_D=1mA, V_{GS}= 0	170			V
Gate threshold voltage	V_{th}	V_{DS}=10V, I_D=1mA	1		2.5	V
Drain-Source ON-resistance	$R_{DS(on)\,1}$	V_{GS}=10V, I_D=10A		95	145	mΩ
	$R_{DS(on)\,2}$	V_{GS}= 4V, I_D=10A		105	160	mΩ
Forward transadmittance	$\|Y_{fs}\|$	V_{DS}=10V, I_D=10A	10	17		S
Diode forward voltage	V_{DSF}	I_{DR}=20A, V_{GS}= 0			–1.6	V
Input capacitance	C_{iss}	V_{DS}=10V, V_{GS}= 0, f=1MHz		1650		pF
Output capacitance	C_{oss}			400		pF
Feedback capacitance	C_{rss}			130		pF
Turn-on time (delay time)	$t_{d(on)}$	V_{DD}=100V, I_D=10A V_{GS}=10V, R_L=10Ω		10		ns
Rise time	t_r			60		ns
Fall time	t_f			280		ns
Turn-off time (delay time)	$t_{d(off)}$			1500		ns
Channel-Case heat resistance	$R_{th(ch-c)}$				2.5	˚C/W
Channel-Atmosphere heat resistance	$R_{th(ch-a)}$				62.5	˚C/W

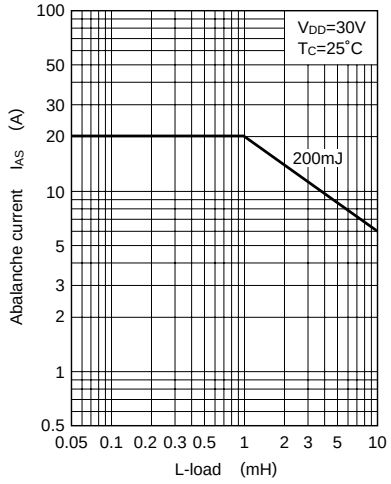
Area of safe operation (ASO)



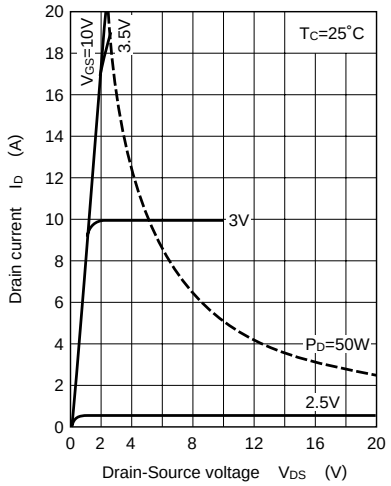
P_D – Ta



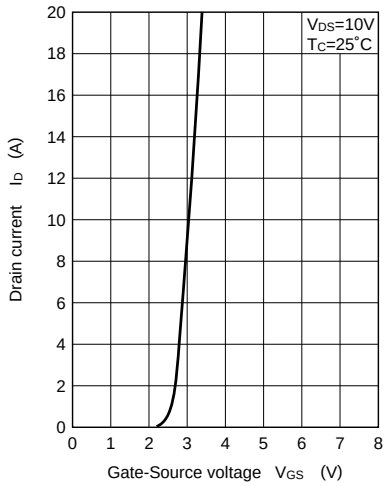
IAS – L-load



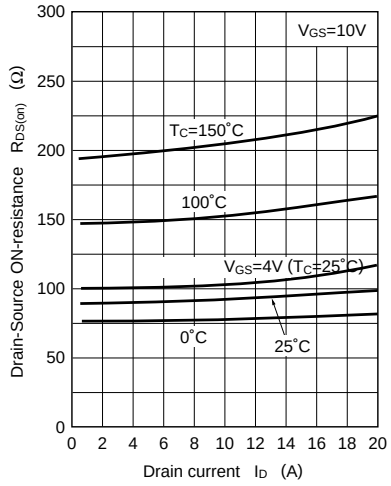
I_D – V_{DS}



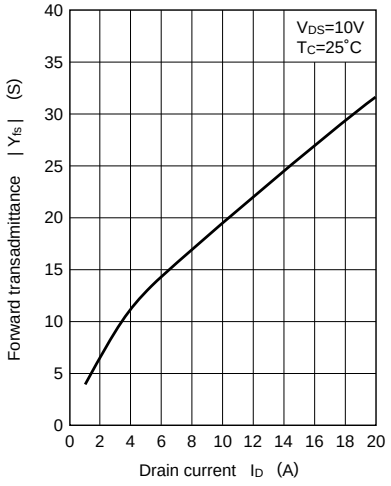
I_D – V_{GS}



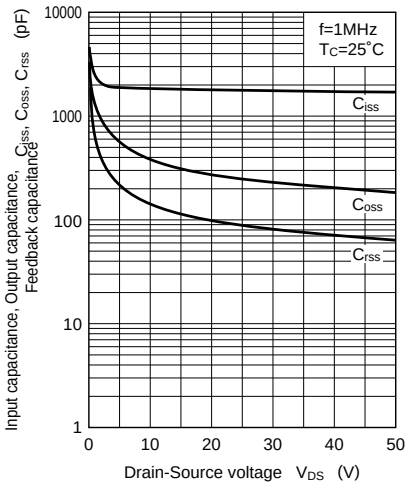
$R_{DS(on)}$ – I_D



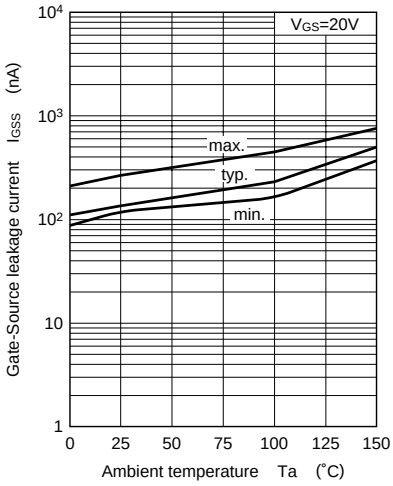
$|Y_{fs}|$ – I_D



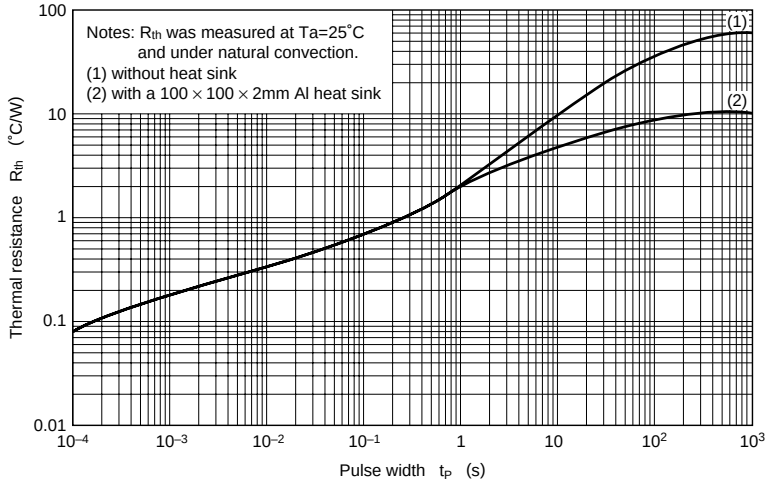
C – V_{DS}



I_{GSS} – Ta



$R_{th} - t_P$


Notes: Rth was measured at Ta=25˚C
and under natural convection.
(1) without heat sink
(2) with a 100 × 100 × 2mm Al heat sink
(1)
(2)
Thermal resistance Rth (˚C/W)
100
10
1
0.1
0.01
10–4
10–3
10–2
10–1
1
10
10²
10³
Pulse width tP (s)