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2SK1862, 2SK1863

Silicon N Channel MOS FET

Application

High speed power switching

Features

- Low on–resistance
- High speed switching
- Low drive current
- No secondary breakdown
- Suitable for Switching regulator

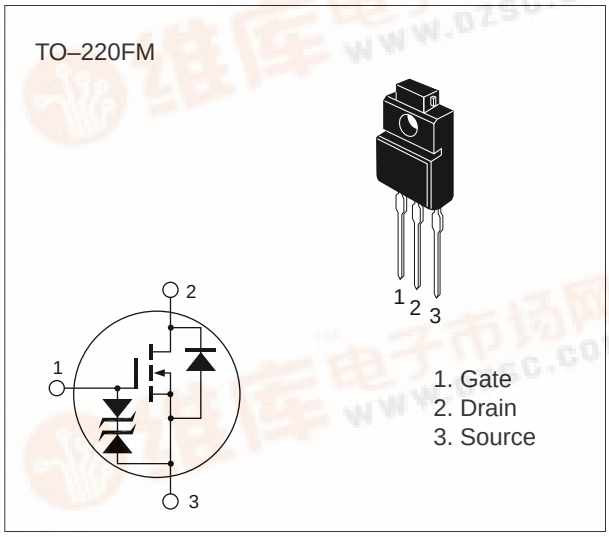

Table 1 Ordering Information

Type No.	V_{DSS}
2SK1862	450 V
2SK1863	500 V

Table 2 Absolute Maximum Ratings (Ta = 25°C)

Item		Symbol	Ratings	Unit
Drain to source voltage	2SK1862	V_{DSS}	450	V
	2SK1863	V_{DSS}	500	
Gate to source voltage		V_{GSS}	±30	V
Drain current		I_D	3	A
Drain peak current		$I_{D(pulse)}$*	12	A
Body–drain diode reverse drain current		I_{DR}	3	A
Channel dissipation		Pch**	25	W
Channel temperature		Tch	150	°C
Storage temperature		Tstg	–55 to +150	°C

* PW ≤ 10 µs, duty cycle ≤ 1 %
** Value at Tc = 25 °C

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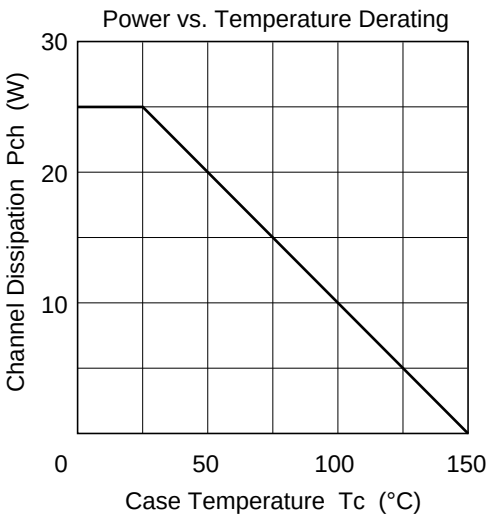
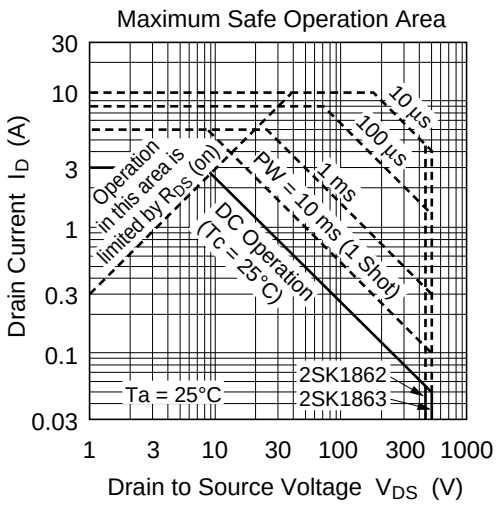
Table 3 Electrical Characteristics (Ta = 25°C)

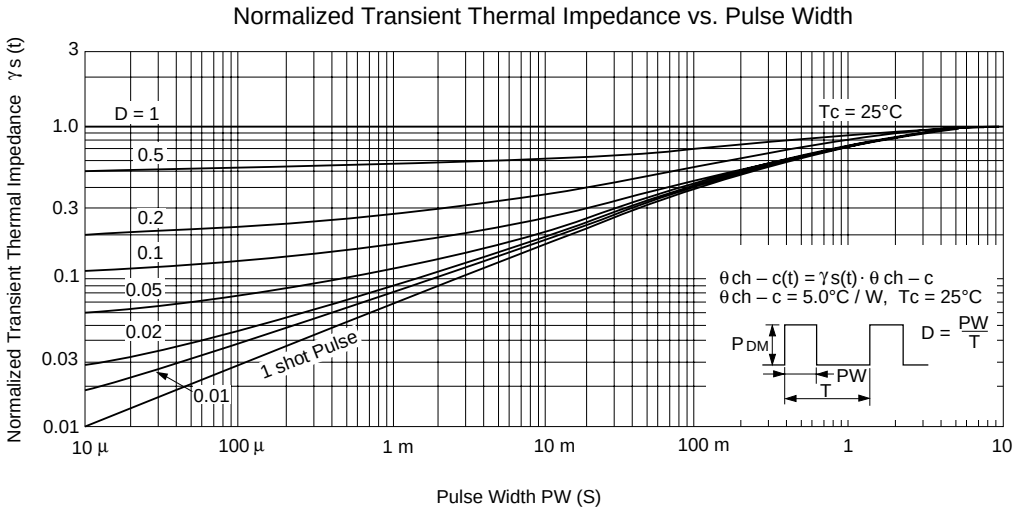
Item		Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	2SK1862	$V_{(BR)DSS}$	450	—	—	V	I_D = 10 mA, V_{GS} = 0
	2SK1863		500				
Gate to source breakdown voltage		$V_{(BR)GSS}$	±20	—	—	V	I_G = ±100 µA, V_{DS} = 0
Gate to source leak current		I_{GSS}	—	—	±10	µA	V_{GS} = ±25 V, V_{DS} = 0
Zero gate voltage drain current	2SK1862	I_{DSS}	—	—	250	µA	V_{DS} = 360 V, V_{GS} = 0
	2SK1863						V_{DS} = 400 V, V_{GS} = 0
Gate to source cutoff voltage		$V_{GS(off)}$	2.0	—	3.0	V	I_D = 1 mA, V_{DS} = 10 V
Static drain to source on state resistance	2SK1862	$R_{DS(on)}$	—	2.0	2.8	Ω	I_D = 2 A, V_{GS} = 10 V *
	2SK1863		—	2.2	3.0		
Forward transfer admittance		$\|y_{fs}\|$	1.5	2.5	—	S	I_D = 2 A V_{DS} = 10 V *
Input capacitance		Ciss	—	330	—	pF	V_{DS} = 10 V
Output capacitance		Coss	—	90	—	pF	V_{GS} = 0
Reverse transfer capacitance		Crss	—	15	—	pF	f = 1 MHz
Turn–on delay time		$t_{d(on)}$	—	7	—	ns	I_D = 2 A
Rise time		t_r	—	20	—	ns	V_{GS} = 10 V
Turn–off delay time		$t_{d(off)}$	—	30	—	ns	R_L = 15 Ω
Fall time		t_f	—	20	—	ns	
Body–drain diode forward voltage		V_{DF}	—	0.9	—	V	I_F = 3 A, V_{GS} = 0
Body–drain diode reverse recovery time		t_{rr}	—	300	—	ns	I_F = 3 A, V_{GS} = 0, diF / dt = 100 A / µs

* Pulse Test

See characteristic curves of 2SK1153, 2SK1154


Power vs. Temperature Derating
Channel Dissipation Pch (W)
30
20
10
0
50
100
150
Case Temperature Tc (°C)


Maximum Safe Operation Area
Drain Current I_D (A)
30
10
3
1
0.3
0.1
0.03
1
3
10
30
100
300
1000
Drain to Source Voltage V_{DS} (V)
Operation in this area is limited by R_{DS} (on)
10 µs
100 µs
1 ms
PW = 10 ms (1 Shot)
DC Operation (Tc = 25°C)
Ta = 25°C
2SK1862
2SK1863


Normalized Transient Thermal Impedance vs. Pulse Width
Normalized Transient Thermal Impedance γs (t)
3
1.0
0.3
0.1
0.03
0.01
D = 1
0.5
0.2
0.1
0.05
0.02
0.01
1 shot Pulse
Tc = 25°C
θch – c(t) = γs(t) · θch – c
θch – c = 5.0°C / W, Tc = 25°C
P_{DM}
PW
T
D = PW/T
10 µ
100 µ
1 m
10 m
100 m
1
10
Pulse Width PW (S)