HITACHI

2SK2075

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

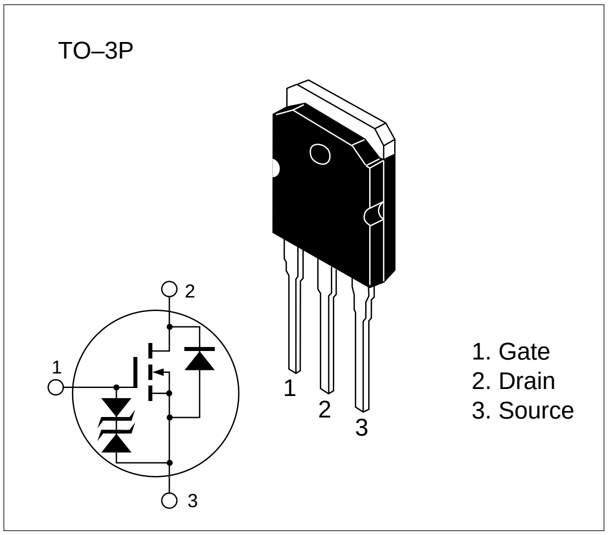


Table 1 Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	250	V
Gate to source voltage	V_{GSS}	±30	V
Drain current	I_D	20	A
Drain peak current	$I_{D(pulse)}^*$	80	A
Body–drain diode reverse drain current	I_{DR}	20	A
Channel dissipation	Pch**	100	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

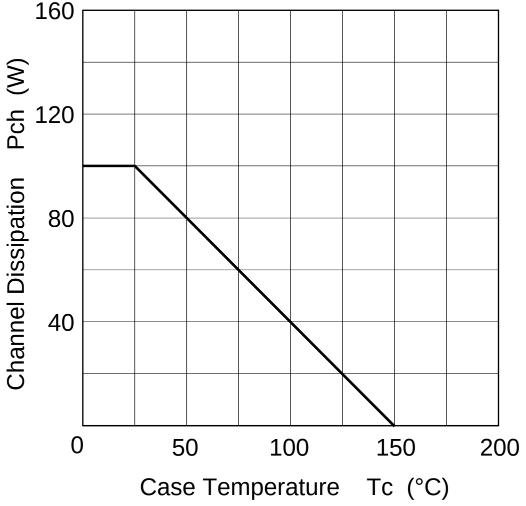
* PW ≤ 10 µs, duty cycle ≤ 1 %
** Value at Tc = 25 °C

Table 2 Electrical Characteristics (Ta = 25°C)

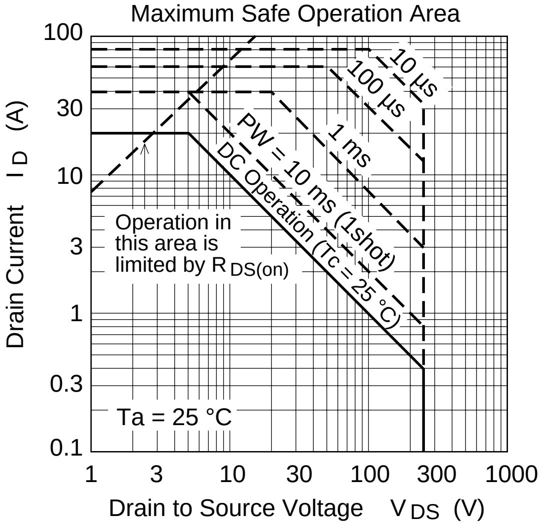
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	250	—	—	V	I_D = 10 mA, V_{GS} = 0
Gate to source breakdown voltage	$V_{(BR)GSS}$	±30	—	—	V	I_G = ±100 µA, V_{DS} = 0
Gate to source leak current	I_{GSS}	—	—	±10	µA	V_{GS} = ±25 V, V_{DS} = 0
Zero gate voltage drain current	I_{DSS}	—	—	250	µA	V_{DS} = 200 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	$R_{DS(on)}$	—	0.105	0.13	Ω	I_D = 10 A V_{GS} = 10 V *
Forward transfer admittance	$\|y_{fs}\|$	9	14	—	S	I_D = 10 A V_{DS} = 10 V *
Input capacitance	Ciss	—	2400	—	pF	V_{DS} = 10 V V_{GS} = 0 f = 1 MHz
Output capacitance	Coss	—	970	—	pF	
Reverse transfer capacitance	Crss	—	145	—	pF	
Turn–on delay time	$t_{d(on)}$	—	30	—	ns	I_D = 10 A V_{GS} = 10 V R_L = 3 Ω
Rise time	t_r	—	110	—	ns	
Turn–off delay time	$t_{d(off)}$	—	220	—	ns	
Fall time	t_f	—	95	—	ns	
Body–drain diode forward voltage	V_{DF}	—	1.3	—	V	I_F = 20 A, V_{GS} = 0
Body–drain diode reverse recovery time	t_{rr}	—	330	—	ns	I_F = 20 A, V_{GS} = 0, diF / dt = 100 A / µs

* Pulse Test

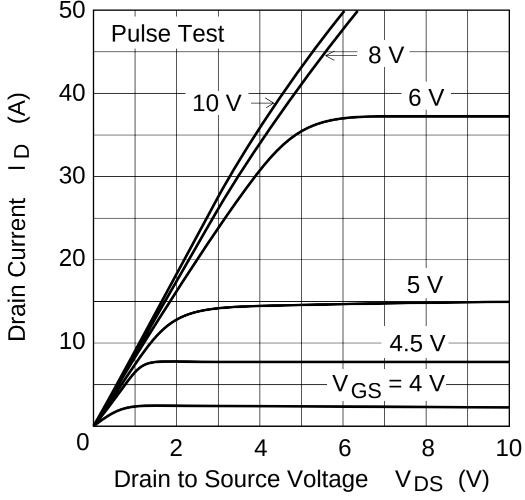
Power vs. Temperature Derating



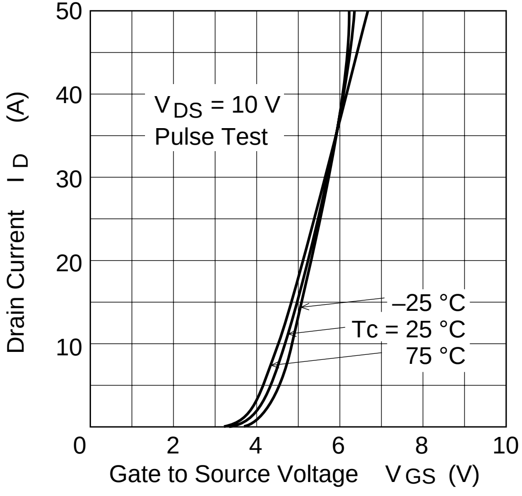
Maximum Safe Operation Area



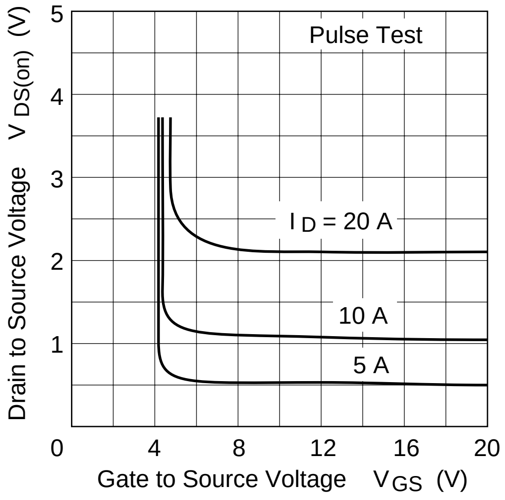
Typical Output Characteristics



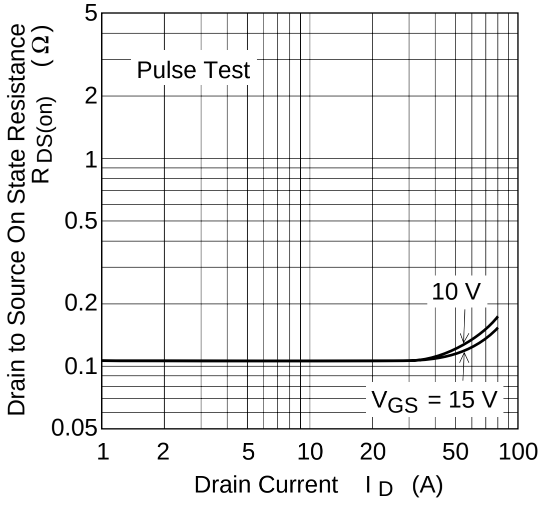
Typical Transfer Characteristics



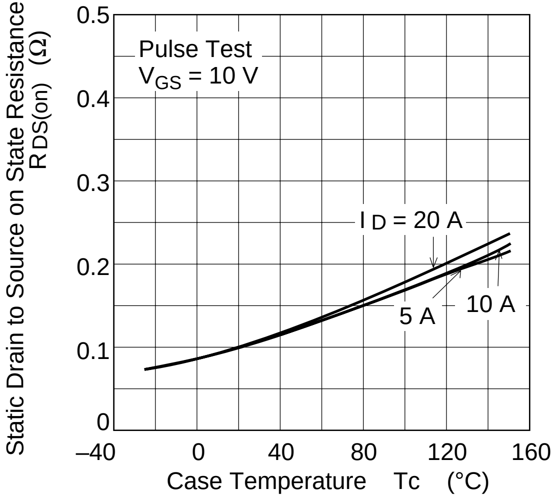
Drain to Source Saturation Voltage vs. Gate to Source Voltage



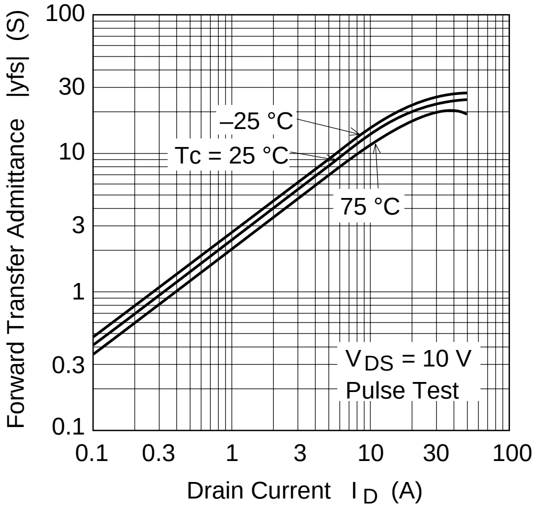
Static Drain to Source on State Resistance vs. Drain Current

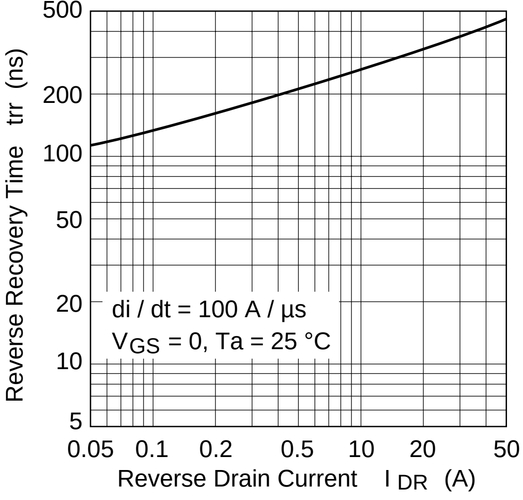


Static Drain to Source on State Resistance vs. Temperature

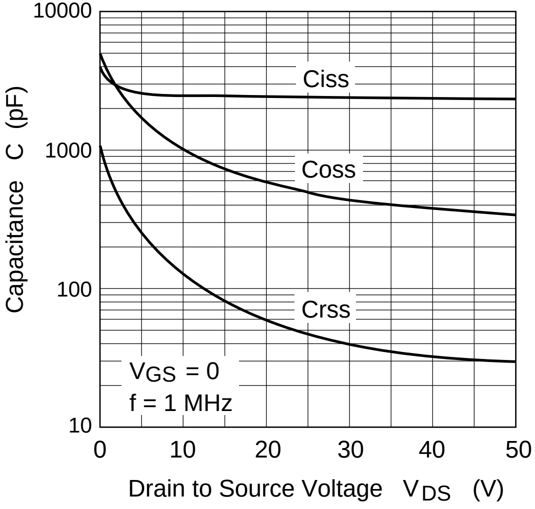


Forward Transfer Admittance vs. Drain Current

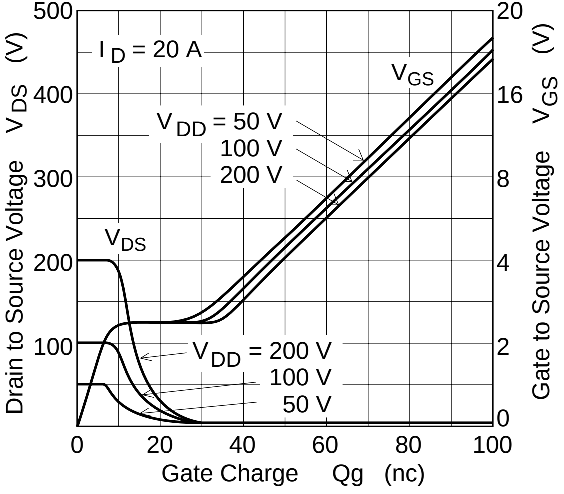




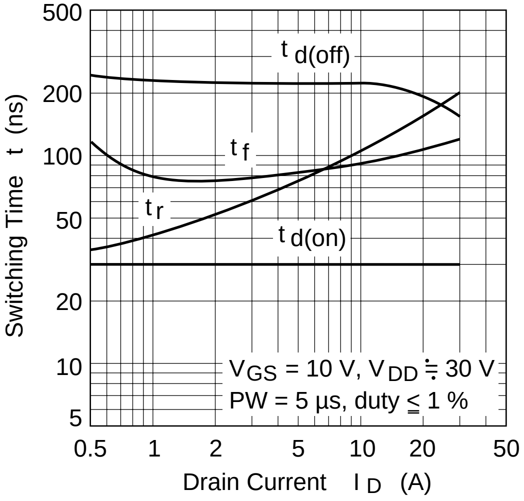
Body–Drain Diode Reverse Recovery Time



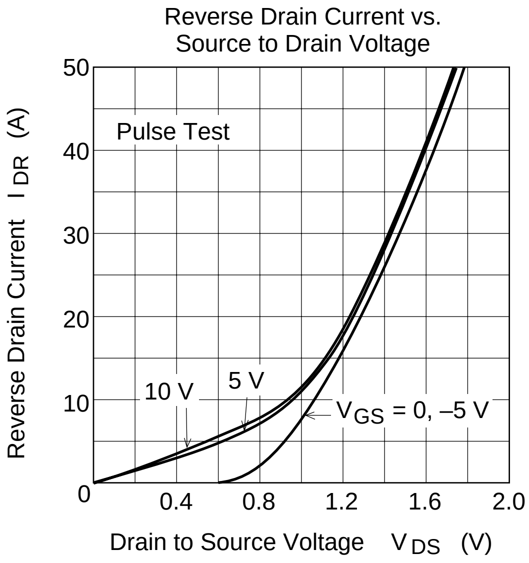
Typical Capacitance vs. Drain to Source Voltage

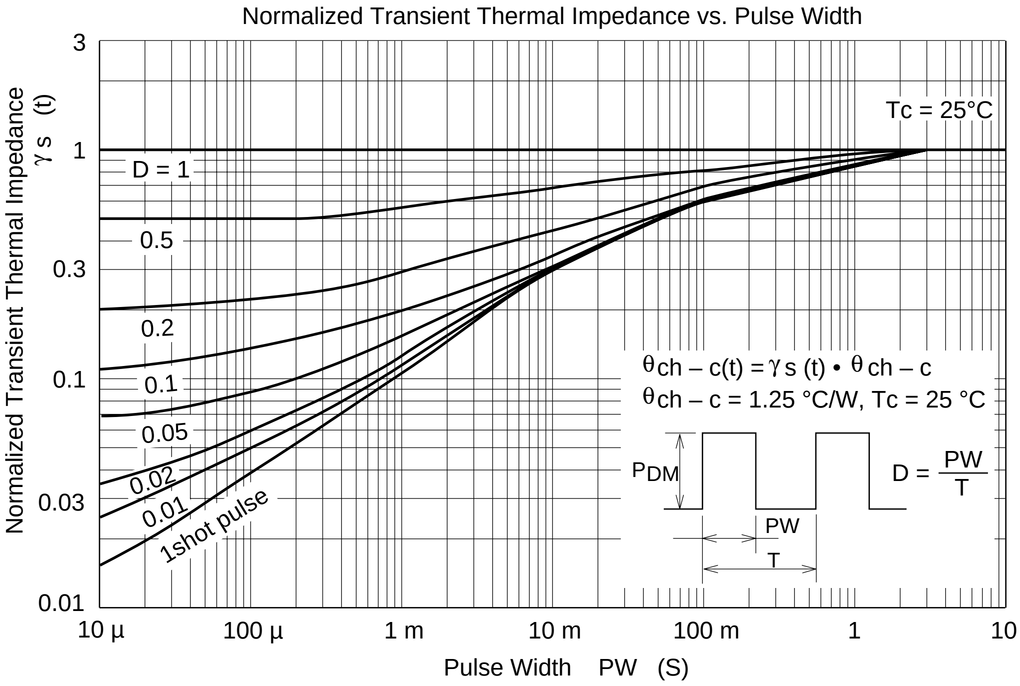


Dynamic Input Characteristics

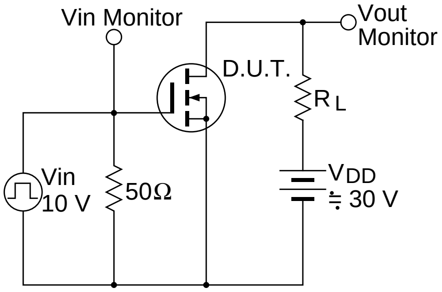


Switching Characteristics


Reverse Drain Current vs.
Source to Drain Voltage
Reverse Drain Current I DR (A)
50
40
30
20
10
0
Pulse Test
10 V
5 V
VGS = 0, –5 V
0.4
0.8
1.2
1.6
2.0
Drain to Source Voltage V DS (V)


Normalized Transient Thermal Impedance vs. Pulse Width
Normalized Transient Thermal Impedance γ s (t)
3
1
0.3
0.1
0.03
0.01
Tc = 25°C
D = 1
0.5
0.2
0.1
0.05
0.02
0.01
1shot pulse
θch – c(t) = γ s (t) • θ ch – c
θch – c = 1.25 °C/W, Tc = 25 °C
PDM
PW
T
D = PW / T
10 µ
100 µ
1 m
10 m
100 m
1
10
Pulse Width PW (S)

Switching Time Test Circuit



Waveform