Ordering number : ENA0787

SANYO Semiconductors
DATA SHEET

An ON Semiconductor Company

N-Channel Silicon MOSFET

2SK4171 — General-Purpose Switching Device Applications

Features

- Low ON-resistance.
- Load switching applications.
- Motor drive applications.
- Avalanche resistance guarantee.

Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	V_{DSS}		60	V
Gate-to-Source Voltage	V_{GSS}		±20	V
Drain Current (DC)	I_D		100	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	400	A
Allowable Power Dissipation	P_D		1.75	W
		Tc=25°C	75	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		-55 to +150	°C
Avalanche Energy (Single pulse) *1	E_{AS}		370	mJ
Avalanche Current *2	I_{AV}		65	A

Note : *1 V_{DD}=30V, L=100μH
*2 L≤100μH, Single pulse

Marking : K4171

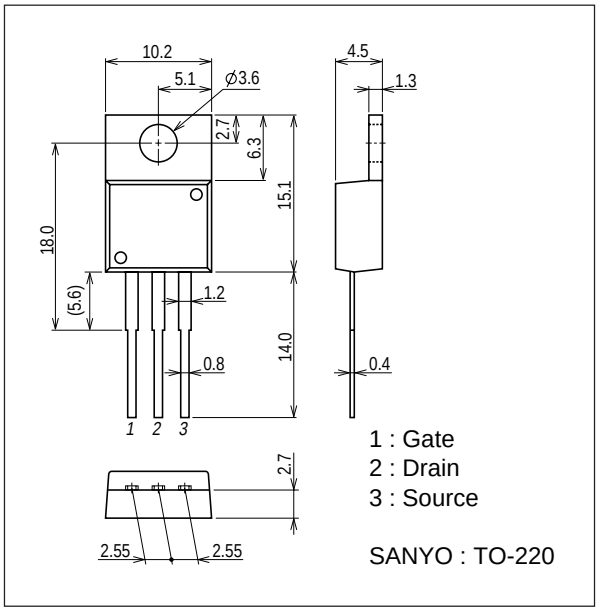
Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=1mA, V_{GS}=0V	60			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V, V_{GS}=0V			1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}= ±16V, V_{DS}=0V			±10	μA
Cutoff Voltage	V_{GS}(off)	V_{DS}=10V, I_D=1mA	1.2		2.6	V
Forward Transfer Admittance	|yfs|	V_{DS}=10V, I_D=50A	35	60		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=50A, V_{GS}=10V		5.5	7.2	mΩ
	R_{DS}(on)2	I_D=50A, V_{GS}=4V		7.5	10.5	mΩ
Input Capacitance	Ciss	V_{DS}=20V, f=1MHz		6900		pF
Output Capacitance	Coss	V_{DS}=20V, f=1MHz		740		pF
Reverse Transfer Capacitance	Crss	V_{DS}=20V, f=1MHz		540		pF
Turn-ON Delay Time	t_d(on)	See specified Test Circuit.		48		ns
Rise Time	t_r	See specified Test Circuit.		380		ns
Turn-OFF Delay Time	t_d(off)	See specified Test Circuit.		500		ns
Fall Time	t_f	See specified Test Circuit.		370		ns
Total Gate Charge	Qg	V_{DS}=30V, V_{GS}=10V, I_D=100A		135		nC
Gate-to-Source Charge	Qgs	V_{DS}=30V, V_{GS}=10V, I_D=100A		18		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=30V, V_{GS}=10V, I_D=100A		50		nC
Diode Forward Voltage	V_{SD}	I_S=100A, V_{GS}=0V		1.0	1.2	V

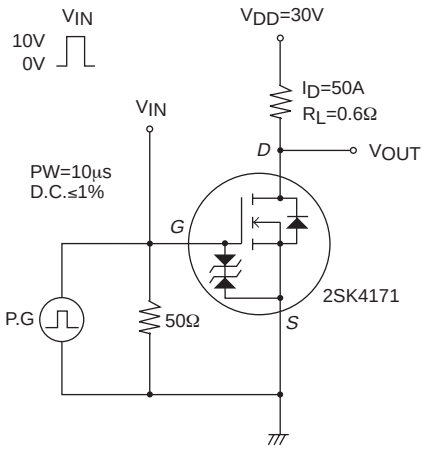
Package Dimensions

unit : mm (typ)

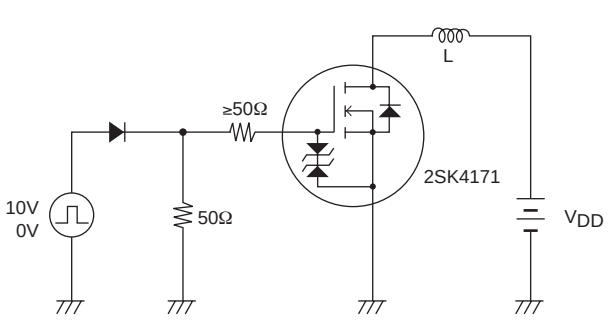
7507-002

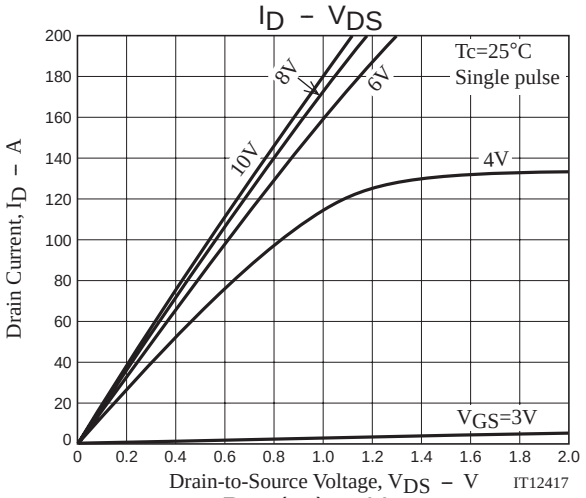


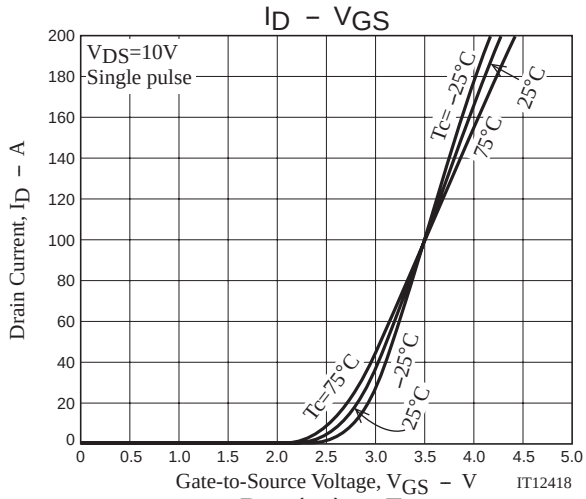
Switching Time Test Circuit

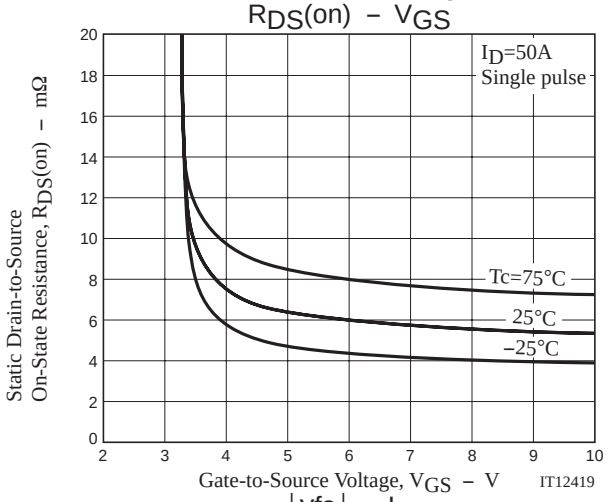


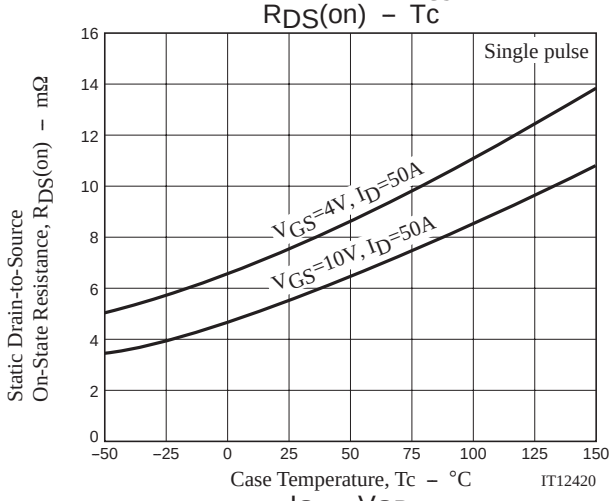
Avalanche Resistance Test Circuit

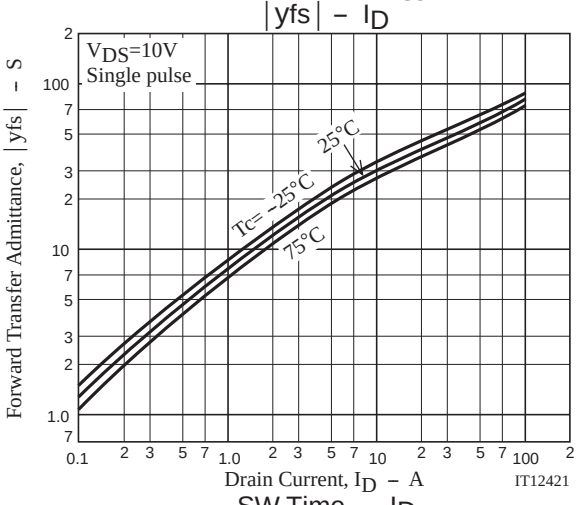


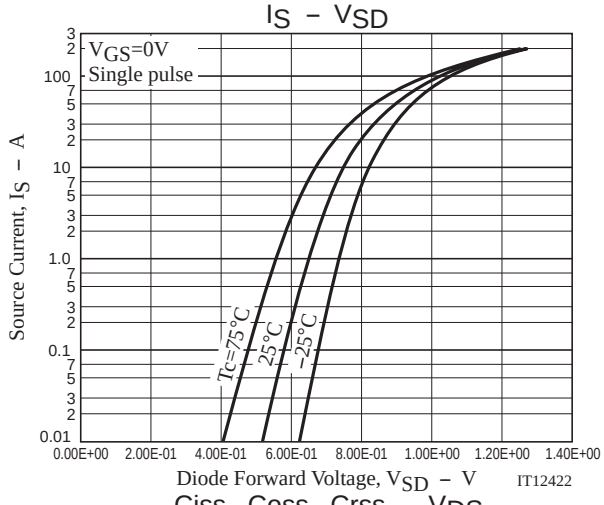

I_D – V_{DS}
Tc=25°C
Single pulse
8V
6V
10V
4V
V_{GS}=3V
Drain Current, I_D – A
Drain-to-Source Voltage, V_{DS} – V
IT12417

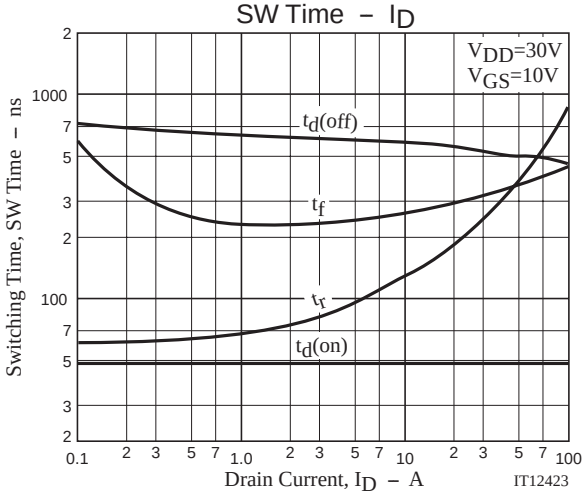

I_D – V_{GS}
V_{DS}=10V
Single pulse
Tc=–25°C
25°C
75°C
Tc=75°C
–25°C
25°C
Drain Current, I_D – A
Gate-to-Source Voltage, V_{GS} – V
IT12418

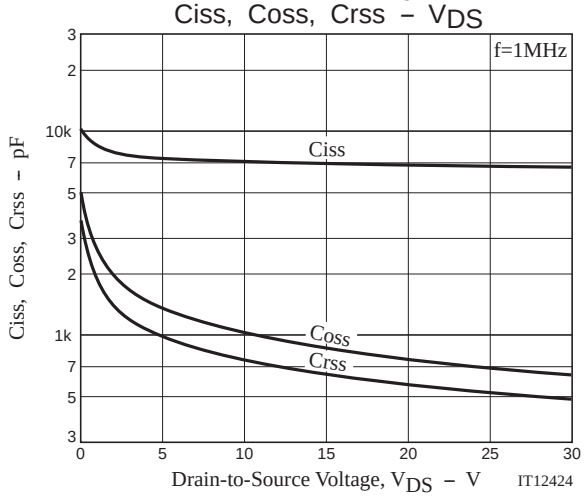

R_{DS}(on) – V_{GS}
I_D=50A
Single pulse
Tc=75°C
25°C
–25°C
Static Drain-to-Source On-State Resistance, R_{DS}(on) – mΩ
Gate-to-Source Voltage, V_{GS} – V
IT12419

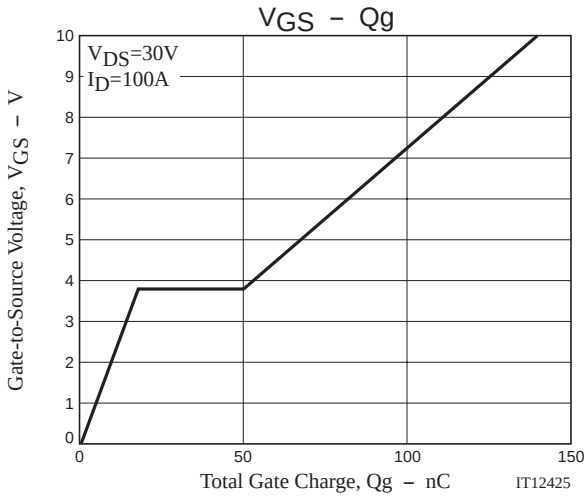

R_{DS}(on) – Tc
Single pulse
V_{GS}=4V, I_D=50A
V_{GS}=10V, I_D=50A
Static Drain-to-Source On-State Resistance, R_{DS}(on) – mΩ
Case Temperature, Tc – °C
IT12420

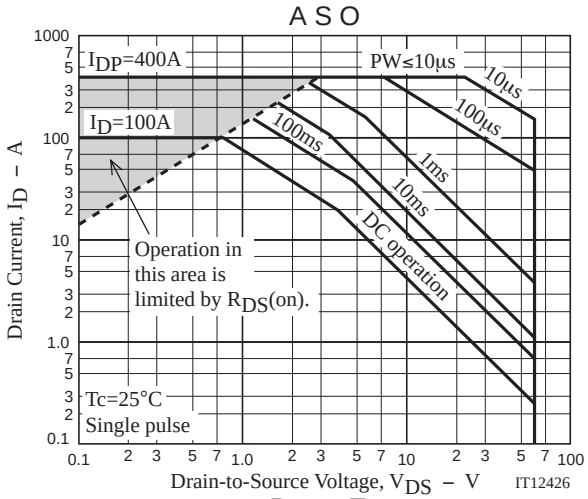

|yfs| – I_D
V_{DS}=10V
Single pulse
25°C
Tc=–25°C
75°C
Forward Transfer Admittance, |yfs| – S
Drain Current, I_D – A
IT12421

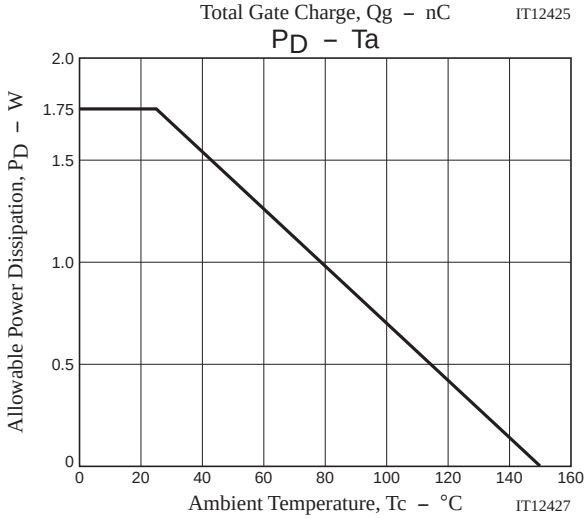

I_S – V_{SD}
V_{GS}=0V
Single pulse
Tc=75°C
25°C
–25°C
Source Current, I_S – A
Diode Forward Voltage, V_{SD} – V
IT12422

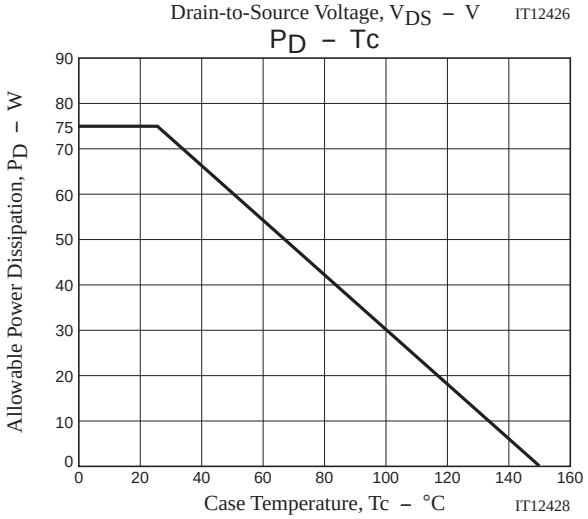

SW Time – I_D
V_{DD}=30V
V_{GS}=10V
t_d(off)
t_f
t_r
t_d(on)
Switching Time, SW Time – ns
Drain Current, I_D – A
IT12423

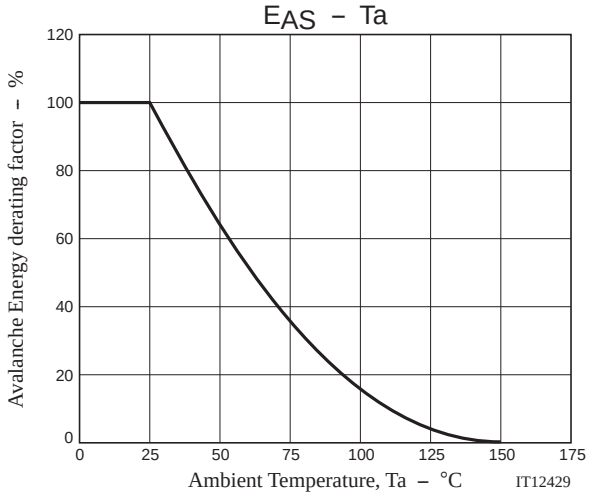

Ciss, Coss, Crss – V_{DS}
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, V_{DS} – V
IT12424


VGS – Qg
VDS=30V
ID=100A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT12425


A S O
IDP=400A
PW≤10μs
10μs
100μs
ID=100A
100ms
1ms
10ms
DC operation
Operation in this area is limited by RDS(on).
Tc=25°C
Single pulse
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT12426


PD – Ta
Allowable Power Dissipation, PD – W
Ambient Temperature, Tc – °C
IT12427


PD – Tc
Allowable Power Dissipation, PD – W
Case Temperature, Tc – °C
IT12428


EAS – Ta
Avalanche Energy derating factor – %
Ambient Temperature, Ta – °C
IT12429

Note on usage : Since the 2SK4171 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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