Ordering number : ENA0523

SANYO Semiconductors

DATA SHEET

N-Channel Silicon MOSFET

2SK4094 — General-Purpose Switching Device Applications

Features

- Low ON-resistance.
- Load switching 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	90	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		−55 to +150	°C
Avalanche Energy (Single Pulse) *1	E_{AS}		850	mJ
Avalanche Current *2	I_{AV}		70	A

Note : *1 V_{DD}=30V, L=200μH, I_{AV}=70A

*2 L≤200μH, Single pulse

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	45	75		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=50A, V_{GS}=10V		3.8	5.0	mΩ
	R_{DS}(on)2	I_D=50A, V_{GS}=4V		4.9	7.0	mΩ

Marking : K4094

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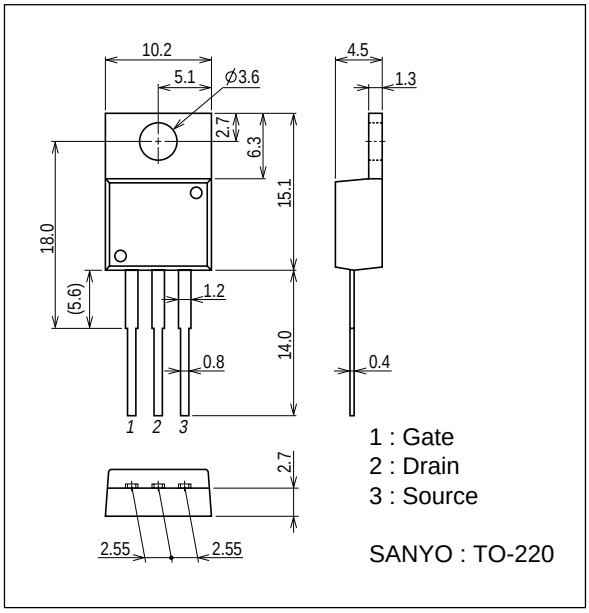
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Input Capacitance	Ciss	V_{DS}=20V, f=1MHz		12500		pF
Output Capacitance	Coss	V_{DS}=20V, f=1MHz		1200		pF
Reverse Transfer Capacitance	Crss	V_{DS}=20V, f=1MHz		950		pF
Turn-ON Delay Time	t_{d}(on)	See specified Test Circuit.		80		ns
Rise Time	t_{r}	See specified Test Circuit.		630		ns
Turn-OFF Delay Time	t_{d}(off)	See specified Test Circuit.		860		ns
Fall Time	t_{f}	See specified Test Circuit.		750		ns
Total Gate Charge	Qg	V_{DS}=30V, V_{GS}=10V, I_{D}=100A		220		nC
Gate-to-Source Charge	Qgs	V_{DS}=30V, V_{GS}=10V, I_{D}=100A		30		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=30V, V_{GS}=10V, I_{D}=100A		55		nC
Diode Forward Voltage	V_{SD}	I_{S}=100A, V_{GS}=0V		1.0	1.2	V

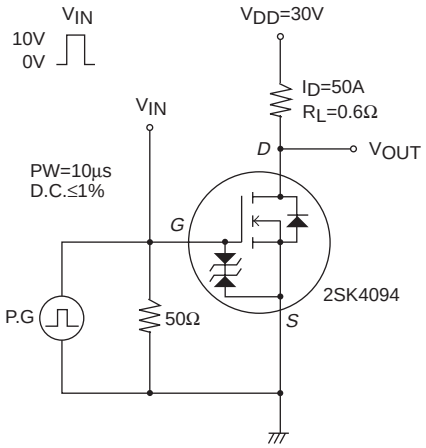
Package Dimensions

unit : mm (typ)

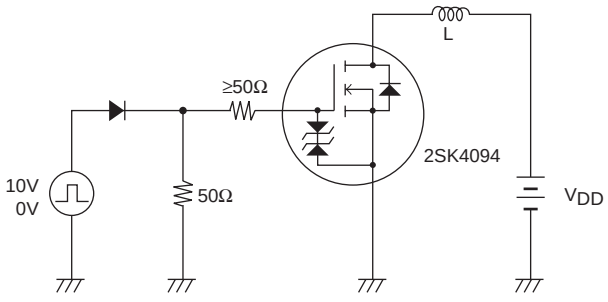
7507-002

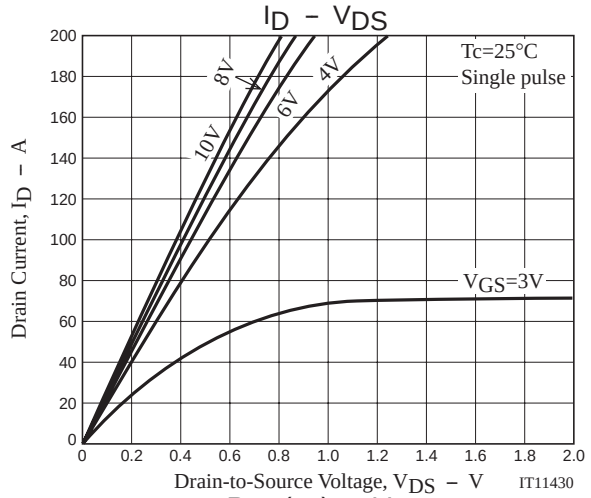


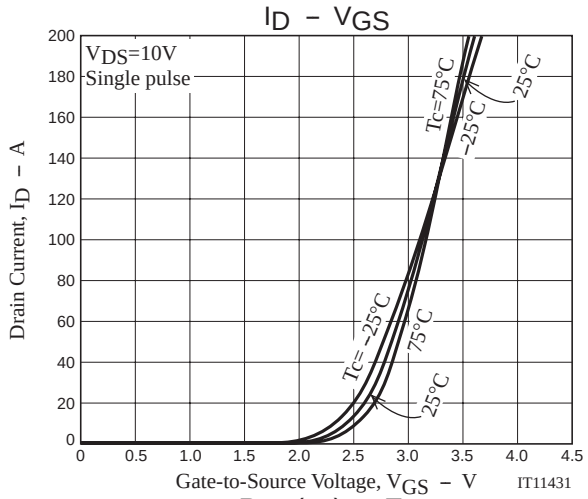
Switching Time Test Circuit

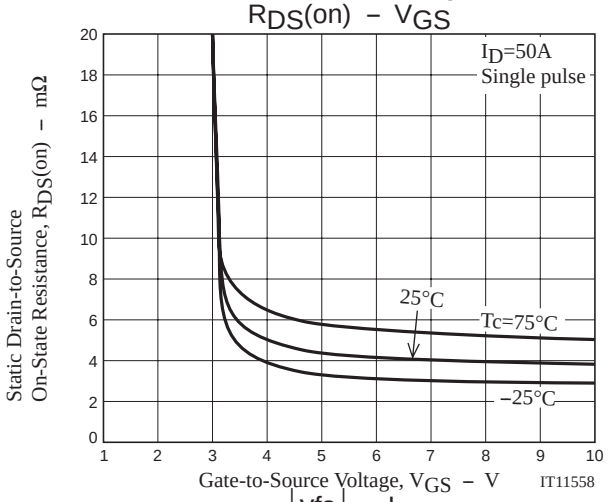


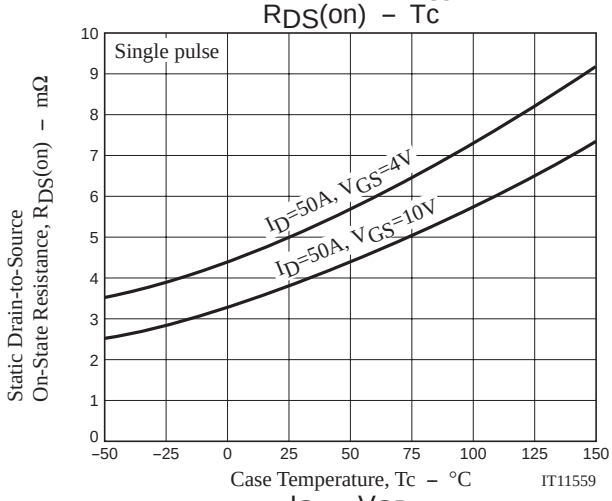
Avalanche Resistance Test Circuit

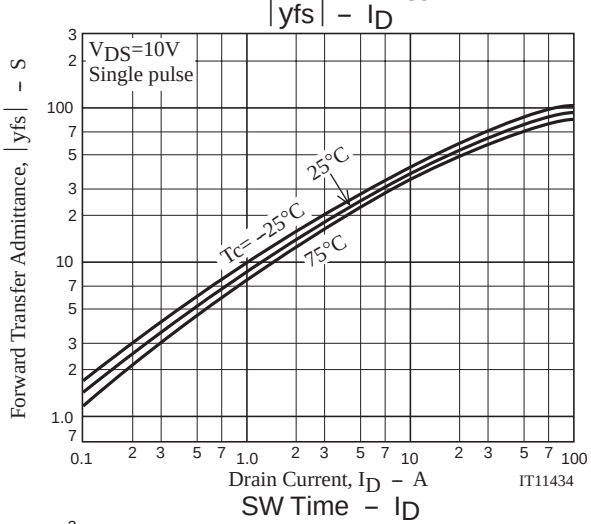


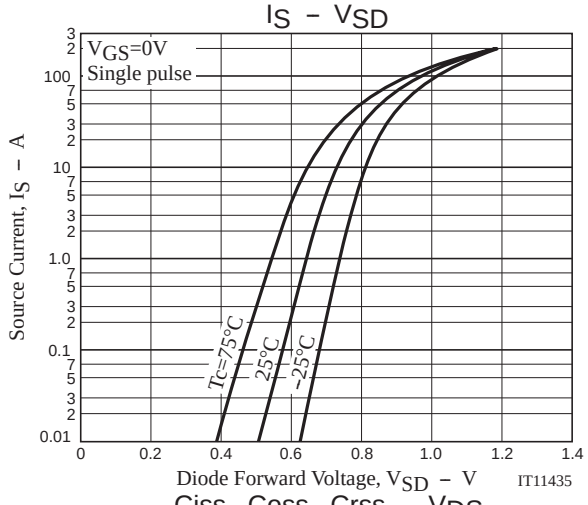

ID – VDS
Tc=25°C
Single pulse
8V
10V
6V
4V
VGS=3V
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT11430

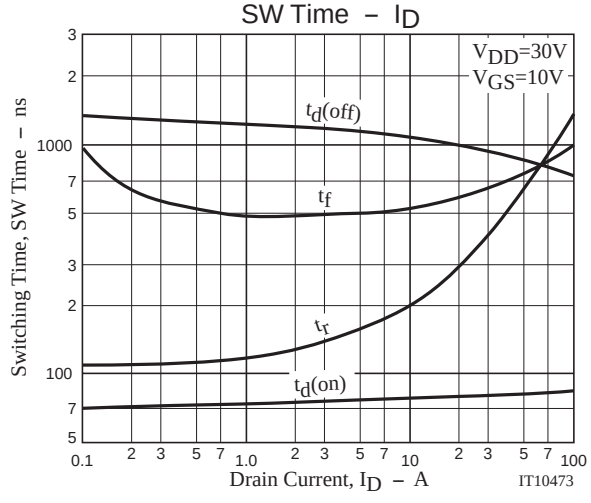

ID – VGS
VDS=10V
Single pulse
Tc=75°C
25°C
–25°C
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT11431

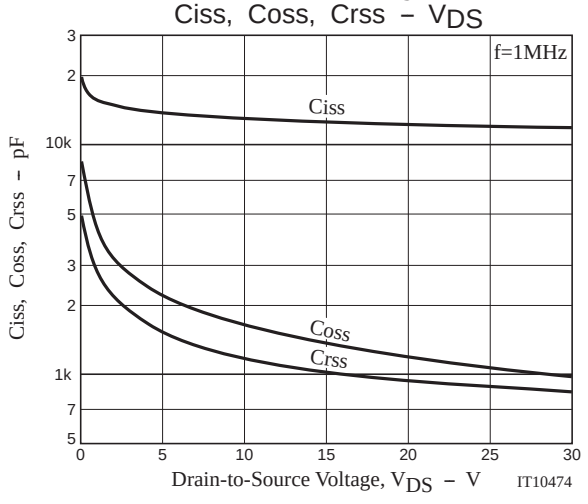

RDS(on) – VGS
ID=50A
Single pulse
25°C
Tc=75°C
–25°C
Static Drain-to-Source
On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT11558

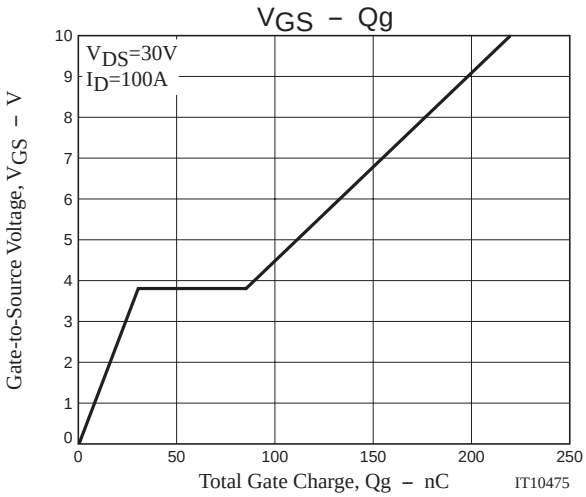

RDS(on) – Tc
Single pulse
ID=50A, VGS=4V
ID=50A, VGS=10V
Static Drain-to-Source
On-State Resistance, RDS(on) – mΩ
Case Temperature, Tc – °C
IT11559

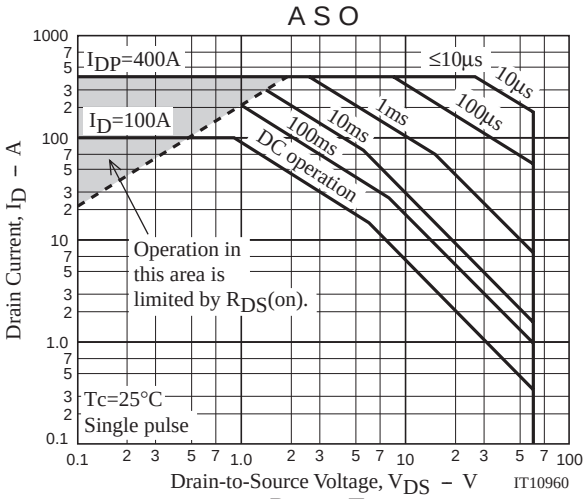

|yfs| – ID
VDS=10V
Single pulse
25°C
Tc=–25°C
75°C
Forward Transfer Admittance, |yfs| – S
Drain Current, ID – A
IT11434

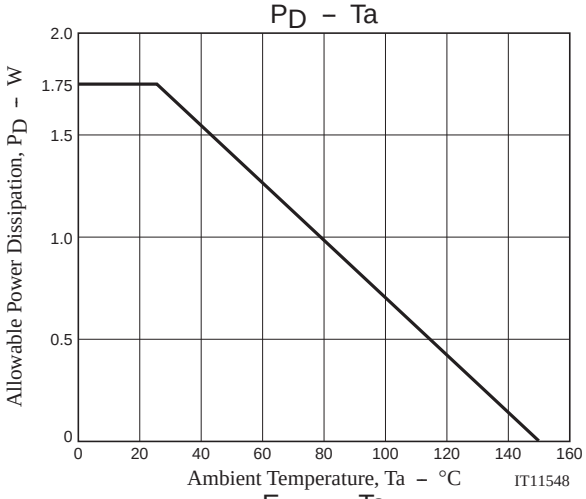

IS – VSD
VGS=0V
Single pulse
Tc=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT11435

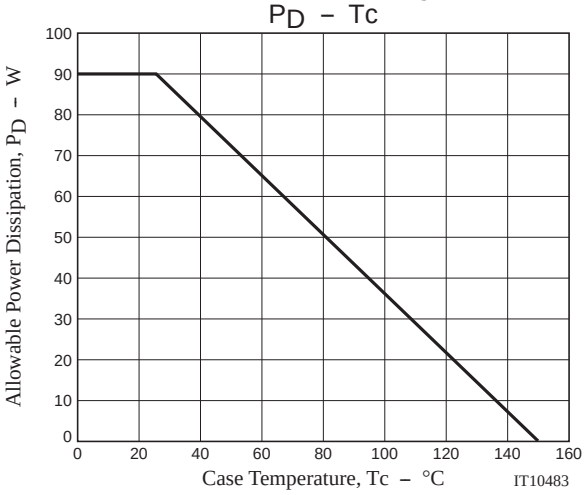

SW Time – ID
VDD=30V
VGS=10V
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT10473

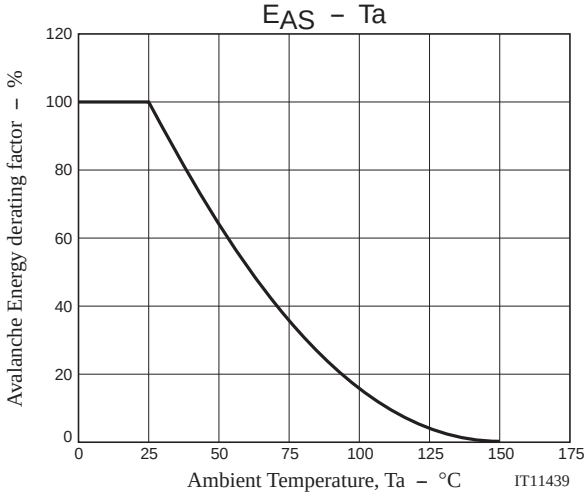

Ciss, Coss, Crss – VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT10474


VGS – Qg
VDS=30V
ID=100A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT10475


ASO
IDP=400A
ID=100A
≤10μs
10μs
100μs
1ms
10ms
100ms
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
IT10960


PD – Ta
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT11548


PD – Tc
Allowable Power Dissipation, PD – W
Case Temperature, Tc – °C
IT10483


EAS – Ta
Avalanche Energy derating factor – %
Ambient Temperature, Ta – °C
IT11439

Note on usage : Since the 2SK4094 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.