Ordering number : ENA1290

SANYO Semiconductors
DATA SHEET

N-Channel Silicon MOSFET

2SK4204LS — General-Purpose Switching Device Applications

Features

- 4V drive.
- Avalanche resistance guarantee.

Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	V_{DSS}		45	V
Gate-to-Source Voltage	V_{GSS}		±20	V
Drain Current (DC)	I_D		20	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	80	A
Allowable Power Dissipation	P_D		2.0	W
		Tc=25°C	35	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		−55 to +150	°C
Avalanche Energy (Single Pulse) *1	E_{AS}		57	mJ
Avalanche Current *2	I_{AV}		20	A

Note :*1 V_{DD}=15V, L=200μH, I_{AV}=20A
*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	45			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=45V, 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

Marking : K4204

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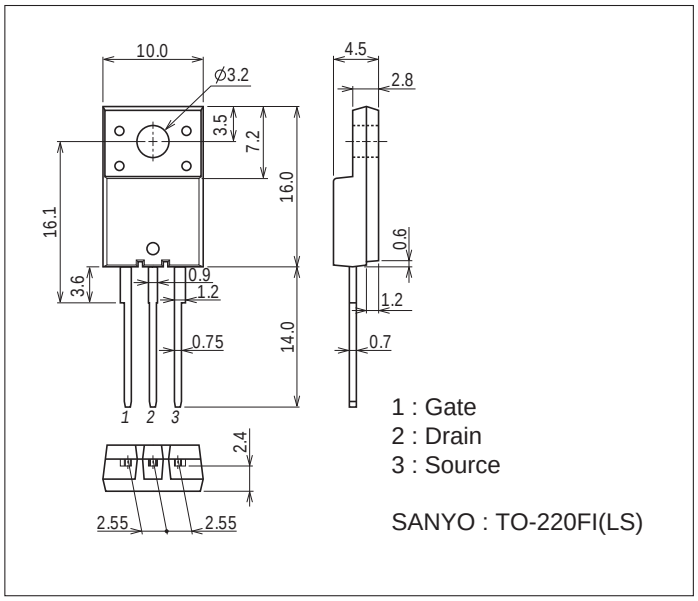
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Forward Transfer Admittance	| yfs |	V_{DS}=10V, I_D=10A	9	15		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=10A, V_{GS}=10V		17.5	23	mΩ
	R_{DS}(on)2	I_D=10A, V_{GS}=4V		25.5	36	mΩ
Input Capacitance	Ciss	V_{DS}=20V, f=1MHz		2250		pF
Output Capacitance	Coss	V_{DS}=20V, f=1MHz		260		pF
Reverse Transfer Capacitance	Crss	V_{DS}=20V, f=1MHz		190		pF
Turn-ON Delay Time	t_d(on)	See specified Test Circuit.		21		ns
Rise Time	t_r	See specified Test Circuit.		78		ns
Turn-OFF Delay Time	t_d(off)	See specified Test Circuit.		152		ns
Fall Time	t_f	See specified Test Circuit.		88		ns
Total Gate Charge	Qg	V_{DS}=24V, V_{GS}=10V, I_D=20A		41		nC
Gate-to-Source Charge	Qgs	V_{DS}=24V, V_{GS}=10V, I_D=20A		8		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=24V, V_{GS}=10V, I_D=20A		8		nC
Diode Forward Voltage	V_{SD}	I_S=20A, V_{GS}=0V		1.0	1.2	V

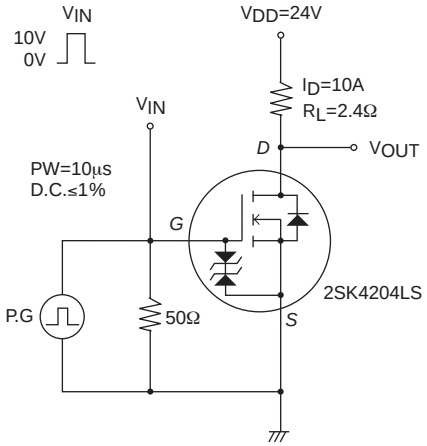
Package Dimensions

unit : mm (typ)

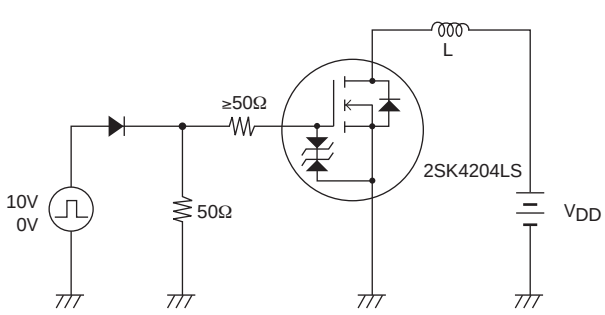
7509-002

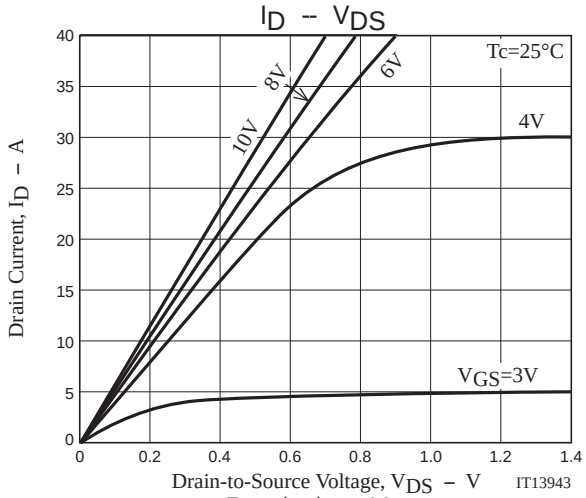


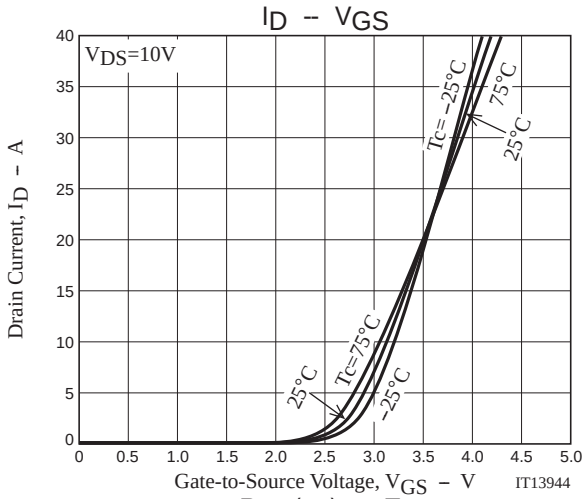
Switching Time Test Circuit

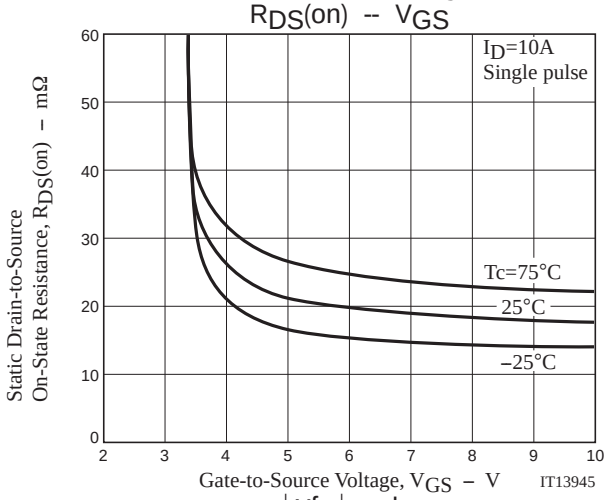


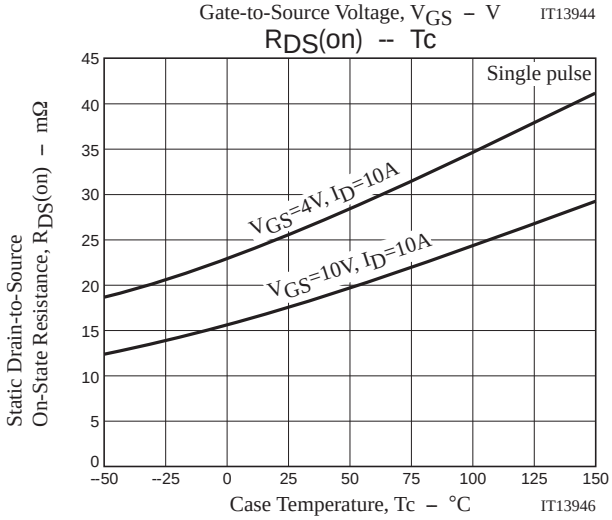
Avalanche Resistance Test Circuit

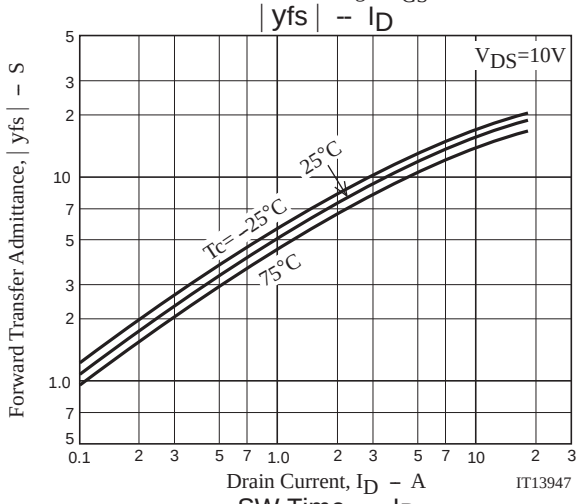


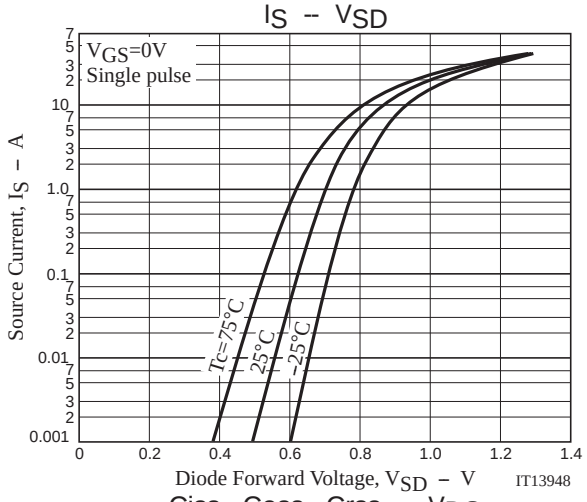

ID -- VDS
Tc=25°C
10V
8V
6V
4V
VGS=3V
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT13943

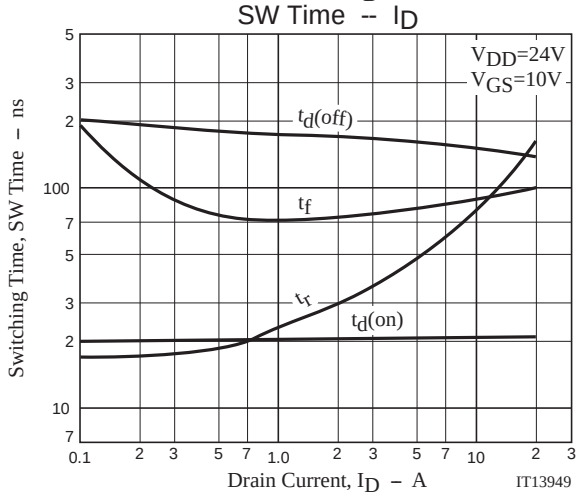

ID -- VGS
VDS=10V
Tc= –25°C
75°C
25°C
Tc=75°C
25°C
–25°C
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT13944

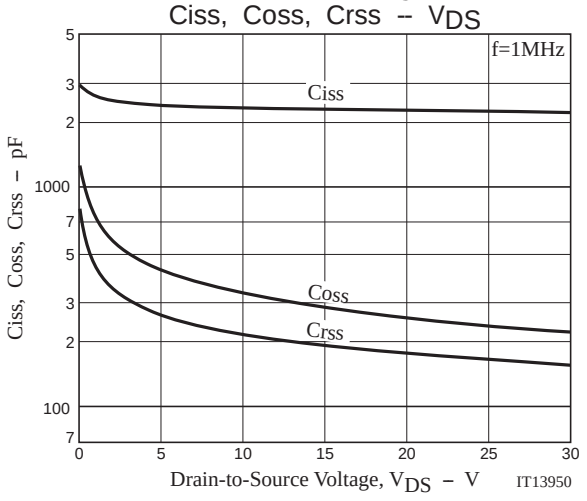

RDS(on) -- VGS
ID=10A
Single pulse
Tc=75°C
25°C
–25°C
Static Drain-to-Source
On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT13945

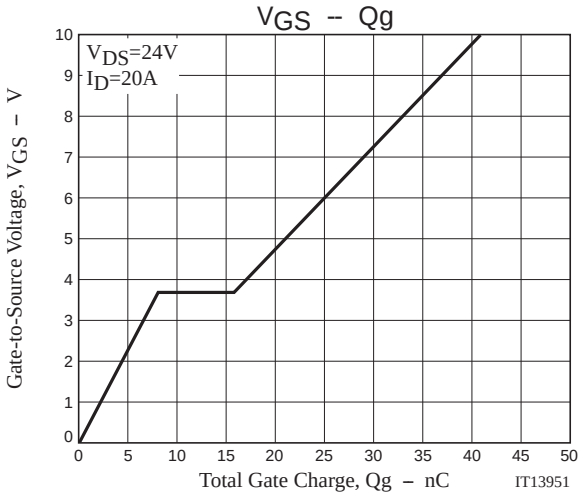

RDS(on) -- Tc
Single pulse
VGS=4V, ID=10A
VGS=10V, ID=10A
Static Drain-to-Source
On-State Resistance, RDS(on) – mΩ
Case Temperature, Tc – °C
IT13946

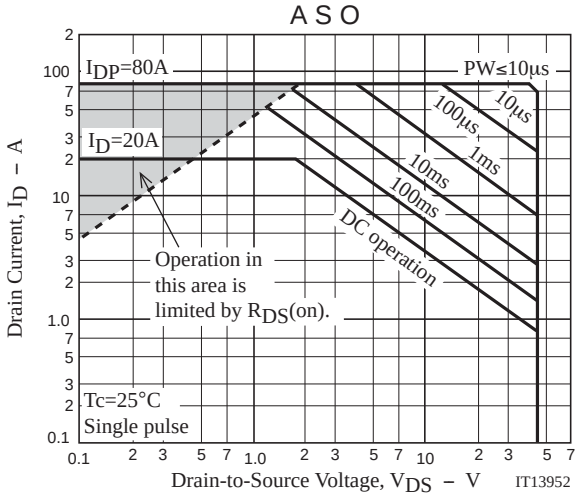

| yfs | -- ID
VDS=10V
25°C
Tc= –25°C
75°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT13947

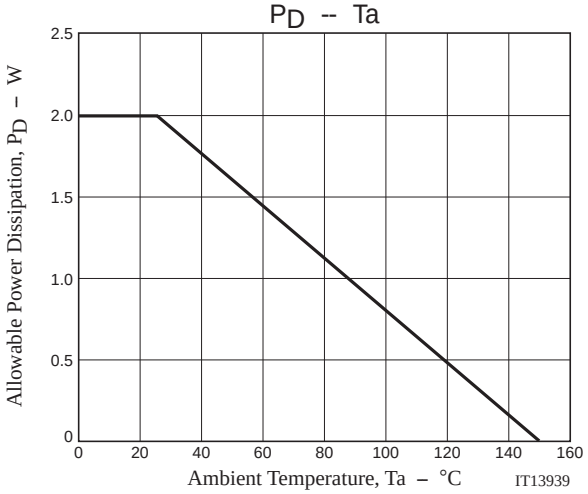

IS -- VSD
VGS=0V
Single pulse
Tc=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT13948

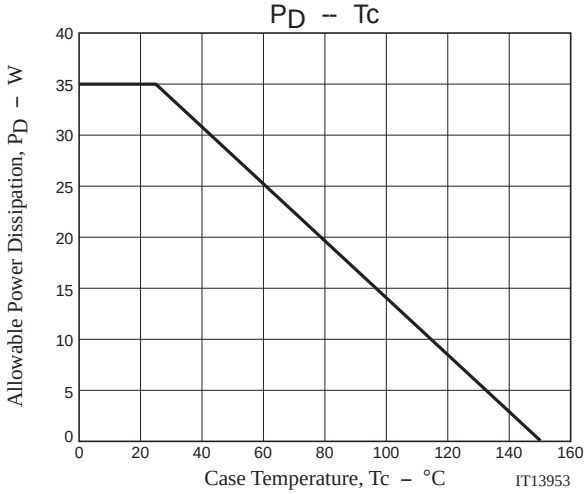

SW Time -- ID
VDD=24V
VGS=10V
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT13949

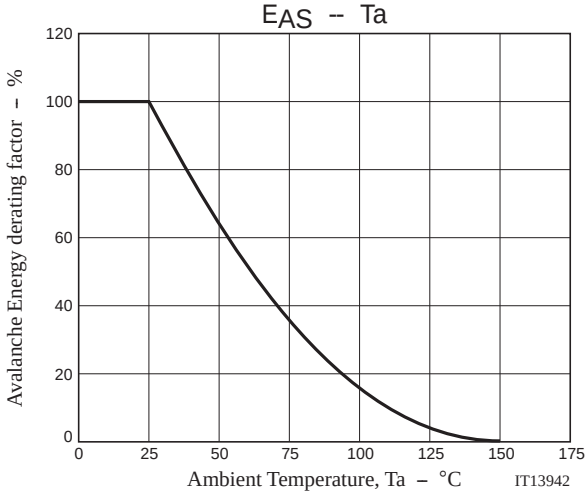

Ciss, Coss, Crss -- VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT13950


VGS -- Qg
VDS=24V
ID=20A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT13951


A S O
IDP=80A
PW≤10μs
ID=20A
100μs
10μs
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
IT13952


PD -- Ta
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT13939


PD -- Tc
Allowable Power Dissipation, PD – W
Case Temperature, Tc – °C
IT13953


EAS -- Ta
Avalanche Energy derating factor – %
Ambient Temperature, Ta – °C
IT13942

Note on usage : Since the 2SK4204LS is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.