Ordering number : ENA0790A

SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

N-Channel Silicon MOSFET

2SK4116LS — General-Purpose Switching Device Applications

Features

- Low ON-resistance, low input capacitance, ultrahigh-speed switching.
- Adoption of high reliability HVP process.
- Attachment workability is good by Mica-less package.
- Avalanche resistance guarantee.

Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	V_{DSS}		400	V
Gate-to-Source Voltage	V_{GSS}		±30	V
Drain Current (DC)	I_{Dc}*1	Limited only by maximum temperature	12	A
	I_{Dpack}*2	Tc=25°C (SANYO's ideal heat dissipation condition)*3	8.9	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	38	A
Allowable Power Dissipation	P_D		2.0	W
		Tc=25°C (SANYO's ideal heat dissipation condition)*3	33	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		-55 to +150	°C
Avalanche Energy (Single Pulse) *4	E_{AS}		474	mJ
Avalanche Current *5	I_{AV}		12	A

*1 Shows chip capability

*2 Package limited

*3 SANYO's condition is radiation from backside.

The method is applying silicone grease to the backside of the device and attaching the device to water-cooled radiator made of aluminium.

*4 V_{DD}=99V, L=5mH, I_{AV}=12A

*5 L≤5mH, single pulse

Marking : K4116

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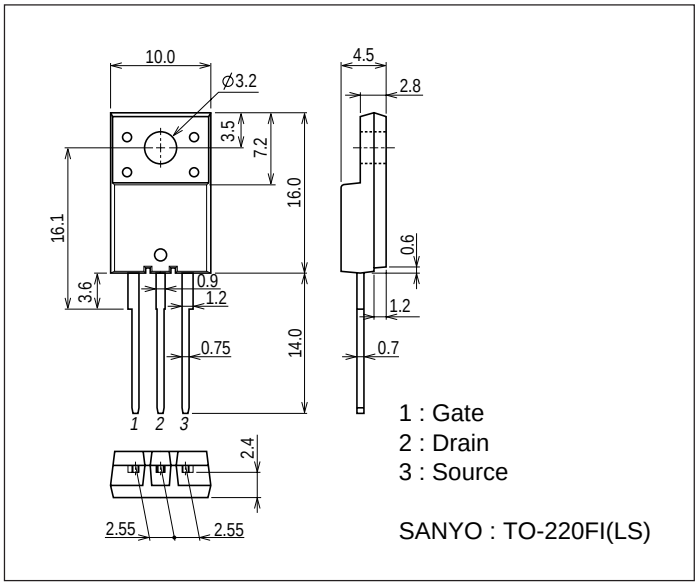
Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=10mA, V_{GS}=0V	400			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=320V, V_{GS}=0V			100	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±30V, V_{DS}=0V			±100	nA
Cutoff Voltage	$V_{GS}(off)$	V_{DS}=10V, I_D=1mA	3		5	V
Forward Transfer Admittance	$\|yfs\|$	V_{DS}=10V, I_D=6A	2.8	5.5		S
Static Drain-to-Source On-State Resistance	$R_{DS}(on)$	I_D=6A, V_{GS}=10V		0.41	0.54	Ω
Input Capacitance	Ciss	V_{DS}=30V, f=1MHz		650		pF
Output Capacitance	Coss	V_{DS}=30V, f=1MHz		150		pF
Reverse Transfer Capacitance	Crss	V_{DS}=30V, f=1MHz		34		pF
Turn-ON Delay Time	$t_d(on)$	See specified Test Circuit.		18		ns
Rise Time	t_r	See specified Test Circuit.		65		ns
Turn-OFF Delay Time	$t_d(off)$	See specified Test Circuit.		71		ns
Fall Time	t_f	See specified Test Circuit.		36		ns
Total Gate Charge	Qg	V_{DS}=200V, V_{GS}=10V, I_D=12A		24.5		nC
Gate-to-Source Charge	Qgs	V_{DS}=200V, V_{GS}=10V, I_D=12A		4.5		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=200V, V_{GS}=10V, I_D=12A		16		nC
Diode Forward Voltage	V_{SD}	I_S=12A, V_{GS}=0V		0.94	1.2	V

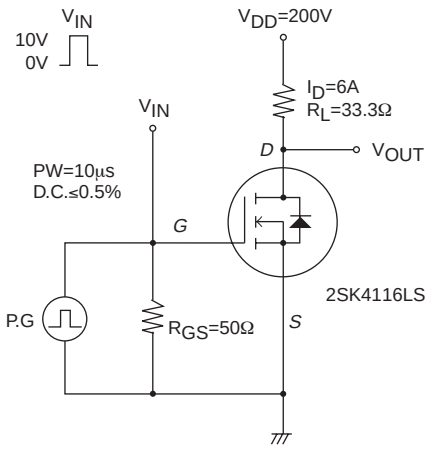
Package Dimensions

unit : mm (typ)

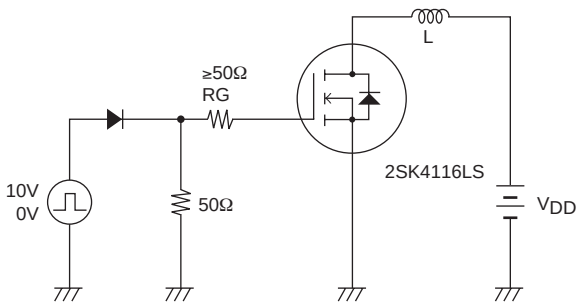
7509-002

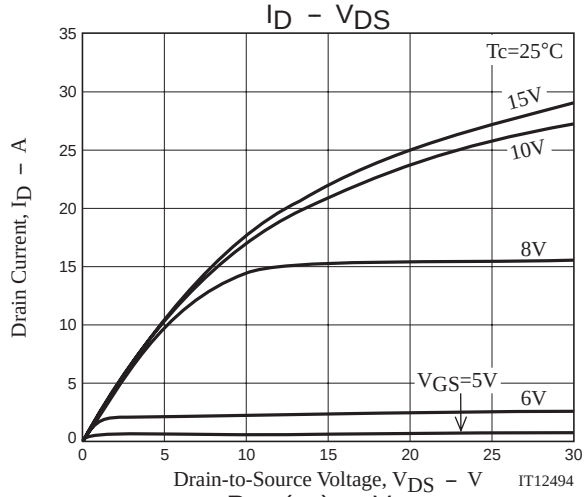


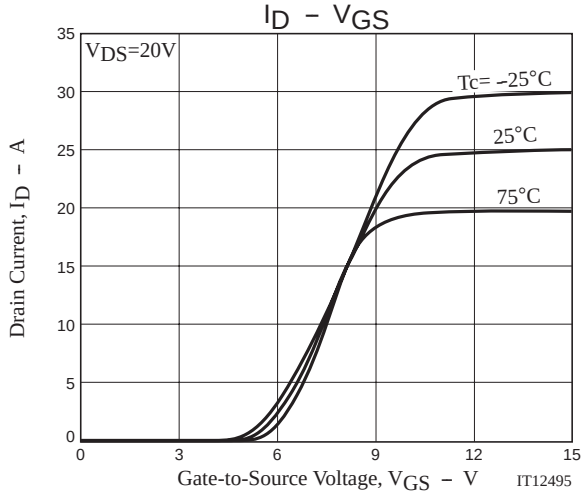
Switching Time Test Circuit

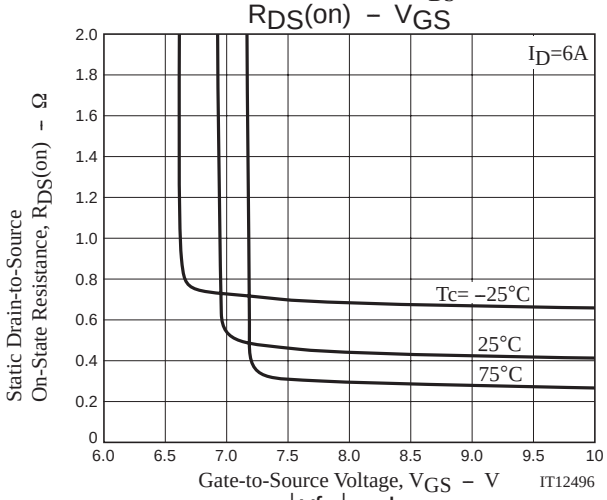


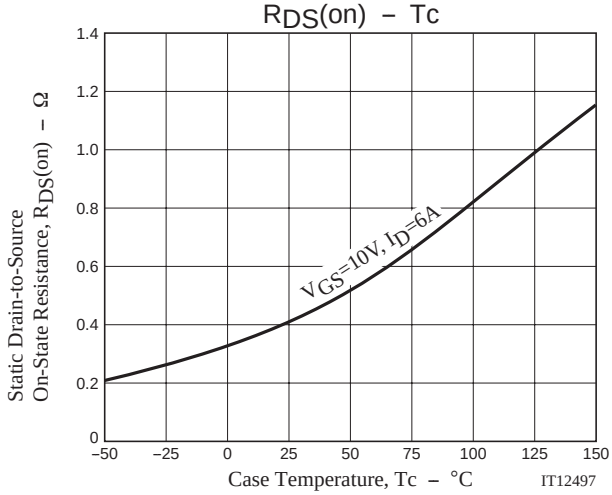
Avalanche Resistance Test Circuit

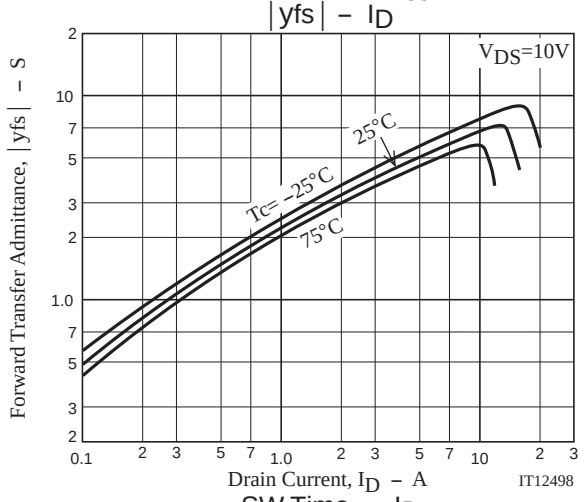


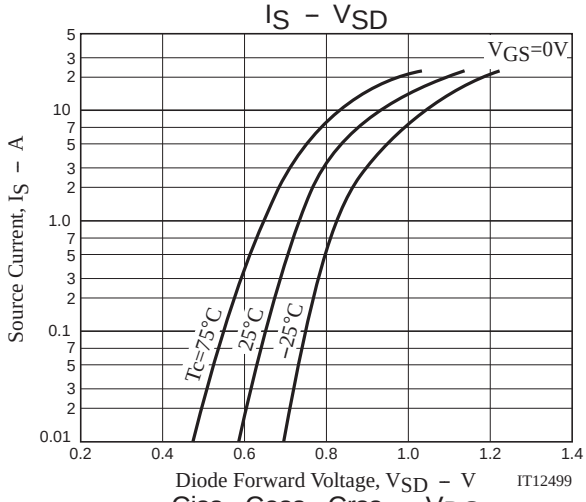

ID – VDS
Tc=25°C
15V
10V
8V
VGS=5V
6V
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT12494

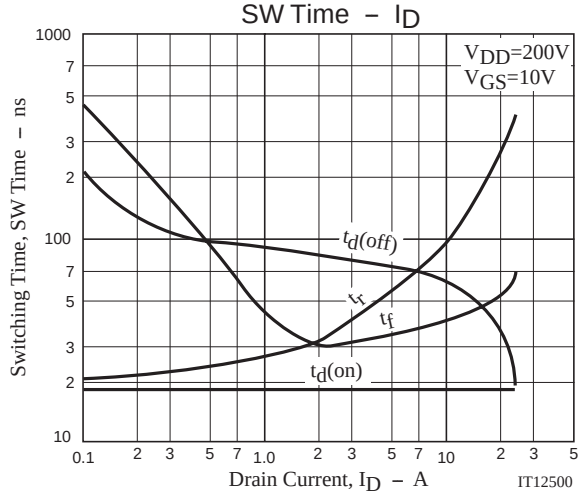

ID – VGS
VDS=20V
Tc= –25°C
25°C
75°C
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT12495

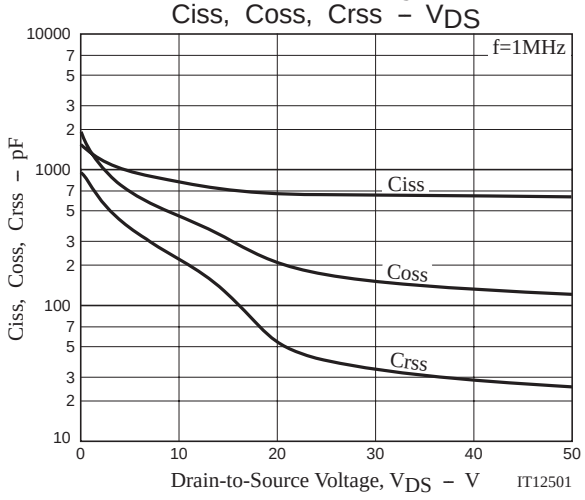

RDS(on) – VGS
ID=6A
Tc= –25°C
25°C
75°C
Static Drain-to-Source On-State Resistance, RDS(on) – Ω
Gate-to-Source Voltage, VGS – V
IT12496

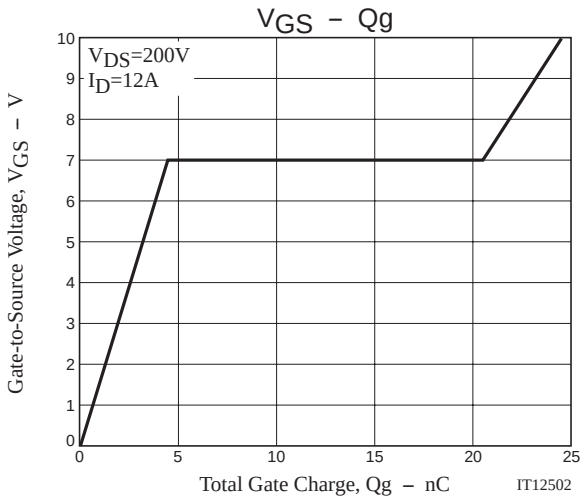

RDS(on) – Tc
VGS=10V, ID=6A
Static Drain-to-Source On-State Resistance, RDS(on) – Ω
Case Temperature, Tc – °C
IT12497

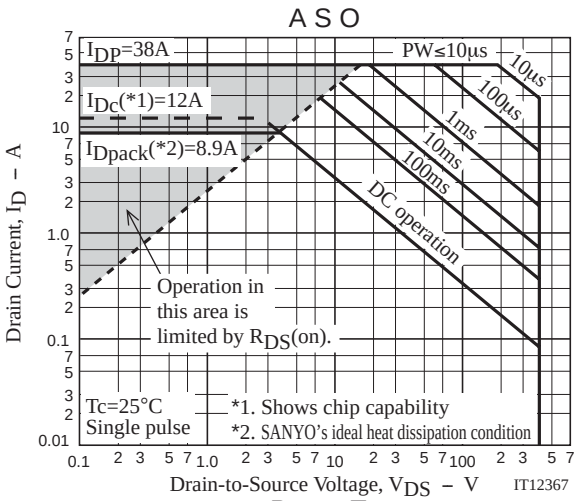

|yfs| – ID
VDS=10V
25°C
Tc= –25°C
75°C
Forward Transfer Admittance, |yfs| – S
Drain Current, ID – A
IT12498

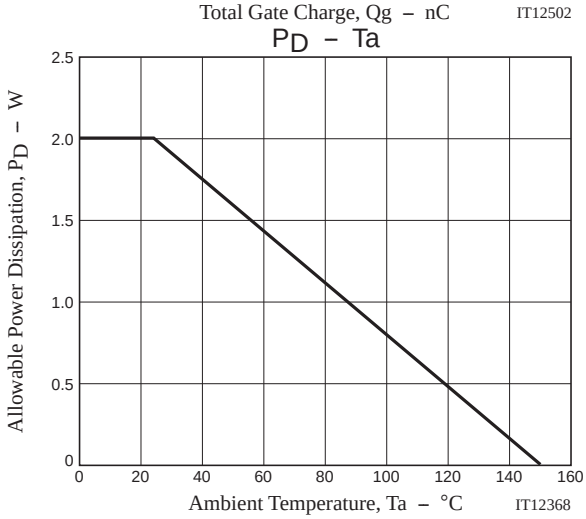

IS – VSD
VGS=0V
Tc=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT12499

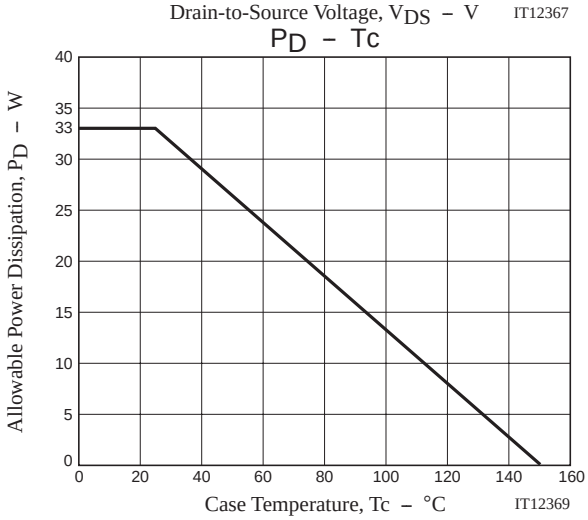

SW Time – ID
VDD=200V
VGS=10V
td(off)
tr
tf
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT12500

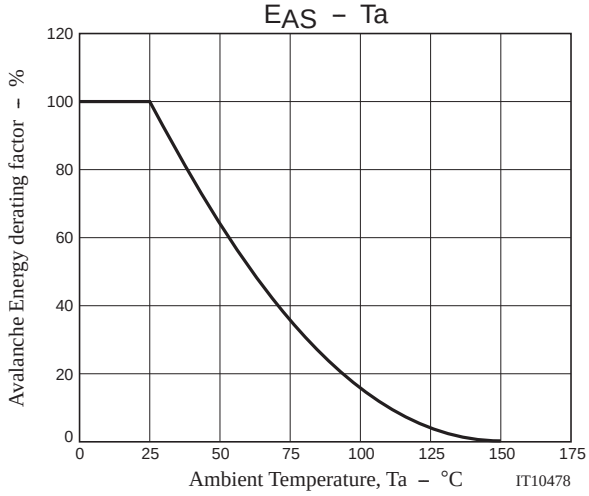

Ciss, Coss, Crss – VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT12501


VGS – Qg
VDS=200V
ID=12A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT12502


A S O
IDP=38A
PW≤10μs
10μs
IDC(*1)=12A
100μs
1ms
IDpack(*2)=8.9A
10ms
100ms
DC operation
Operation in
this area is
limited by RDS(on).
Tc=25°C
Single pulse
*1. Shows chip capability
*2. SANYO's ideal heat dissipation condition
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT12367


PD – Ta
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT12368


PD – Tc
Allowable Power Dissipation, PD – W
Case Temperature, Tc – °C
IT12369


EAS – Ta
Avalanche Energy derating factor – %
Ambient Temperature, Ta – °C
IT10478

Note on usage : Since the 2SK4116LS is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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