



SANYO Semiconductors

## DATA SHEET

# 2SK4089LS — N-Channel Silicon MOSFET

## General-Purpose Switching Device Applications

### Features

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

### Specifications

**Absolute Maximum Ratings** at  $T_a=25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	$V_{DS}$		650	V
Gate-to-Source Voltage	$V_{GS}$		$\pm 30$	V
Drain Current (DC)	$I_{DC}^{*1}$	Limited only by maximum temperature	12	A
	$I_{Dpack}^{*2}$	$T_c=25^\circ\text{C}$ (SANYO's ideal heat dissipation condition)*3	8.5	A
Drain Current (Pulse)	$I_{DP}$	$PW \leq 10\mu\text{s}$ , duty cycle $\leq 1\%$	48	A
Allowable Power Dissipation	$P_D$		2.0	W
		$T_c=25^\circ\text{C}$ (SANYO's ideal heat dissipation condition)*3	40	W
Channel Temperature	$T_{ch}$		150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$
Avalanche Energy (Single Pulse) *4	$E_{AS}$		84	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  $V_{DD}=99\text{V}$ ,  $L=1\text{mH}$ ,  $I_{AV}=12\text{A}$

\*5  $L \leq 1\text{mH}$ , single pulse

Marking : K4089

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**SANYO Semiconductor Co., Ltd.**

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# 2SK4089LS

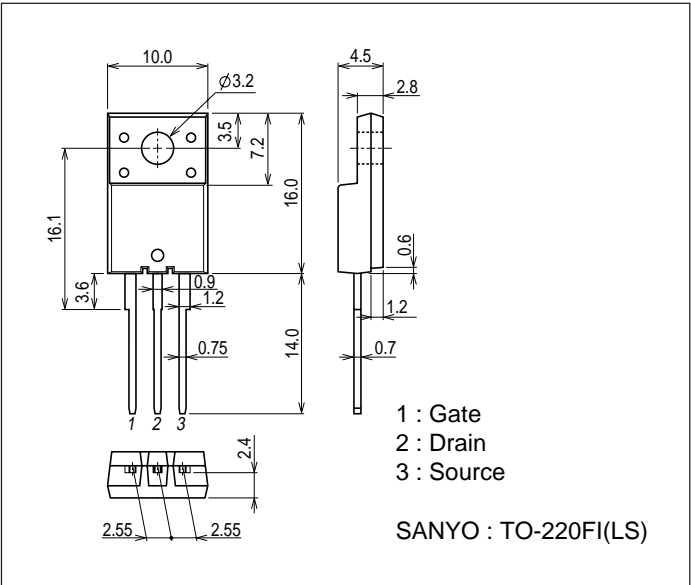
## Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=10mA, V_{GS}=0V$	650			V
Zero-Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=520V, V_{GS}=0V$			100	$\mu A$
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 30V, V_{DS}=0V$			$\pm 100$	nA
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=10V, I_D=1mA$	3		5	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=10V, I_D=6A$	3.8	7.5		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)}$	$I_D=6A, V_{GS}=10V$		0.55	0.72	$\Omega$
Input Capacitance	$C_{iss}$	$V_{DS}=30V, f=1MHz$		1200		pF
Output Capacitance	$C_{oss}$	$V_{DS}=30V, f=1MHz$		208		pF
Reverse Transfer Capacitance	$C_{rss}$	$V_{DS}=30V, f=1MHz$		44		pF
Turn-ON Delay Time	$t_d(on)$	See specified Test Circuit.		27		ns
Rise Time	$t_r$	See specified Test Circuit.		66		ns
Turn-OFF Delay Time	$t_d(off)$	See specified Test Circuit.		140		ns
Fall Time	$t_f$	See specified Test Circuit.		45		ns
Total Gate Charge	$Q_g$	$V_{DS}=200V, V_{GS}=10V, I_D=12A$		45.4		nC
Gate-to-Source Charge	$Q_{gs}$	$V_{DS}=200V, V_{GS}=10V, I_D=12A$		7.7		nC
Gate-to-Drain "Miller" Charge	$Q_{gd}$	$V_{DS}=200V, V_{GS}=10V, I_D=12A$		26.1		nC
Diode Forward Voltage	$V_{SD}$	$I_S=12A, V_{GS}=0V$		0.9	1.2	V

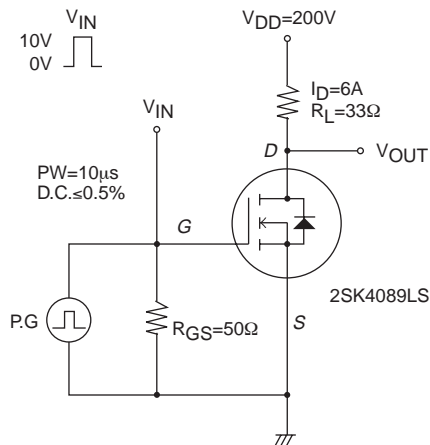
## Package Dimensions

unit : mm (typ)

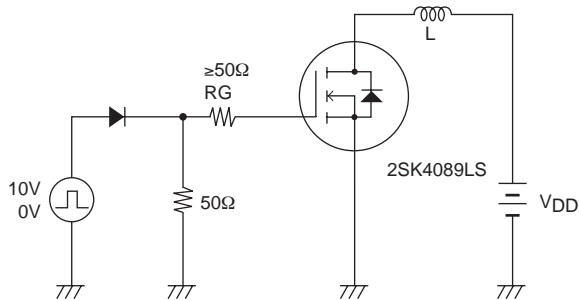
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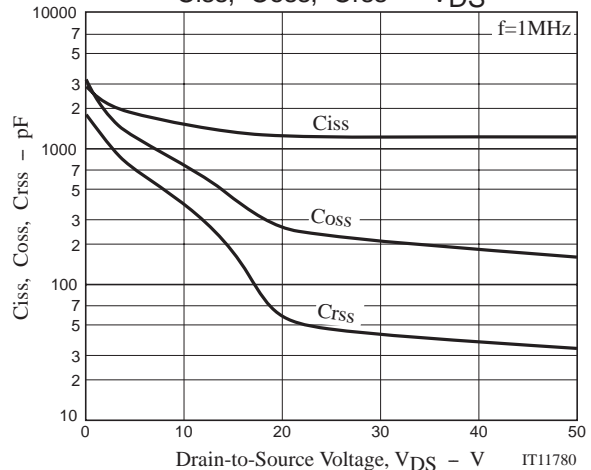
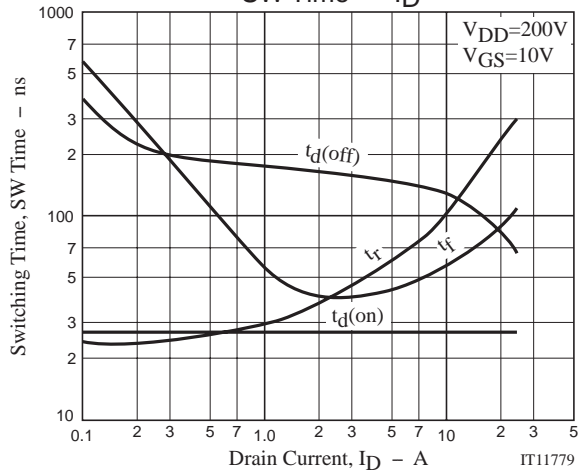
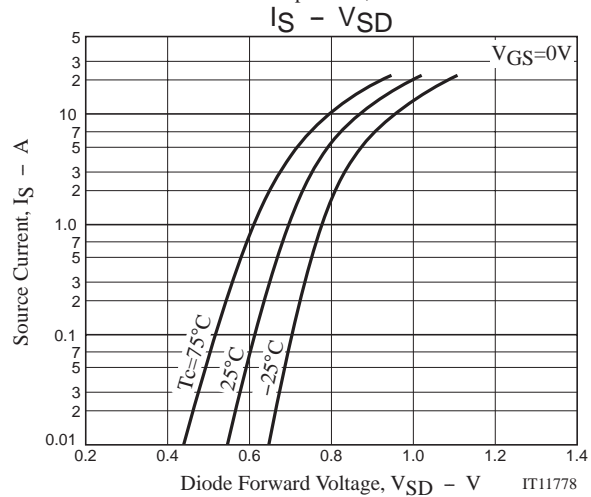
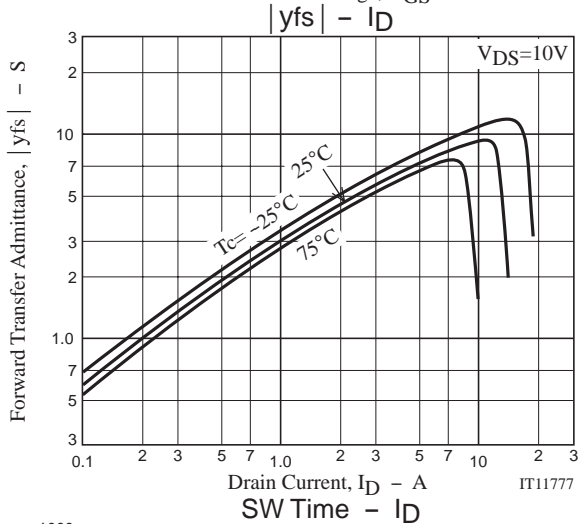
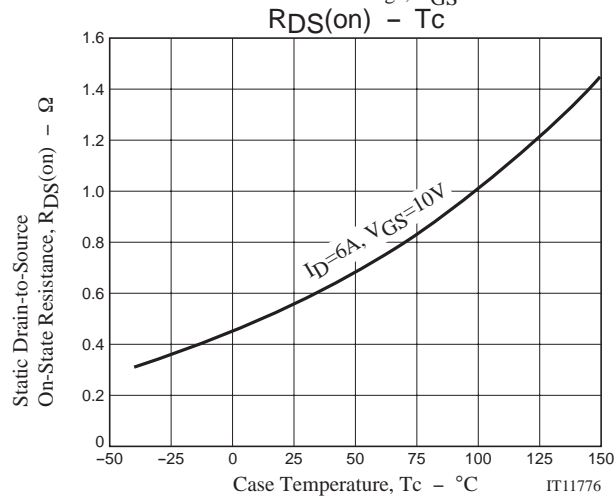
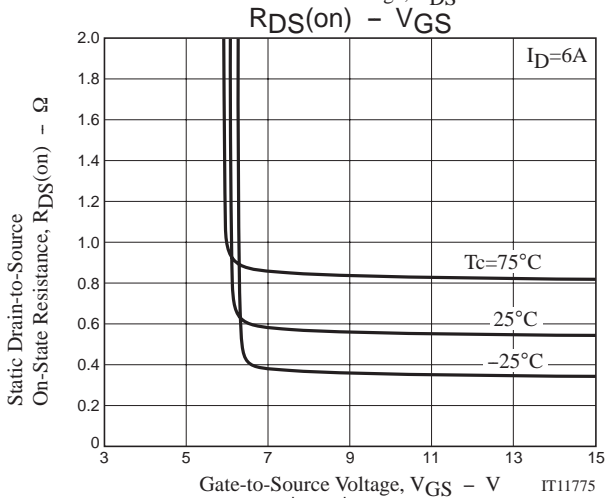
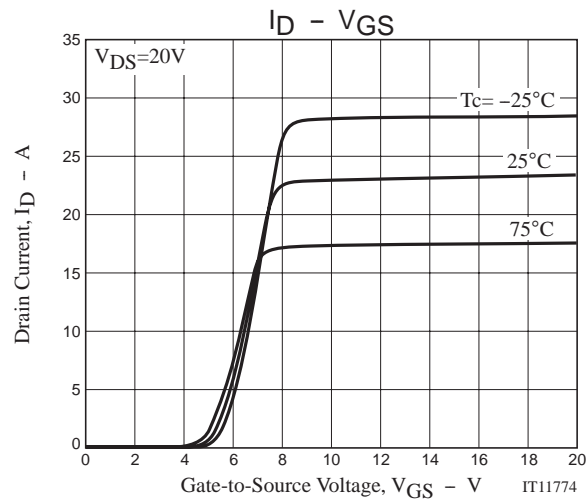
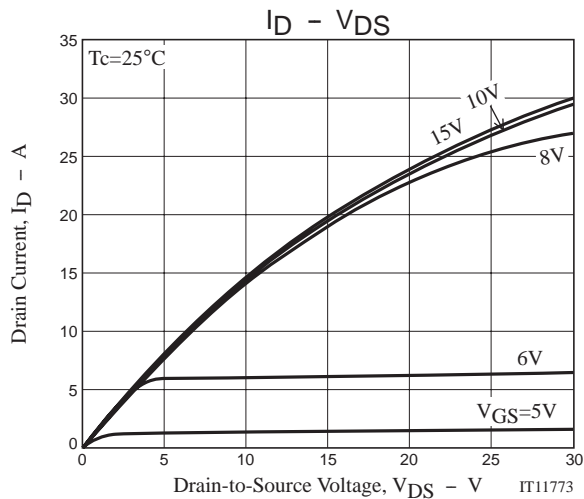
## Switching Time Test Circuit



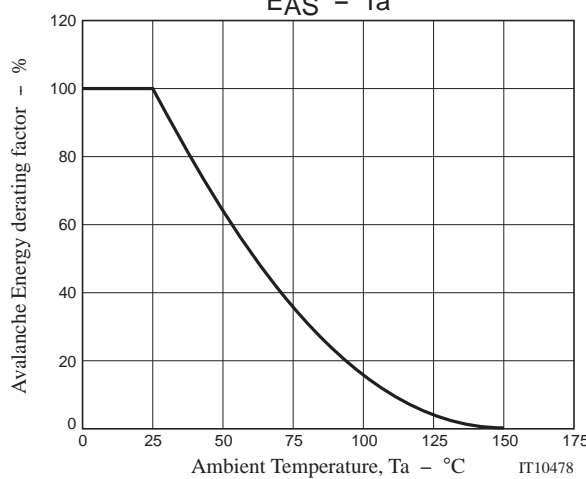
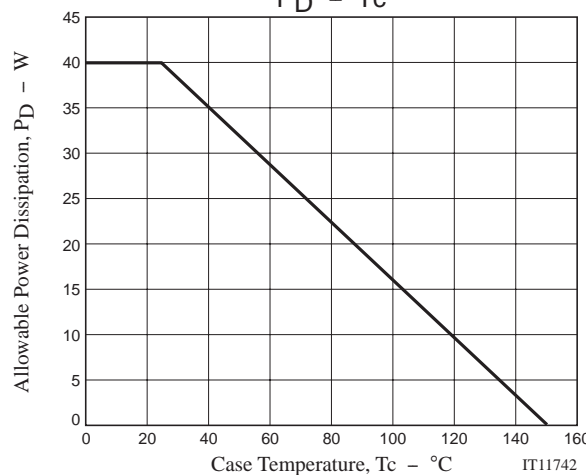
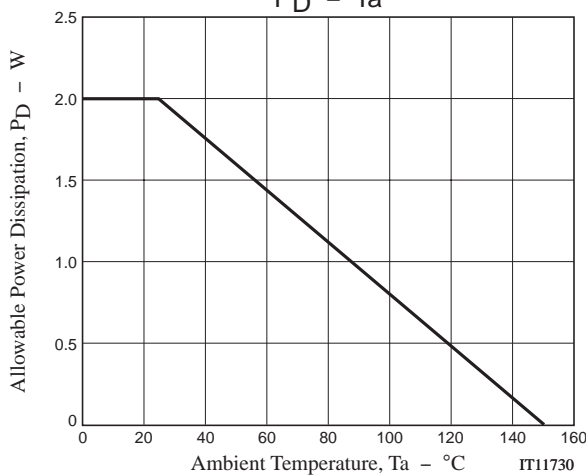
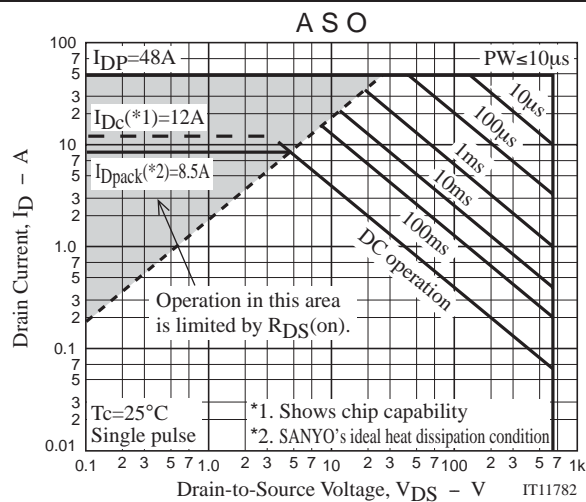
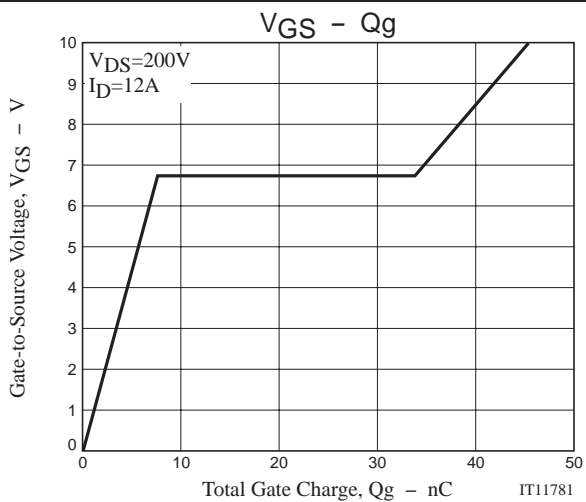
## Avalanche Resistance Test Circuit













Note on usage : Since the 2SK4089LS is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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