



SANYO Semiconductors

## DATA SHEET

# 2SK3977 — N-Channel Silicon MOSFET

## General-Purpose Switching Device Applications

### Features

- Low ON-resistance.
- Ultrahigh-speed switching.
- 4.5V drive

### Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	$V_{DSS}$		100	V
Gate-to-Source Voltage	$V_{GSS}$		$\pm 20$	V
Drain Current (DC)	$I_D$		10	A
Drain Current (Pulse)	$I_{DP}$	$PW \leq 10\mu\text{s}$ , duty cycle $\leq 1\%$	40	A
Allowable Power Dissipation	$P_D$		1	W
		$T_c=25^\circ\text{C}$	20	W
Channel Temperature	$T_{ch}$		150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$

**Electrical Characteristics** at  $T_a=25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=1\text{mA}$ , $V_{GS}=0\text{V}$	100			V
Zero-Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=100\text{V}$ , $V_{GS}=0\text{V}$			1	$\mu\text{A}$
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 16\text{V}$ , $V_{DS}=0\text{V}$			$\pm 10$	$\mu\text{A}$
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=10\text{V}$ , $I_D=1\text{mA}$	1.2		2.6	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=10\text{V}$ , $I_D=6\text{A}$	6	10		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	$I_D=6\text{A}$ , $V_{GS}=10\text{V}$		70	92	$\text{m}\Omega$
	$R_{DS(on)2}$	$I_D=6\text{A}$ , $V_{GS}=4.5\text{V}$		85	120	$\text{m}\Omega$
Input Capacitance	$C_{iss}$	$V_{DS}=20\text{V}$ , $f=1\text{MHz}$		1560		pF
Output Capacitance	$C_{oss}$	$V_{DS}=20\text{V}$ , $f=1\text{MHz}$		130		pF
Reverse Transfer Capacitance	$C_{rss}$	$V_{DS}=20\text{V}$ , $f=1\text{MHz}$		83		pF
Turn-ON Delay Time	$t_{d(on)}$	See specified Test Circuit.		16		ns
Rise Time	$t_r$	See specified Test Circuit.		55		ns
Turn-OFF Delay Time	$t_{d(off)}$	See specified Test Circuit.		120		ns
Fall Time	$t_f$	See specified Test Circuit.		80		ns

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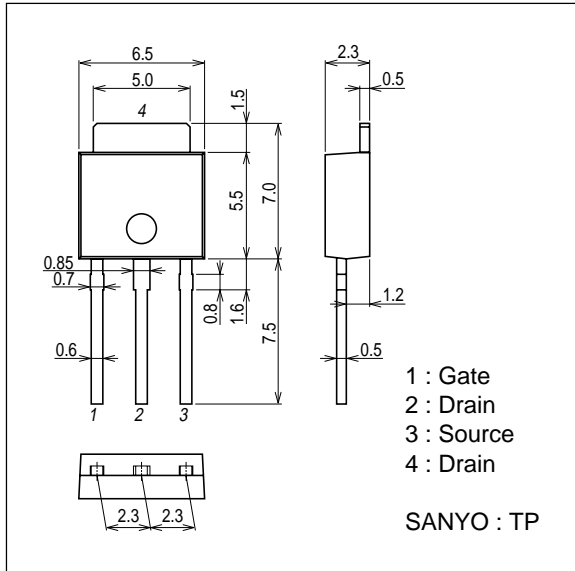
# 2SK3977

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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Total Gate Charge	Qg	V <sub>DS</sub> =50V, V <sub>GS</sub> =10V, I <sub>D</sub> =10A		34		nC
Gate-to-Source Charge	Qgs	V <sub>DS</sub> =50V, V <sub>GS</sub> =10V, I <sub>D</sub> =10A		5.5		nC
Gate-to-Drain "Miller" Charge	Qgd	V <sub>DS</sub> =50V, V <sub>GS</sub> =10V, I <sub>D</sub> =10A		6		nC
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =10A, V <sub>GS</sub> =0V		0.95	1.2	V

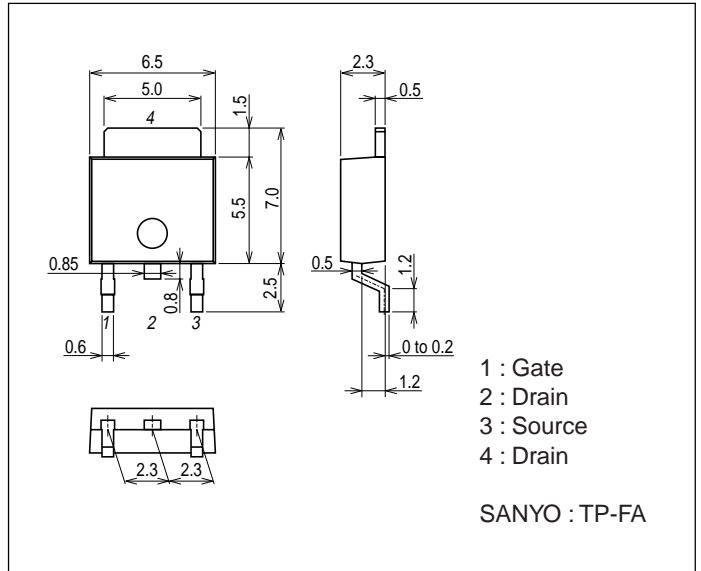
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unit : mm (typ)  
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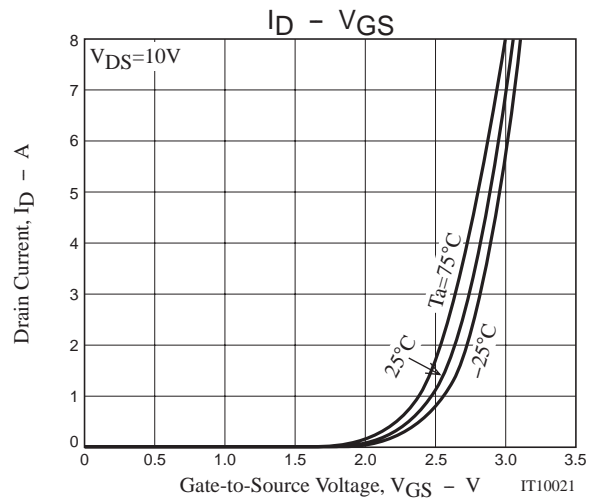
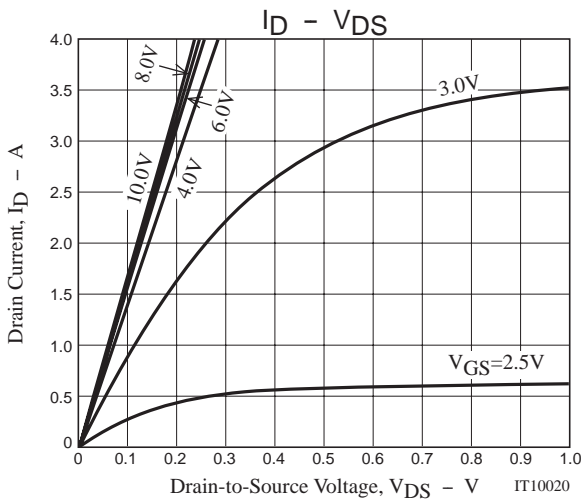
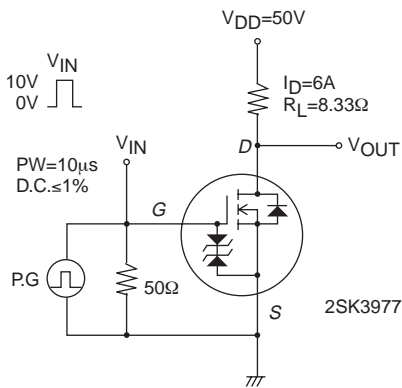


## Package Dimensions

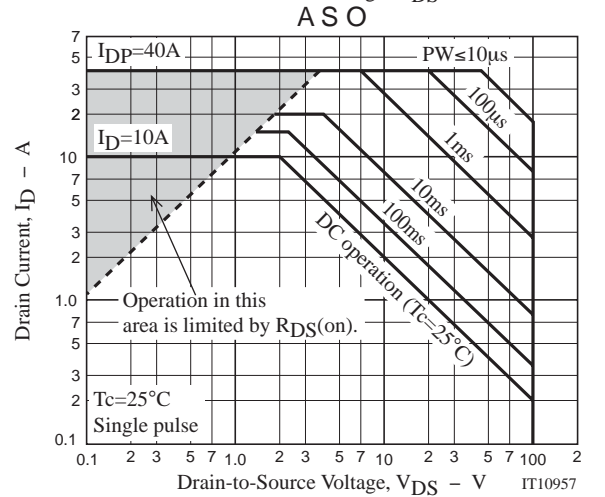
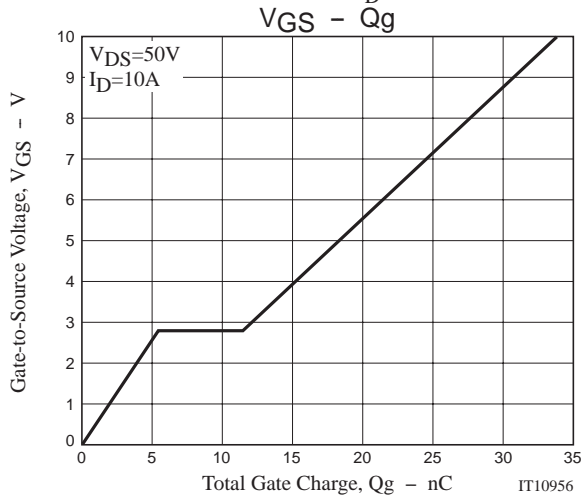
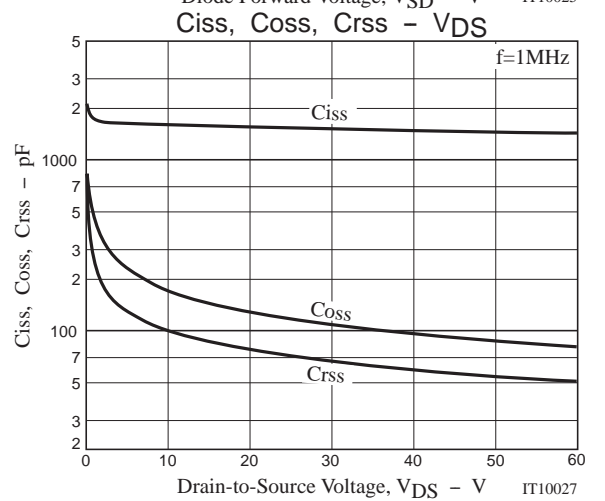
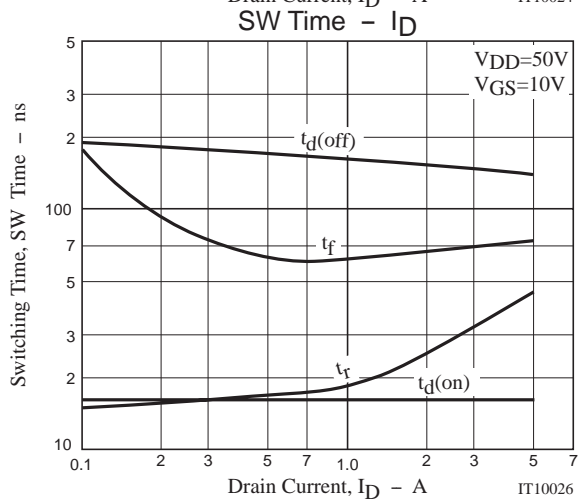
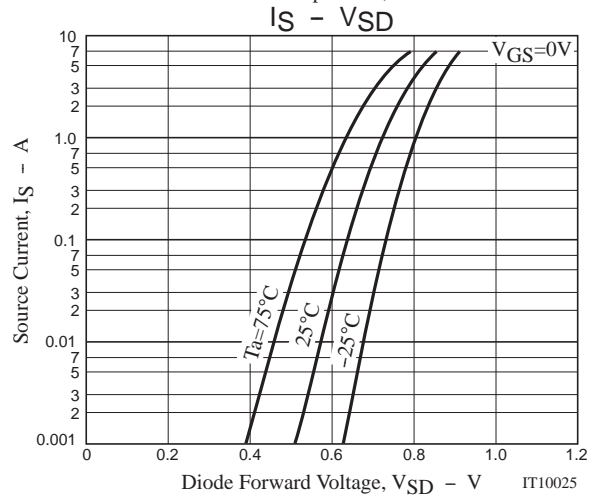
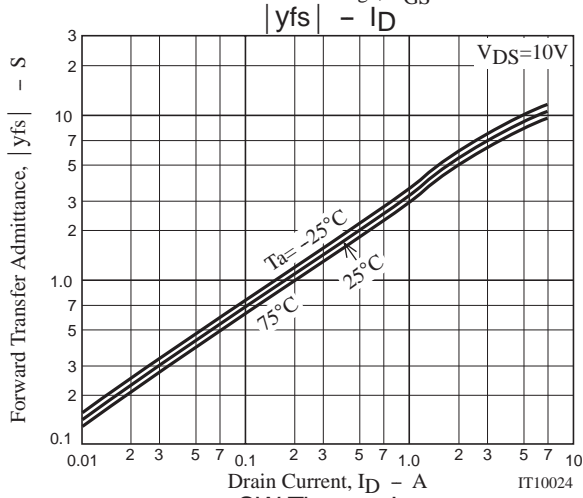
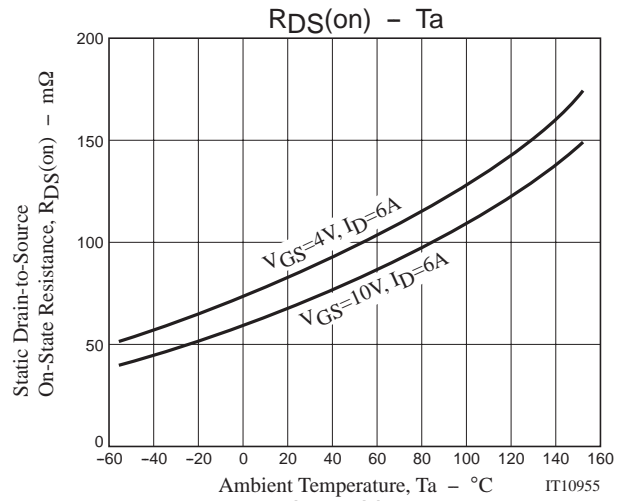
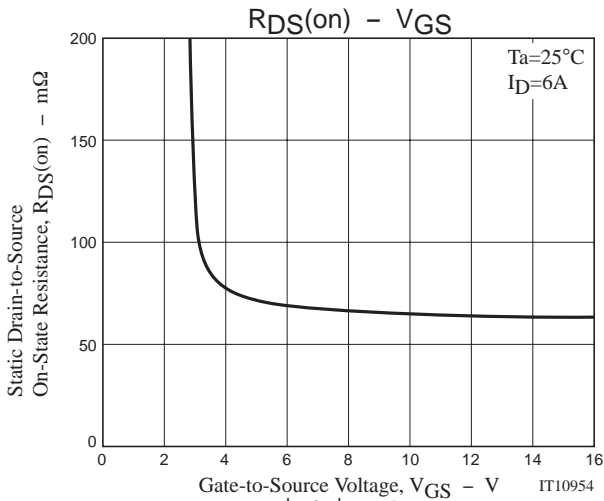
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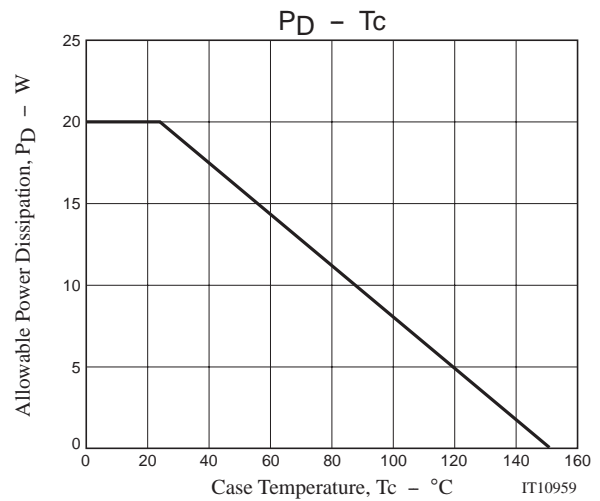
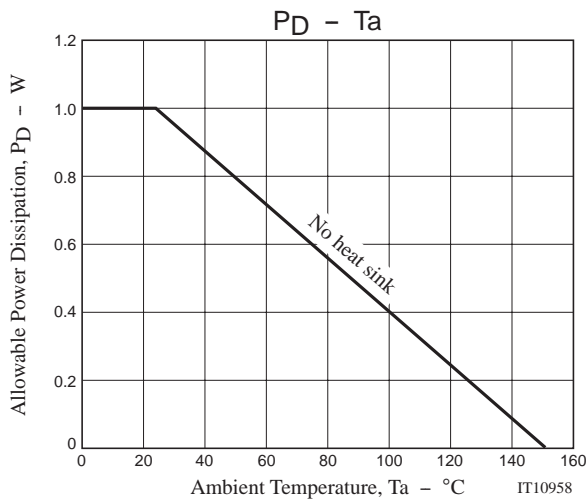


## Switching Time Test Circuit



# 2SK3977





Note on usage : Since the 2SK3977 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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