



# 2SK3978 — N-Channel Silicon MOSFET

## General-Purpose Switching Device Applications

### Features

- Low ON-resistance.
- Ultrahigh-speed switching.
- 4V drive

### Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	$V_{DSS}$		200	V
Gate-to-Source Voltage	$V_{GSS}$		$\pm 20$	V
Drain Current (DC)	$I_D$		4	A
Drain Current (Pulse)	$I_{DP}$	$PW \leq 10\mu\text{s}$ , duty cycle $\leq 1\%$	16	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	$V_{(BR)DSS}$	$I_D=1\text{mA}$ , $V_{GS}=0\text{V}$	200			V
Zero-Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=200\text{V}$ , $V_{GS}=0\text{V}$			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} $	$V_{DS}=10\text{V}$ , $I_D=2\text{A}$	3.2	5.3		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	$I_D=2\text{A}$ , $V_{GS}=10\text{V}$		420	550	$\text{m}\Omega$
	$R_{DS(on)2}$	$I_D=2\text{A}$ , $V_{GS}=4\text{V}$		450	640	$\text{m}\Omega$

Marking: K3978

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# 2SK3978

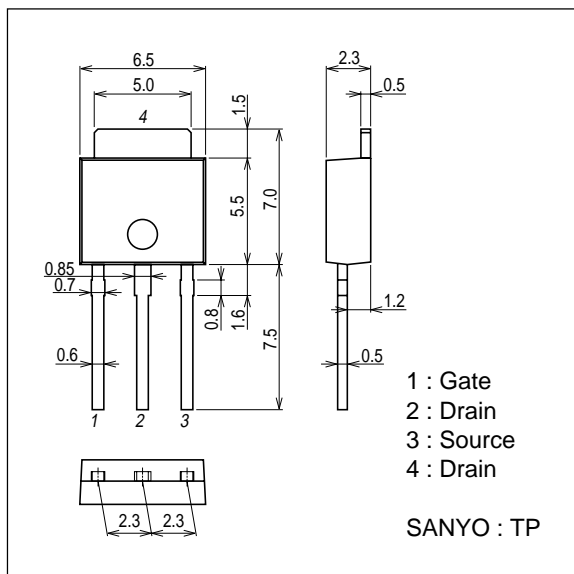
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Input Capacitance	Ciss	V <sub>DS</sub> =20V, f=1MHz		950		pF
Output Capacitance	Coss	V <sub>DS</sub> =20V, f=1MHz		44		pF
Reverse Transfer Capacitance	Crss	V <sub>DS</sub> =20V, f=1MHz		26		pF
Turn-ON Delay Time	t <sub>d(on)</sub>	See specified Test Circuit.		12.2		ns
Rise Time	t <sub>r</sub>	See specified Test Circuit.		8.4		ns
Turn-OFF Delay Time	t <sub>d(off)</sub>	See specified Test Circuit.		96		ns
Fall Time	t <sub>f</sub>	See specified Test Circuit.		32		ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =100V, V <sub>GS</sub> =10V, I <sub>D</sub> =4A		21		nC
Gate-to-Source Charge	Q <sub>gs</sub>	V <sub>DS</sub> =100V, V <sub>GS</sub> =10V, I <sub>D</sub> =4A		2.8		nC
Gate-to-Drain "Miller" Charge	Q <sub>gd</sub>	V <sub>DS</sub> =100V, V <sub>GS</sub> =10V, I <sub>D</sub> =4A		4.7		nC
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =4A, V <sub>GS</sub> =0V	0.88		1.2	V

## Package Dimensions

unit : mm (typ)

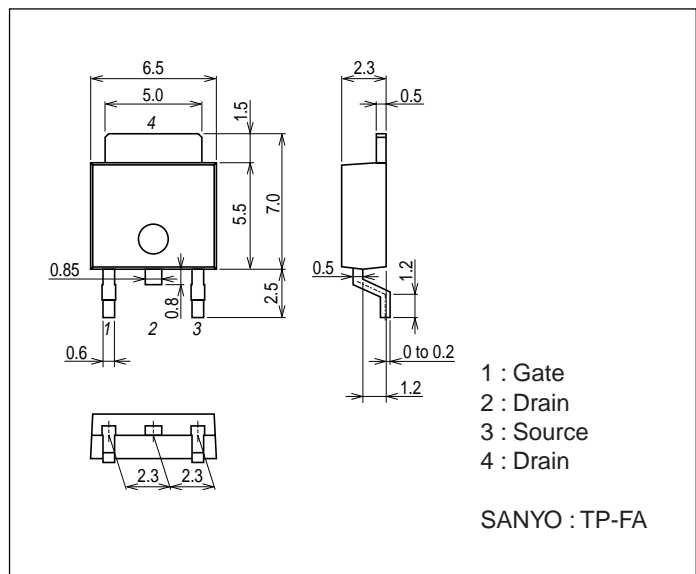
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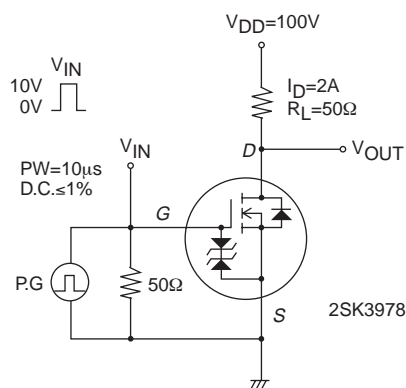
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unit : mm (typ)

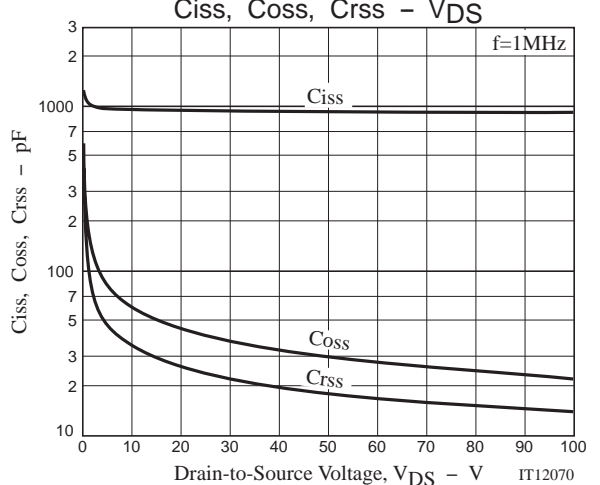
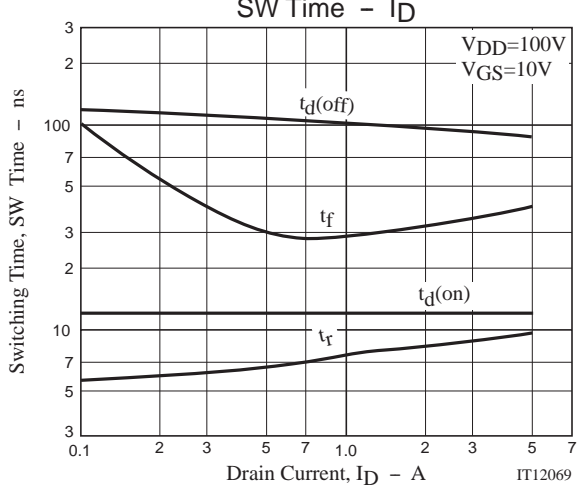
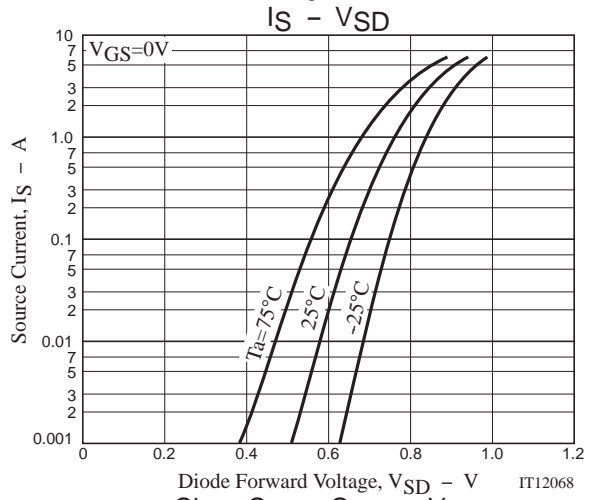
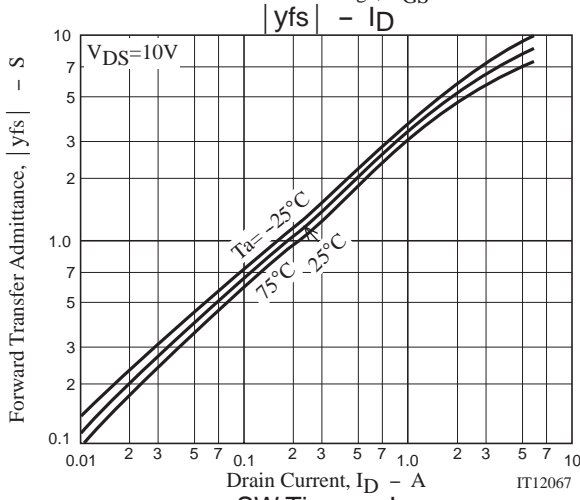
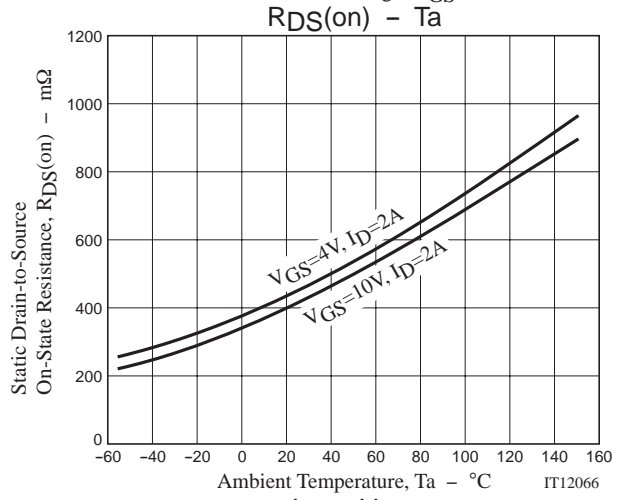
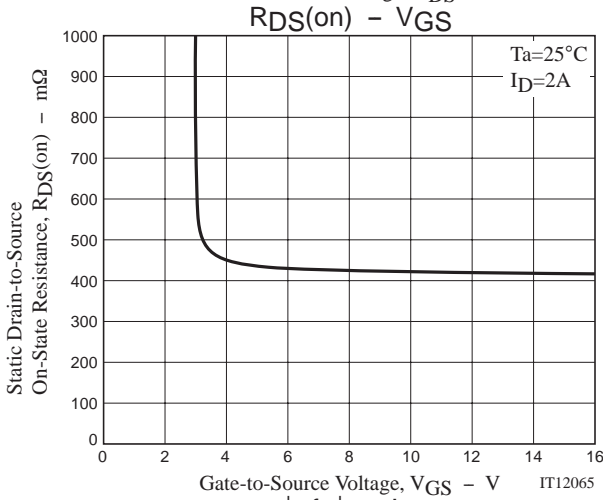
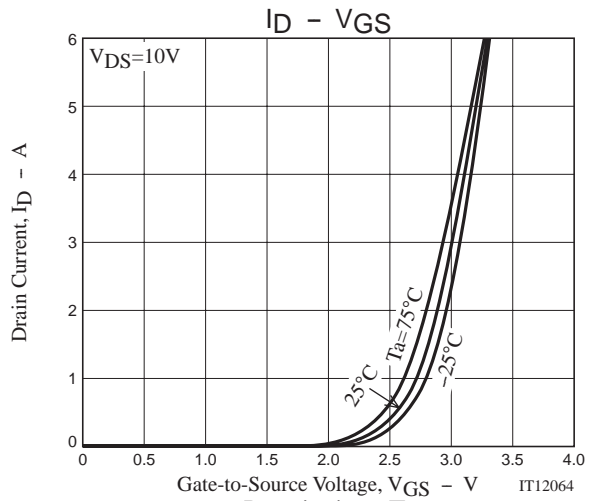
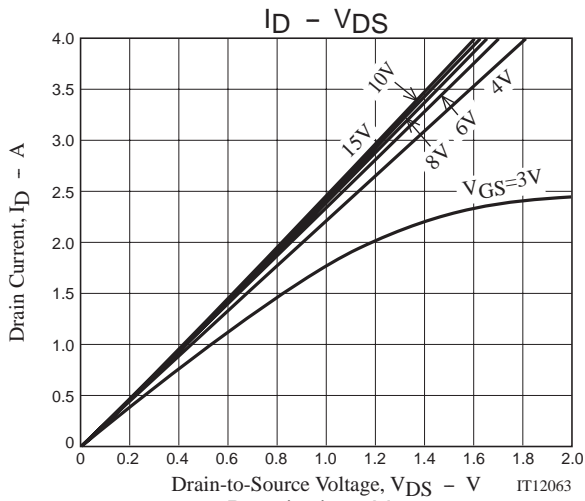
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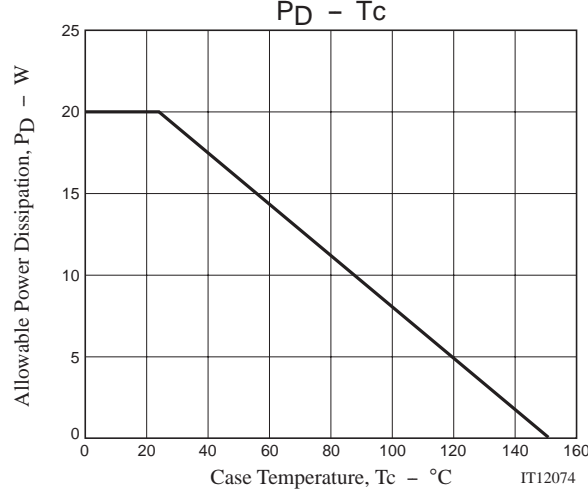
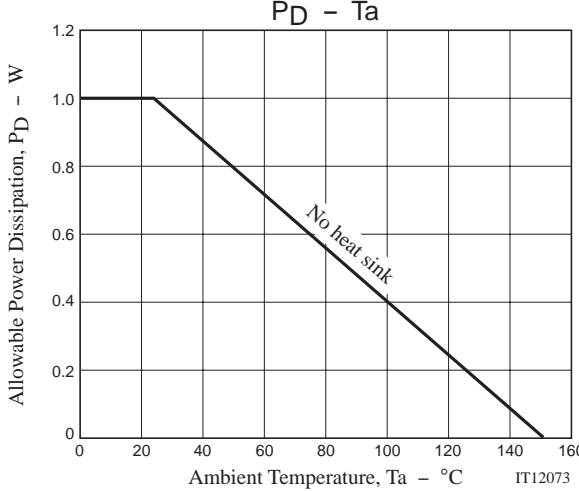
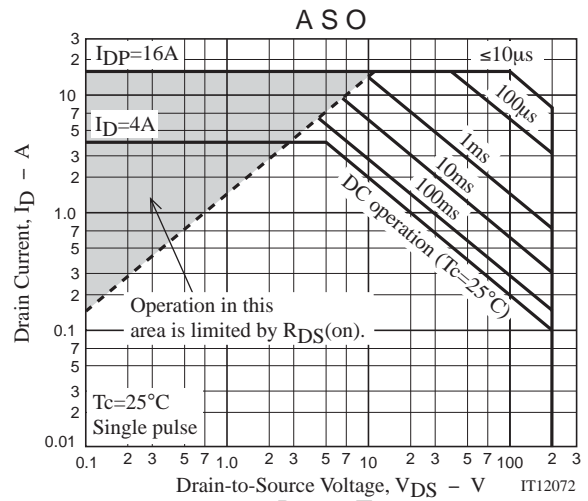
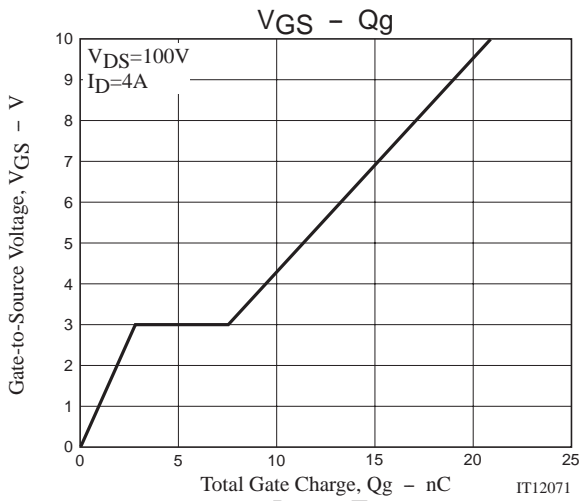


## Switching Time Test Circuit



# 2SK3978





Note on usage : Since the 2SK3978 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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