



ON Semiconductor®

ON Semiconductor
DATA SHEET**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}		± 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	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 16\text{V}$, $V_{DS}=0\text{V}$			± 10	μA
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

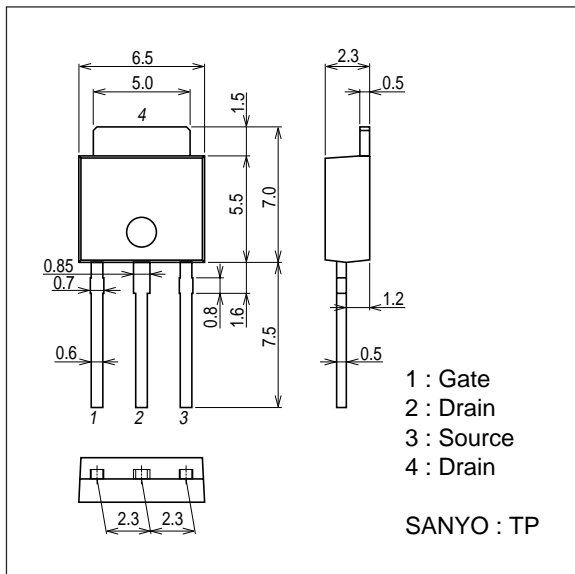
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Input Capacitance	Ciss	V _{DS} =20V, f=1MHz		950		pF
Output Capacitance	Coss	V _{DS} =20V, f=1MHz		44		pF
Reverse Transfer Capacitance	Crss	V _{DS} =20V, f=1MHz		26		pF
Turn-ON Delay Time	t _{d(on)}	See specified Test Circuit.		12.2		ns
Rise Time	t _r	See specified Test Circuit.		8.4		ns
Turn-OFF Delay Time	t _{d(off)}	See specified Test Circuit.		96		ns
Fall Time	t _f	See specified Test Circuit.		32		ns
Total Gate Charge	Qg	V _{DS} =100V, V _{GS} =10V, I _D =4A		21		nC
Gate-to-Source Charge	Qgs	V _{DS} =100V, V _{GS} =10V, I _D =4A		2.8		nC
Gate-to-Drain "Miller" Charge	Qgd	V _{DS} =100V, V _{GS} =10V, I _D =4A		4.7		nC
Diode Forward Voltage	V _{SD}	I _S =4A, V _{GS} =0V	0.88		1.2	V

Package Dimensions

unit : mm (typ)

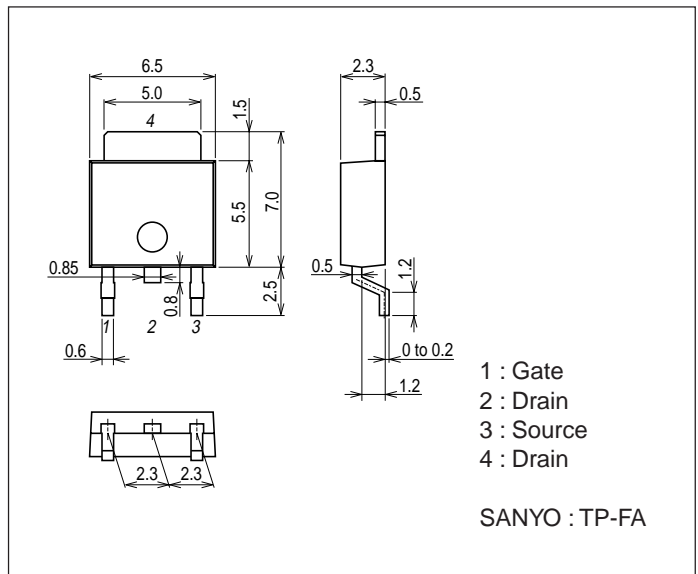
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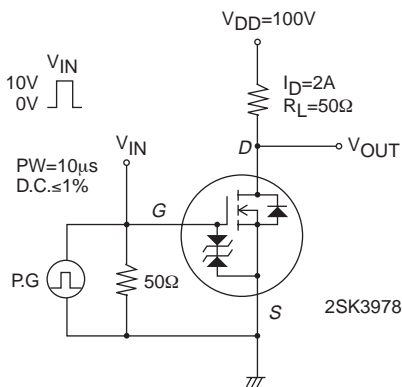
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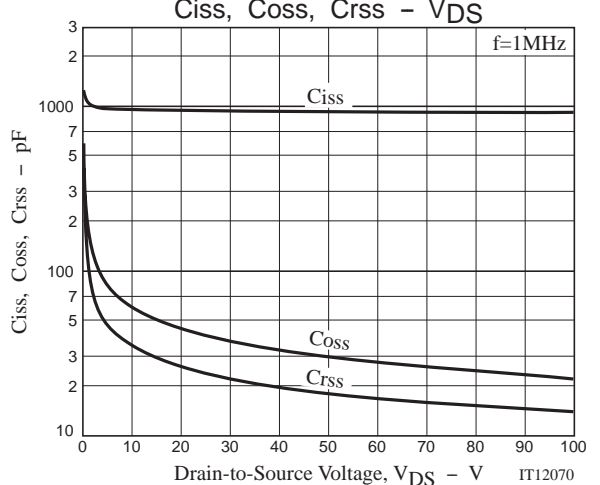
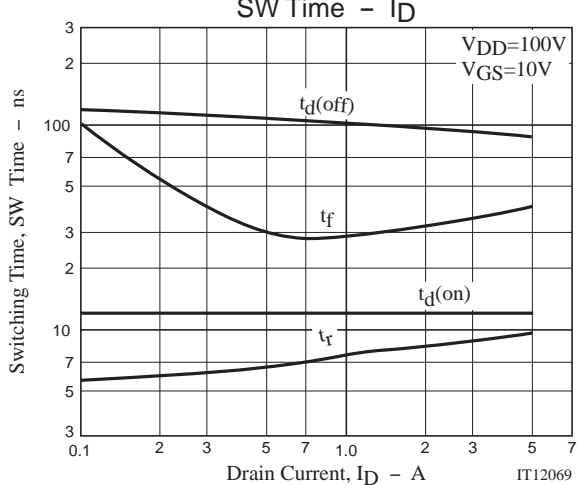
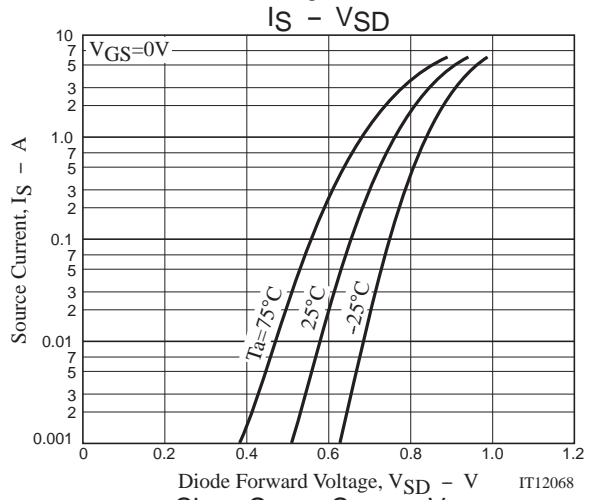
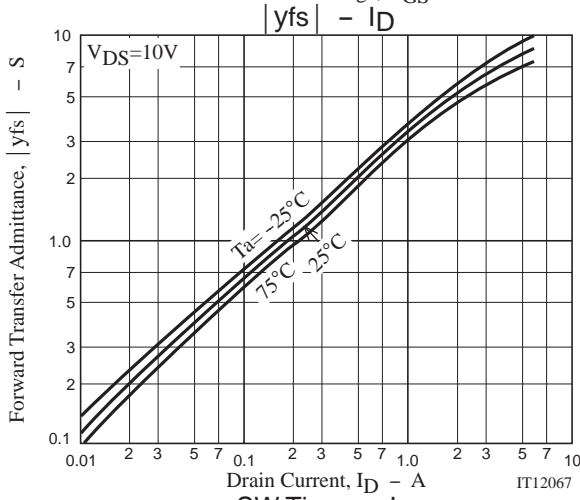
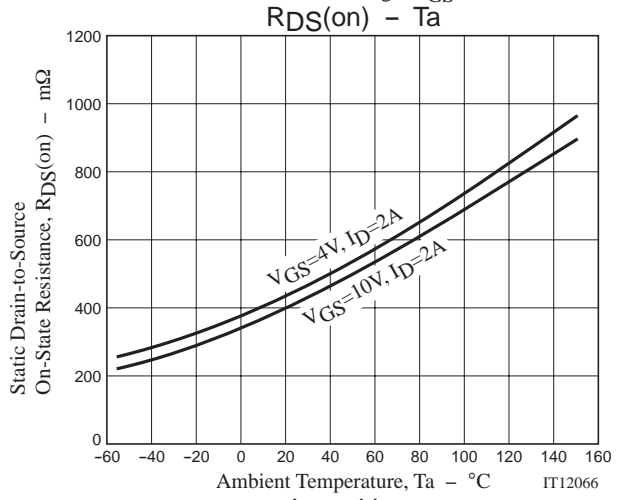
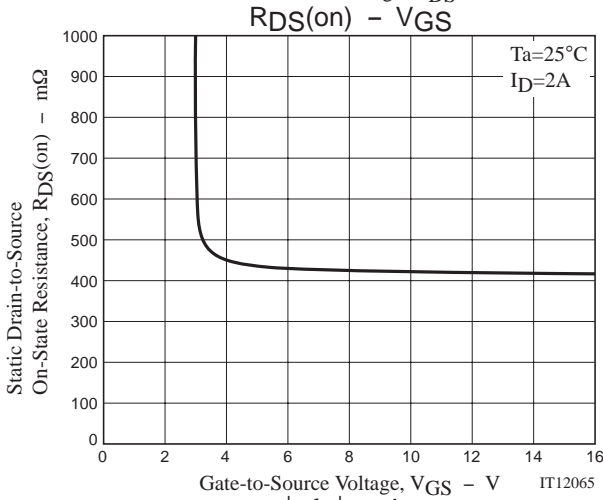
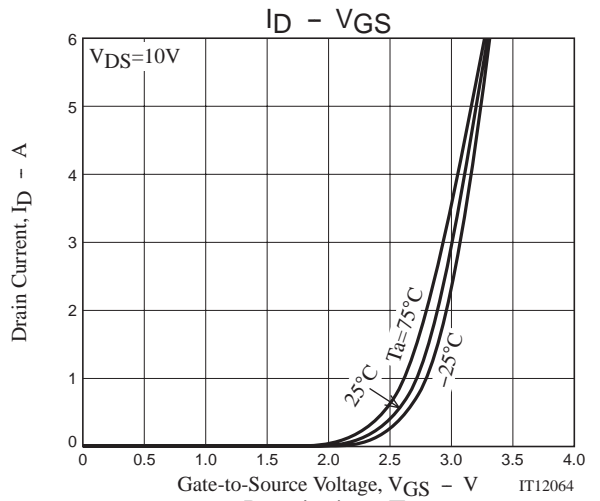
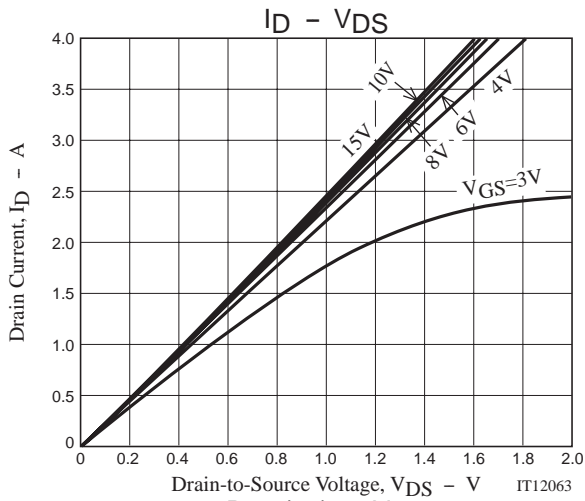
unit : mm (typ)

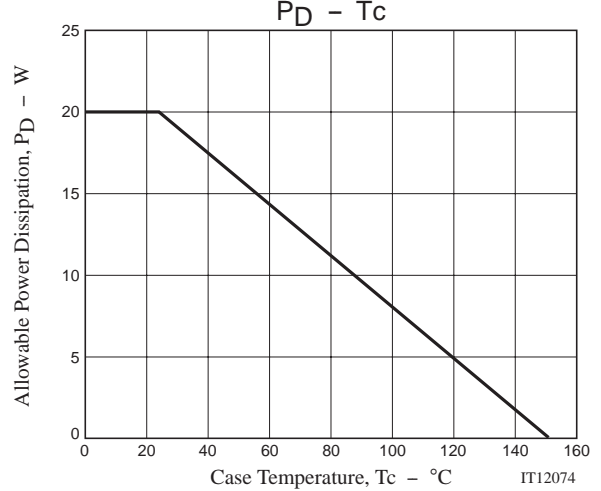
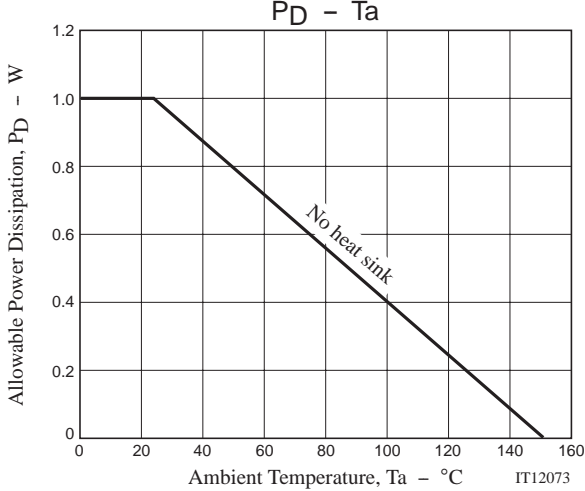
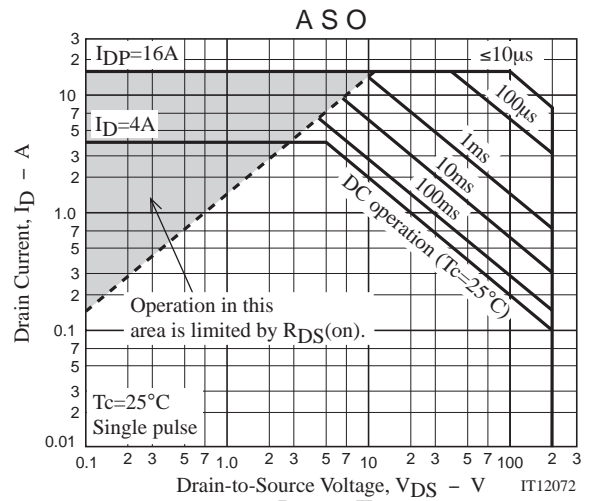
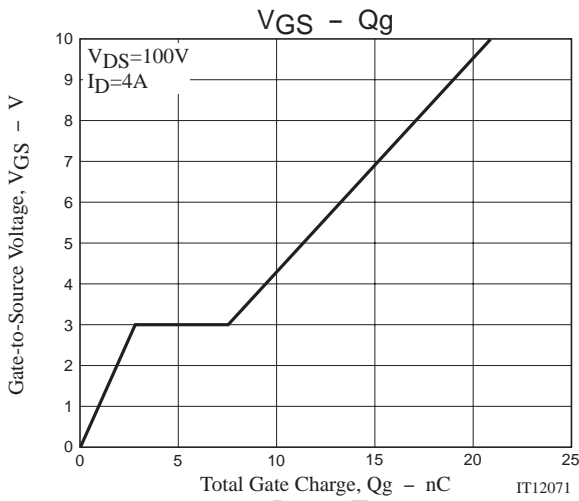
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Switching Time Test Circuit







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