



ON Semiconductor®

**ON Semiconductor**  
**DATA SHEET****2SK3821** — N-Channel Silicon MOSFET  
**General-Purpose Switching Device Applications****Features**

- Low ON-resistance.
- 4V drive.
- Ultrahigh-speed switching.
- Motor drive, DC / DC converter.
- Avalanche resistance guarantee.

**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)	$I_D$		40	A
Drain Current (Pulse)	$I_{DP}$	$PW \leq 10\mu\text{s}$ , duty cycle $\leq 1\%$	160	A
Allowable Power Dissipation	$P_D$		1.65	W
		$T_c=25^\circ\text{C}$	65	W
Channel Temperature	$T_{ch}$		150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$
Avalanche Energy (Single Pulse) *1	$E_{AS}$		200	mJ
Avalanche Current *2	$I_{AV}$		40	A

Note : \*1  $V_{DD}=20\text{V}$ ,  $L=200\mu\text{H}$ ,  $I_{AV}=40\text{A}$ \*2  $L \leq 200\mu\text{H}$ , single pulse**Electrical Characteristics** at  $T_a=25^\circ\text{C}$ 

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=1\text{mA}$ , $V_{GS}=0$	100			V
Zero-Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=100\text{V}$ , $V_{GS}=0$			1	$\mu\text{A}$
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS} = \pm 16\text{V}$ , $V_{DS}=0$			$\pm 10$	$\mu\text{A}$
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} $	$V_{DS}=10\text{V}$ , $I_D=20\text{A}$	18.5	31		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	$I_D=20\text{A}$ , $V_{GS}=10\text{V}$		25	33	$\text{m}\Omega$
	$R_{DS(on)2}$	$I_D=20\text{A}$ , $V_{GS}=4\text{V}$		30	42	$\text{m}\Omega$

Marking : K3821

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# 2SK3821

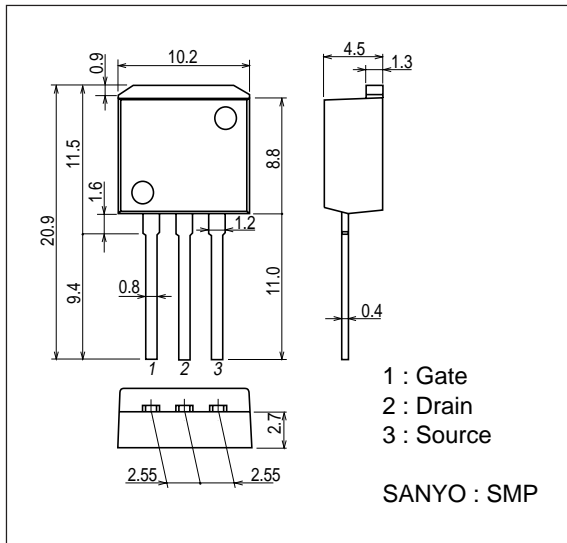
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Input Capacitance	Ciss	V <sub>DS</sub> =20V, f=1MHz		4200		pF
Output Capacitance	Coss	V <sub>DS</sub> =20V, f=1MHz		300		pF
Reverse Transfer Capacitance	Crss	V <sub>DS</sub> =20V, f=1MHz		250		pF
Turn-ON Delay Time	t <sub>d(on)</sub>	See specified Test Circuit.		30		ns
Rise Time	t <sub>r</sub>	See specified Test Circuit.		68		ns
Turn-OFF Delay Time	t <sub>d(off)</sub>	See specified Test Circuit.		300		ns
Fall Time	t <sub>f</sub>	See specified Test Circuit.		110		ns
Total Gate Charge	Qg	V <sub>DS</sub> =50V, V <sub>GS</sub> =10V, I <sub>D</sub> =40A		73		nC
Gate-to-Source Charge	Qgs	V <sub>DS</sub> =50V, V <sub>GS</sub> =10V, I <sub>D</sub> =40A		12.5		nC
Gate-to-Drain "Miller" Charge	Qgd	V <sub>DS</sub> =50V, V <sub>GS</sub> =10V, I <sub>D</sub> =40A		16		nC
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =40A, V <sub>GS</sub> =0	1.0	1.2		V

## Package Dimensions

unit : mm

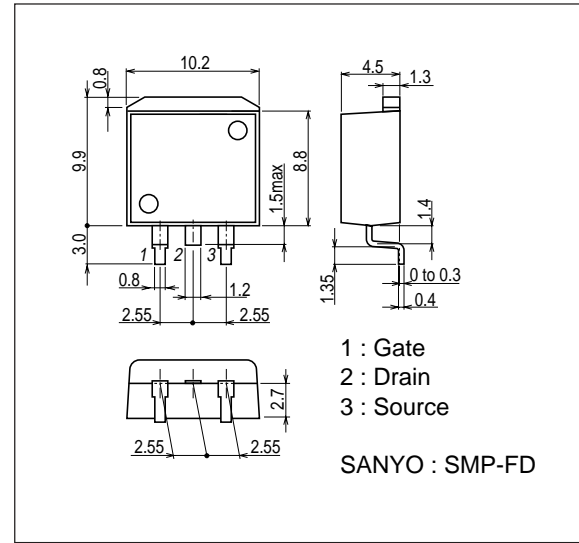
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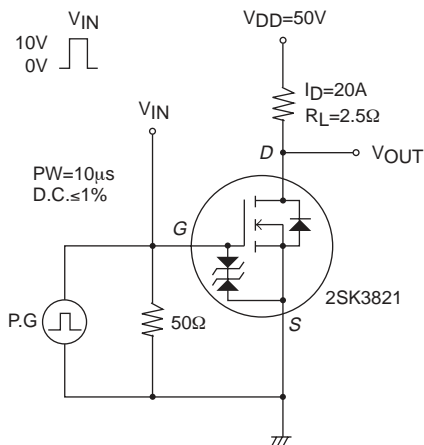
## Package Dimensions

unit : mm

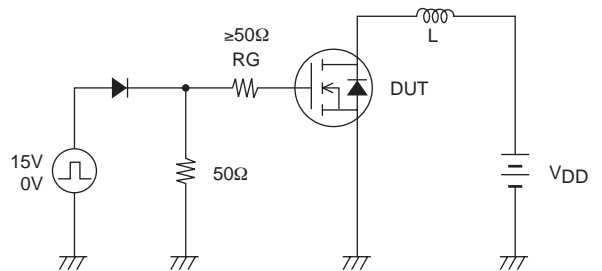
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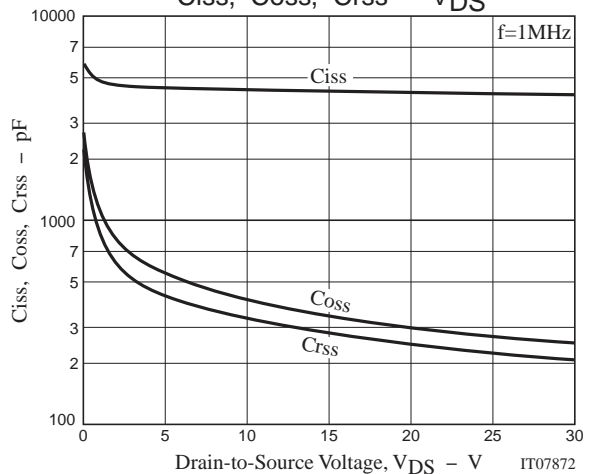
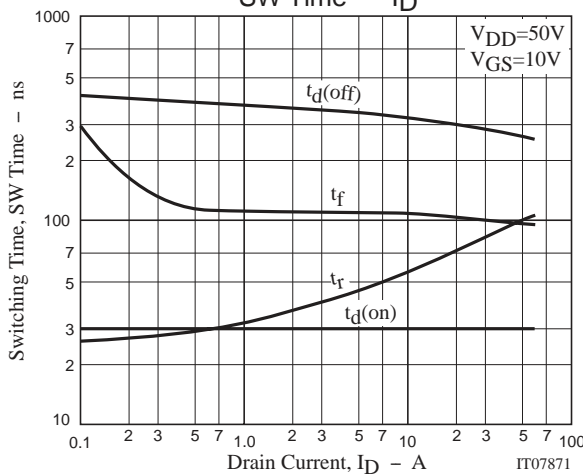
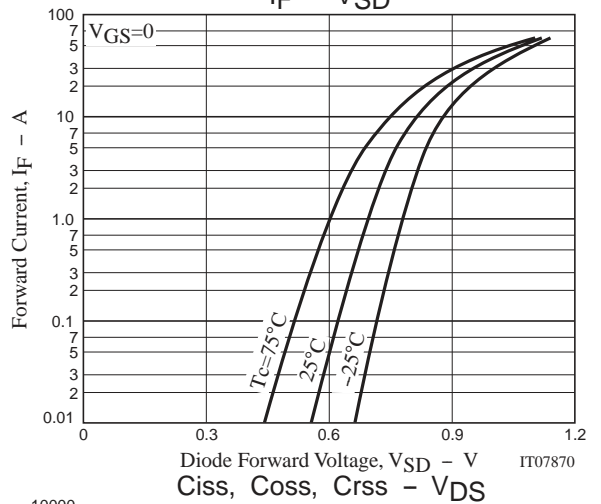
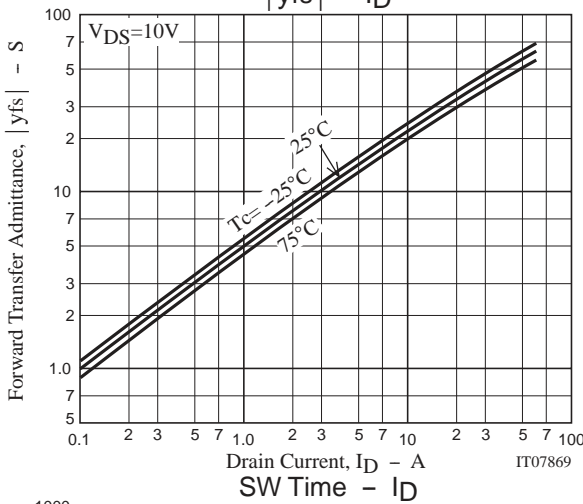
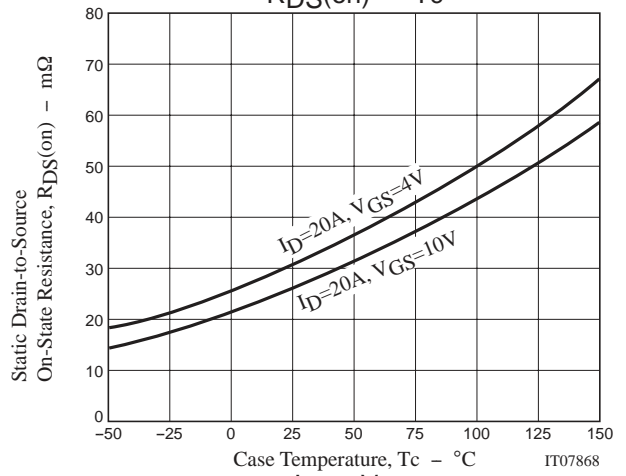
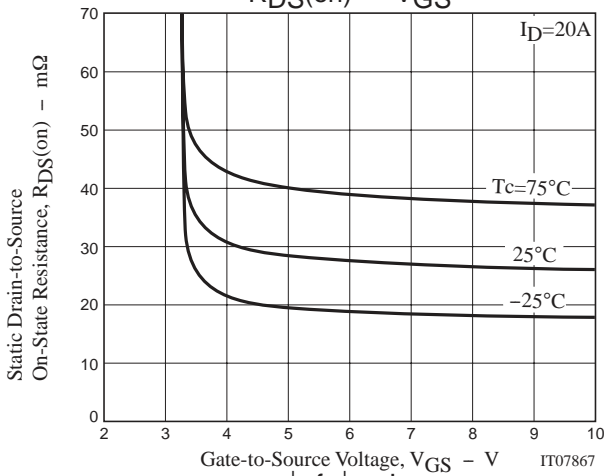
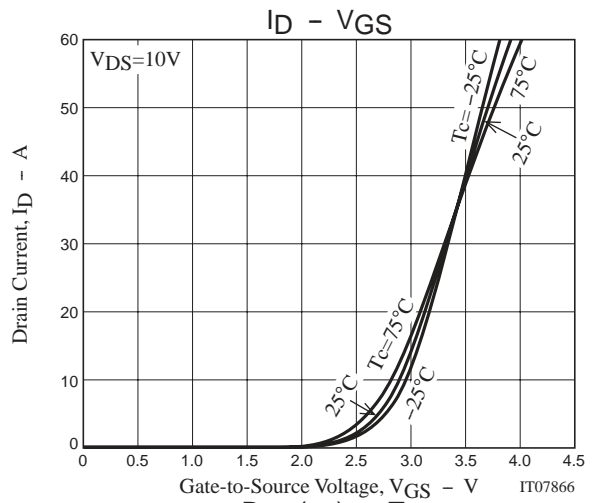
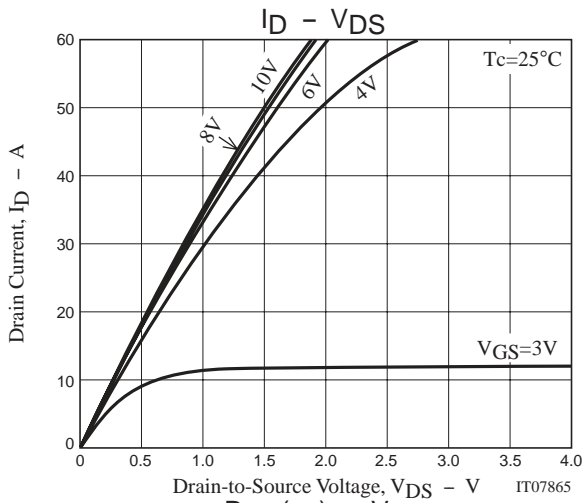


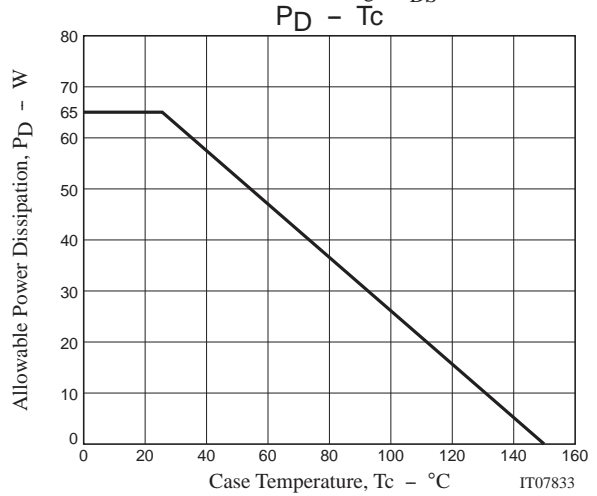
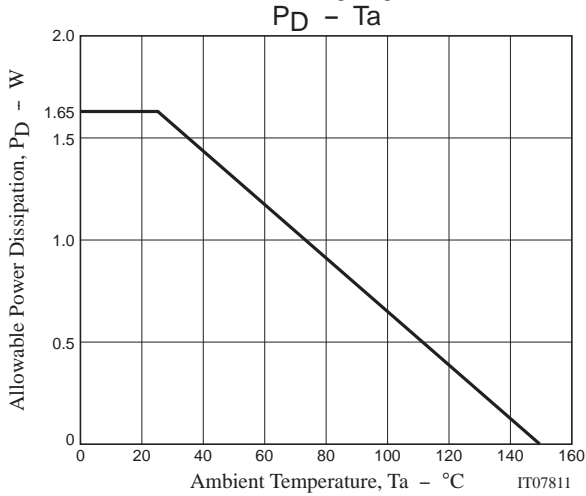
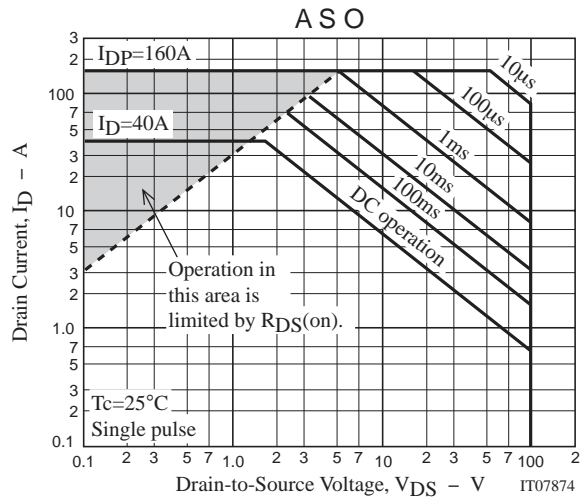
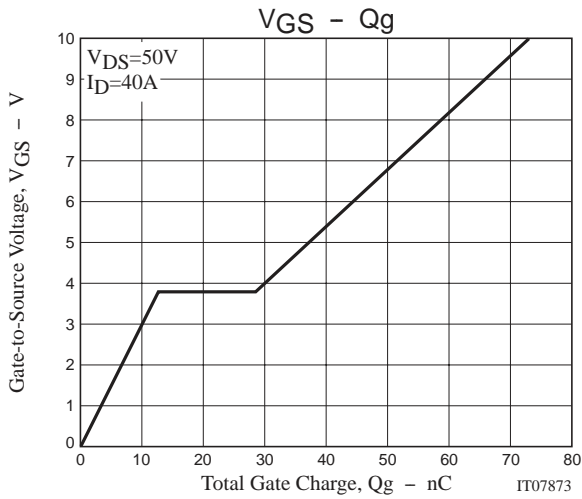
## Switching Time Test Circuit



## Unclamped Inductive Test Circuit







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