



# 2SK3709 — N-Channel Silicon MOSFET

## General-Purpose Switching Device Applications

### Features

- Low ON-resistance.
- 4V drive.
- Motor driver, 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)	$I_D$		37	A
Drain Current (Pulse)	$I_{DP}$	$PW \leq 10\mu\text{s}$ , duty cycle $\leq 1\%$	148	A
Allowable Power Dissipation	$P_D$		2.0	W
		$T_c=25^\circ\text{C}$	35	W
Channel Temperature	$T_{ch}$		150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$
Avalanche Energy (Single Pulse) *1	$E_{AS}$		427	mJ
Avalanche Current *2	$I_{AV}$		37	A

\*1  $V_{DD}=20\text{V}$ ,  $L=500\mu\text{H}$ ,  $I_{AV}=37\text{A}$

\*2  $L \leq 500\mu\text{H}$ , 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} $	$V_{DS}=10\text{V}$ , $I_D=19\text{A}$	25	36		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	$I_D=19\text{A}$ , $V_{GS}=10\text{V}$		19	25	$\text{m}\Omega$
	$R_{DS(on)2}$	$I_D=19\text{A}$ , $V_{GS}=4\text{V}$		23	32	$\text{m}\Omega$

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# 2SK3709

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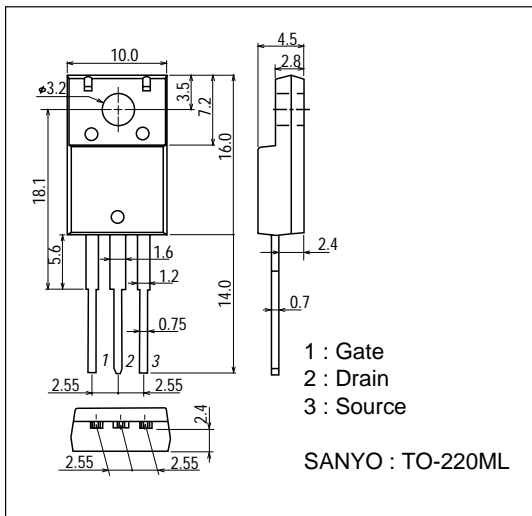
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Input Capacitance	Ciss	$V_{DS}=20V, f=1MHz$		6250		pF
Output Capacitance	Coss	$V_{DS}=20V, f=1MHz$		440		pF
Reverse Transfer Capacitance	Crss	$V_{DS}=20V, f=1MHz$		380		pF
Turn-ON Delay Time	$t_{d(on)}$	See specified Test Circuit.		45		ns
Rise Time	$t_r$	See specified Test Circuit.		115		ns
Turn-OFF Delay Time	$t_{d(off)}$	See specified Test Circuit.		500		ns
Fall Time	$t_f$	See specified Test Circuit.		180		ns
Total Gate Charge	Qg	$V_{DS}=50V, V_{GS}=10V, I_D=37A$		117		nC
Gate-to-Source Charge	Qgs	$V_{DS}=50V, V_{GS}=10V, I_D=37A$		20		nC
Gate-to-Drain "Miller" Charge	Qgd	$V_{DS}=50V, V_{GS}=10V, I_D=37A$		25.8		nC
Diode Forward Voltage	$V_{SD}$	$I_S=37A, V_{GS}=0$		0.97	1.2	V

Marking : K3709

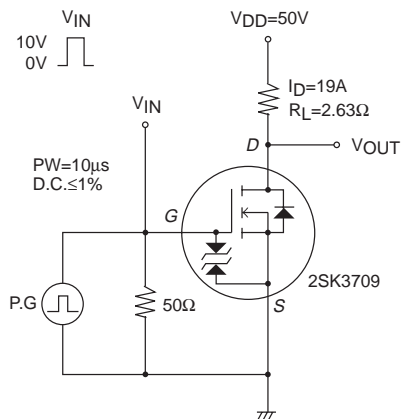
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unit : mm

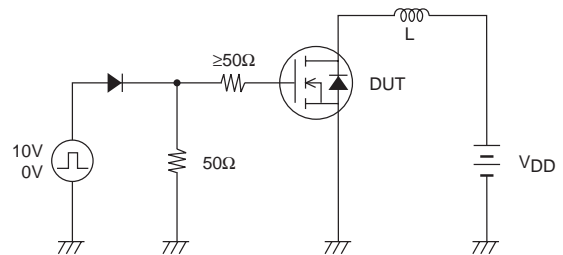
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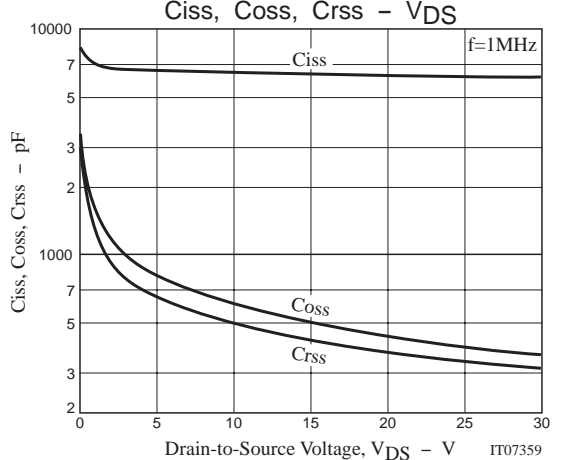
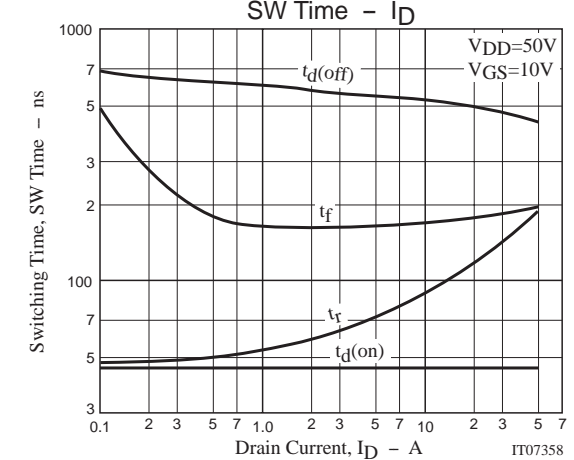
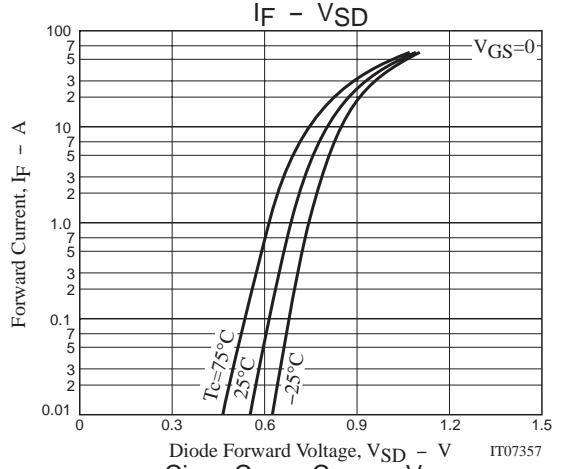
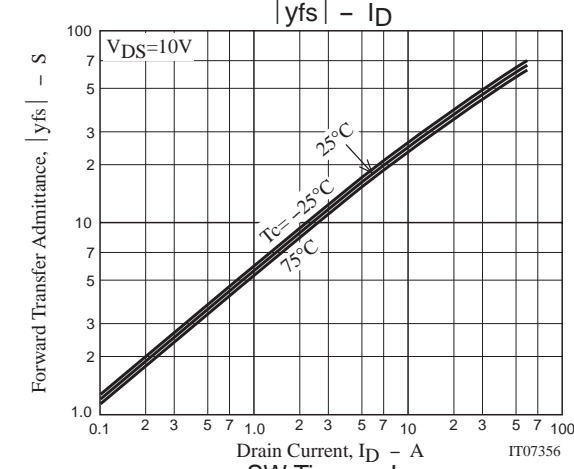
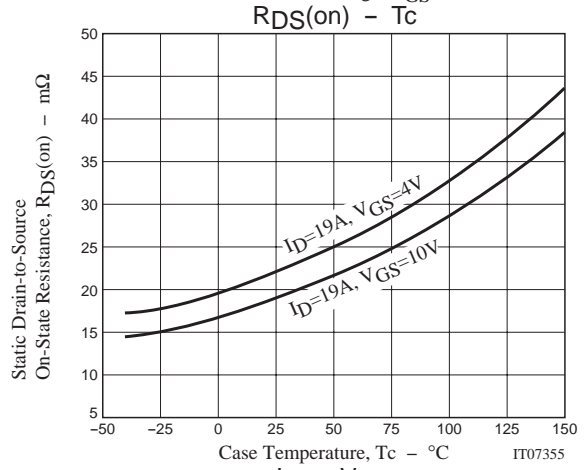
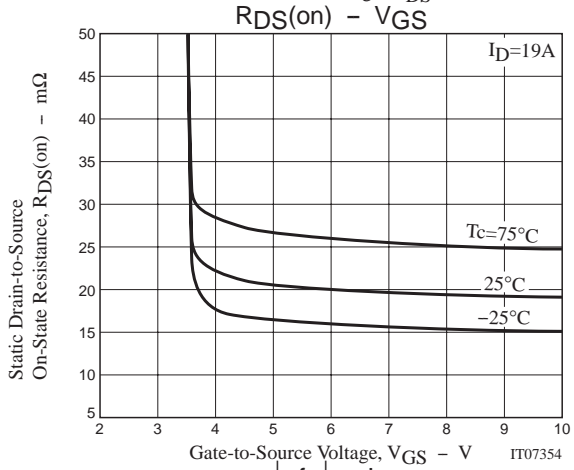
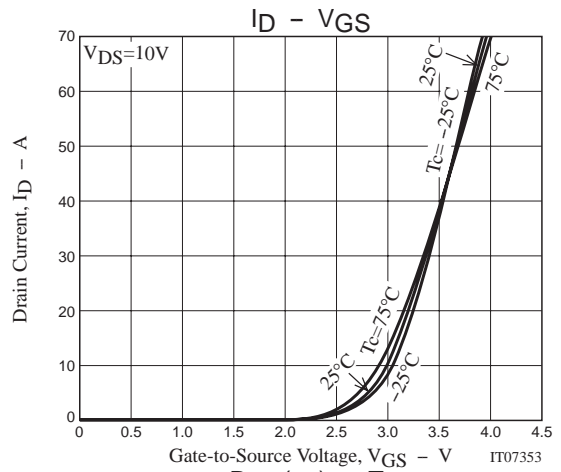
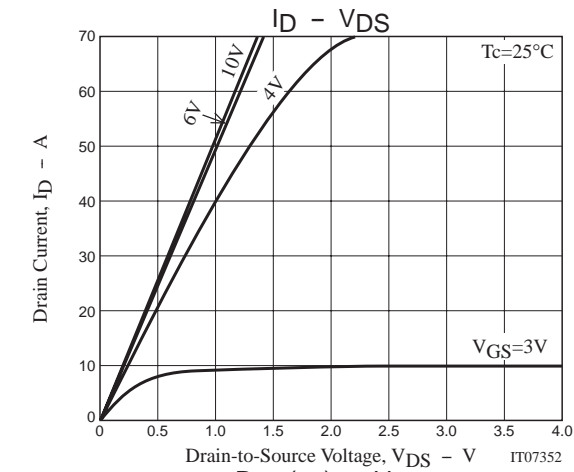


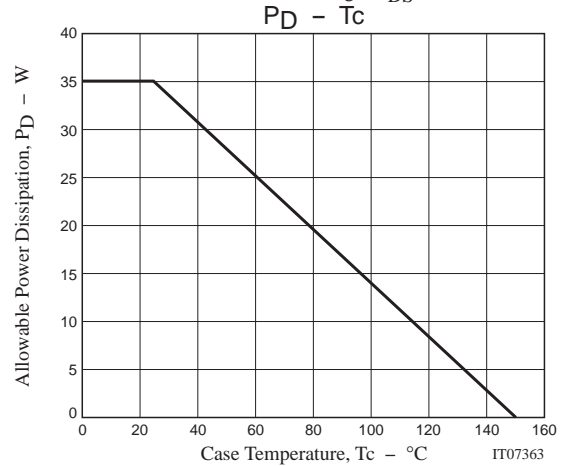
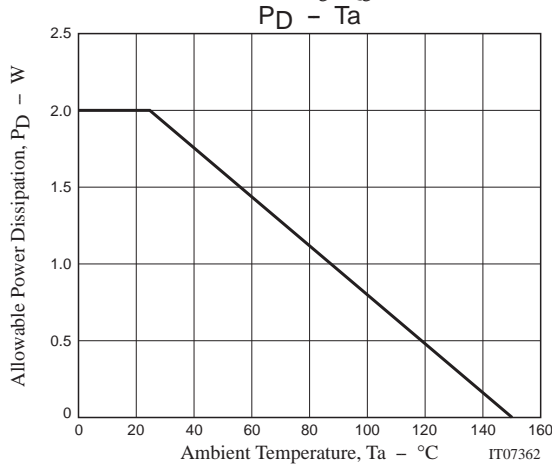
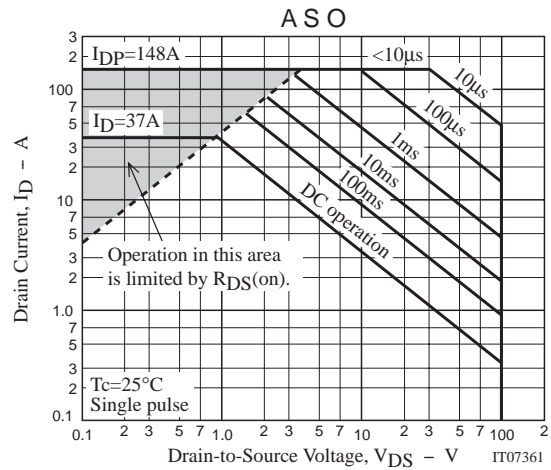
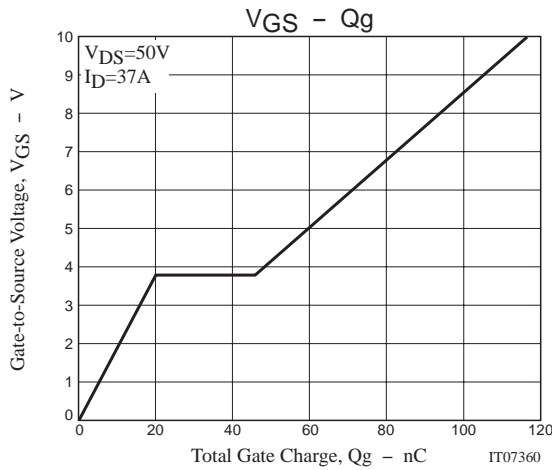
## Switching Time Test Circuit



## Unclamped Inductive Test Circuit







Note on usage : Since the 2SK3709 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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