

2SK3681-01 (600V/0.16Ω/43A)

1) Package TO-247

2) Absolute Maximum Ratings (Tc=25 unless otherwise specified)

Items	Symbols	Ratings	Units
Drain-Source Voltage	V_{DS}	600	V
Continuous Drain Current	I_D	±43	A
Pulsed Drain Current	$I_{D(pulse)}$	±172	A
Gate-Source Voltage	V_{GS}	±30	V
Non-Repetitive Maximum Avalanche Current	I_{AS}	43	A
Repetitive Maximum Avalanche Current	I_{AR}	21.5	A
Non-Repetitive Maximum Avalanche Energy	E_{AS}	808.9	mJ *1
Maximum Drain-Source dV/dt	dV/dt	20	kV/us
Peak Diode recovery dV/dt	dV/dt	5	kV/us *2
Maximum Power Dissipation	$P_D @ T_c=25$	600	W
	$P_D @ T_a=25$	2.50	W
Operating and Storage Temperature range	T_{ch} T_{stg}	150 -55 ~ +150	

3) Electrical Characteristics (Tch=25 unless otherwise specified)

Items	Symbols	Test Conditions	min.	typ.	max.	Units
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu A$ $V_{GS}=0V$	500	---	---	V
Gate Threshold Voltage	$V_{GS(th)}$	$I_D=250\mu A$ $V_{DS}=V_{GS}$	3.0	---	5.0	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=600V$ $T_{ch}=25$	---	---	25	μA
		$V_{GS}=0V$ $T_{ch}=125$	---	---	250	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 30V$ $V_{DS}=0V$	---	---	100	μA
Drain-Source On-State Resistance	$R_{DS(on)}$	$I_D=21.5A$ $V_{GS}=10V$	---	---	0.16	Ω
Input Capacitance	C_{iss}	$V_{DS}=25V$	---	5260	7890	pF
Output Capacitance	C_{oss}	$V_{GS}=0V$	---	685	1030	
Reverse Transfer Capacitance	C_{rss}	$f=1MHz$	---	65	100	
Total Gate Charge	Q_g	$V_{CC}=300V$	---	118	177	nC
Gate to Source Charge	Q_{gs}	$I_D=43A$	---	39	59	
Gate to Drain (Miller) Charge	Q_{gd}	$V_{GS}=10V$	---	42	63	
Avalanche Capability	I_{AV}	$L=802\mu H$ $T_{ch}=25$	43	---	---	A
Diode Forward On-Voltage	V_{SD}	$I_F=43A, V_{GS}=0V, T_{ch}=25$	---	1.00	1.50	V

4) Thermal Characteristics

Items	Symbols	Test Conditions	min.	typ.	max.	Units
Channel to Case	$R_{th(ch-c)}$				0.2083	$^{\circ}C/W$
Channel to Ambient	$R_{th(ch-a)}$				50.0	$^{\circ}C/W$

*1 $L=802\mu H, V_{CC}=60V$ *2 $I_F \leq -I_D, -di/dt=50A/\mu s, V_{CC} \leq BV_{DSS}, T_{ch} \leq 150^{\circ}C$

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