

SWITCHING
N-CHANNEL POWER MOS FET

DESCRIPTION

The 2SK3918 is N-channel MOS FET device that features a low on-state resistance and excellent switching characteristics, and designed for low voltage high current applications such as DC/DC converter with synchronous rectifier.

FEATURES

- Low on-state resistance
 $R_{DS(on)1} = 7.5 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 24 \text{ A)}$
- Low C_{iss} : $C_{iss} = 1300 \text{ pF TYP.}$
- 5 V drive available

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

Drain to Source Voltage ($V_{GS} = 0 \text{ V}$)	V_{DSS}	25	V
Gate to Source Voltage ($V_{DS} = 0 \text{ V}$)	V_{GSS}	± 20	V
Drain Current (DC) ($T_C = 25^\circ\text{C}$)	$I_{D(DC)}$	± 48	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	± 192	A
Total Power Dissipation ($T_C = 25^\circ\text{C}$)	P_{T1}	29	W
Total Power Dissipation	P_{T2}	1.0	W
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	$-55 \text{ to } +150$	$^\circ\text{C}$
Single Avalanche Current ^{Note2}	I_{AS}	22	A
Single Avalanche Energy ^{Note2}	E_{AS}	48	mJ

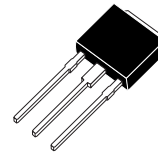
Notes 1. $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1\%$

2. Starting $T_{ch} = 25^\circ\text{C}$, $V_{DD} = 12.5 \text{ V}$, $R_G = 25 \Omega$, $V_{GS} = 20 \rightarrow 0 \text{ V}$

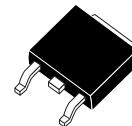
ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK3918	TO-251 (MP-3)
2SK3918-ZK	TO-252 (MP-3ZK)

(TO-251)



(TO-252)



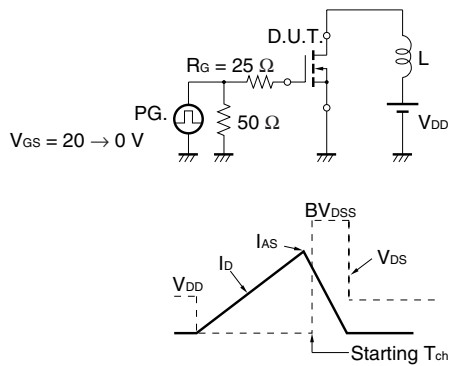
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ELECTRICAL CHARACTERISTICS (TA = 25°C)

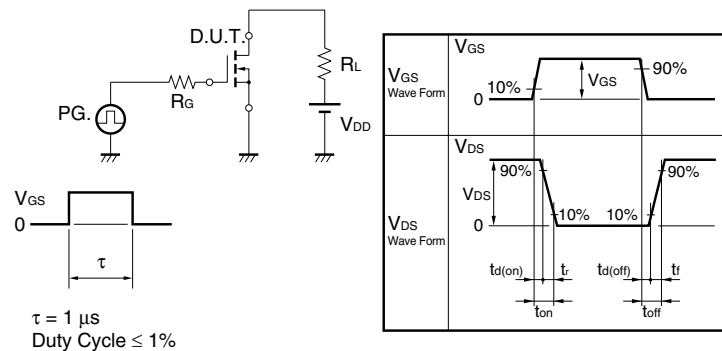
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}$			10	μA
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$			± 100	nA
Gate Cut-off Voltage	$V_{GS(off)}$	$V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$	2.0	2.5	3.0	V
Forward Transfer Admittance ^{Note}	$ y_{fs} $	$V_{DS} = 10\text{ V}, I_D = 12\text{ A}$	6	12		S
Drain to Source On-state Resistance ^{Note}	$R_{DS(on)1}$	$V_{GS} = 10\text{ V}, I_D = 24\text{ A}$		5.9	7.5	$\text{m}\Omega$
	$R_{DS(on)2}$	$V_{GS} = 5.0\text{ V}, I_D = 12\text{ A}$		11	22.2	$\text{m}\Omega$
Input Capacitance	C_{iss}	$V_{DS} = 10\text{ V}$		1300		pF
Output Capacitance	C_{oss}	$V_{GS} = 0\text{ V}$		310		pF
Reverse Transfer Capacitance	C_{rss}	$f = 1\text{ MHz}$		220		pF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 12.5\text{ V}, I_D = 24\text{ A}$		13		ns
Rise Time	t_r	$V_{GS} = 10\text{ V}$		14		ns
Turn-off Delay Time	$t_{d(off)}$	$R_G = 10\ \Omega$		38		ns
Fall Time	t_f			14		ns
Total Gate Charge	Q_G	$V_{DD} = 20\text{ V}$		28		nC
Gate to Source Charge	Q_{GS}	$V_{GS} = 10\text{ V}$		5		nC
Gate to Drain Charge	Q_{GD}	$I_D = 48\text{ A}$		10		nC
Body Diode Forward Voltage ^{Note}	$V_{F(S-D)}$	$I_F = 48\text{ A}, V_{GS} = 0\text{ V}$		0.98		V
Reverse Recovery Time	t_{rr}	$I_F = 48\text{ A}, V_{GS} = 0\text{ V}$		27		ns
Reverse Recovery Charge	Q_{rr}	$di/dt = 100\text{ A}/\mu\text{s}$		15		nC

Note Pulsed

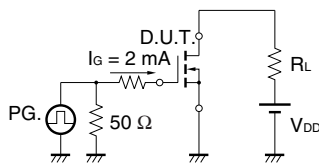
TEST CIRCUIT 1 AVALANCHE CAPABILITY



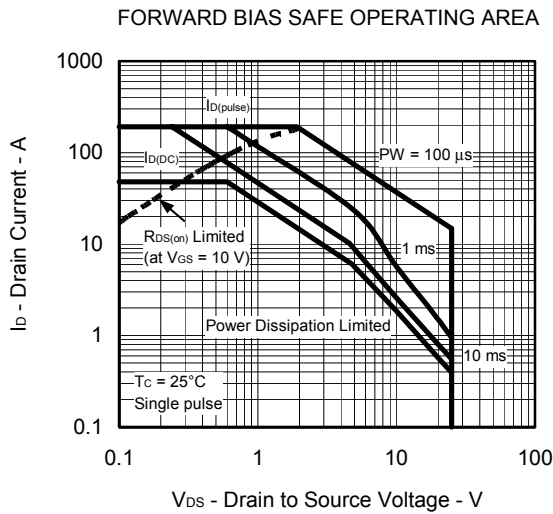
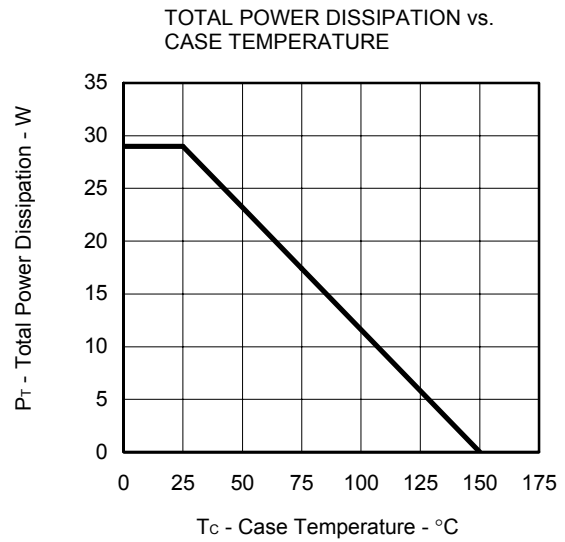
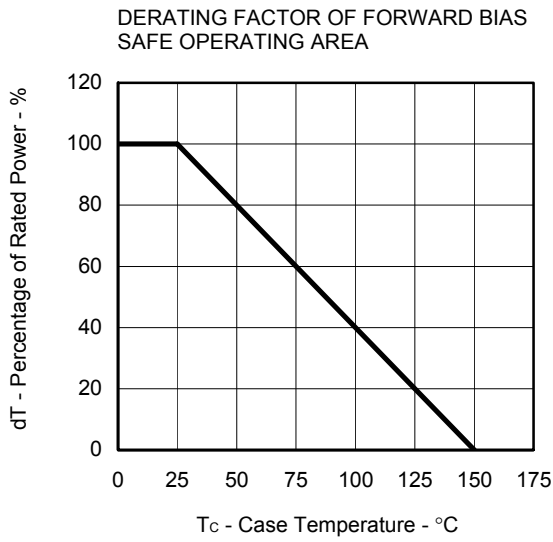
TEST CIRCUIT 2 SWITCHING TIME



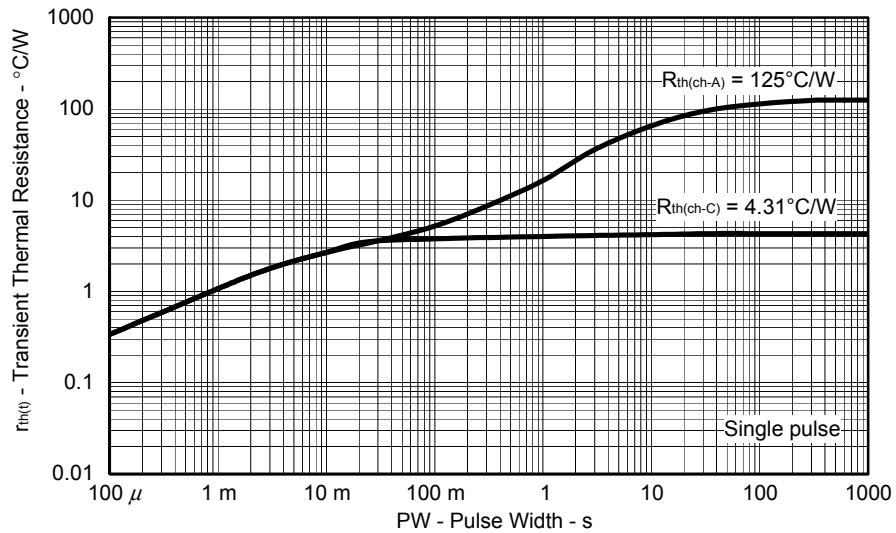
TEST CIRCUIT 3 GATE CHARGE



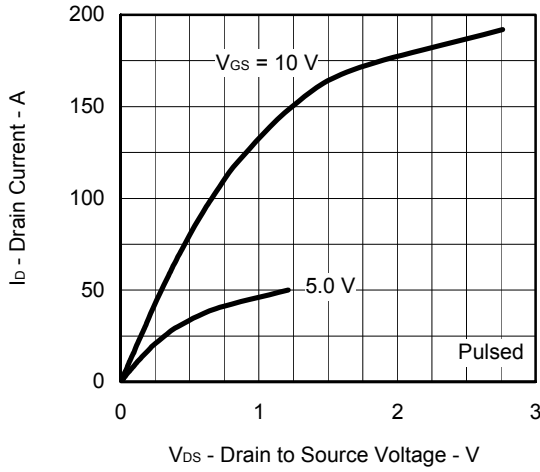
TYPICAL CHARACTERISTICS (T_A = 25°C)



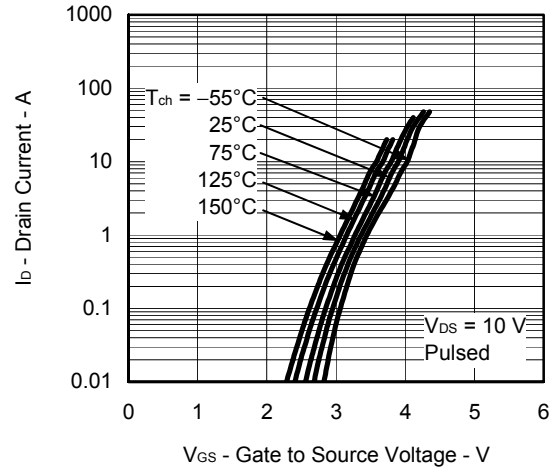
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



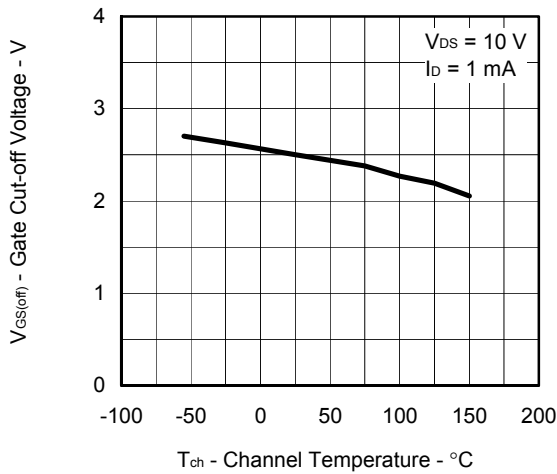
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



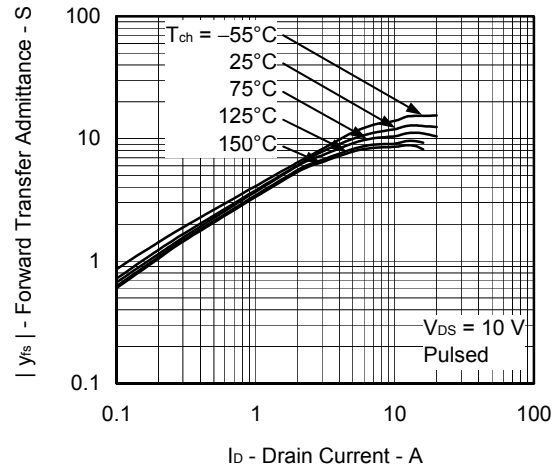
FORWARD TRANSFER CHARACTERISTICS



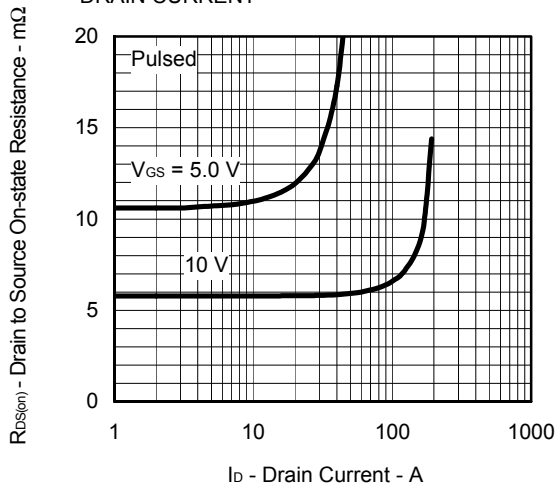
GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



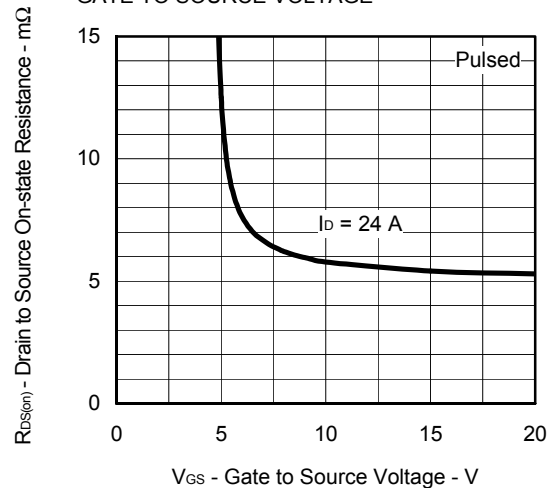
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



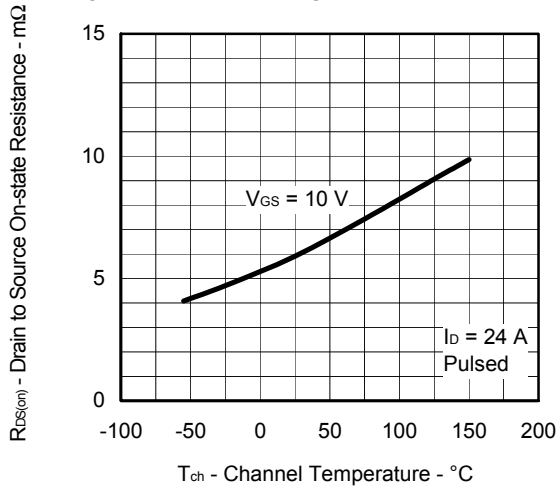
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



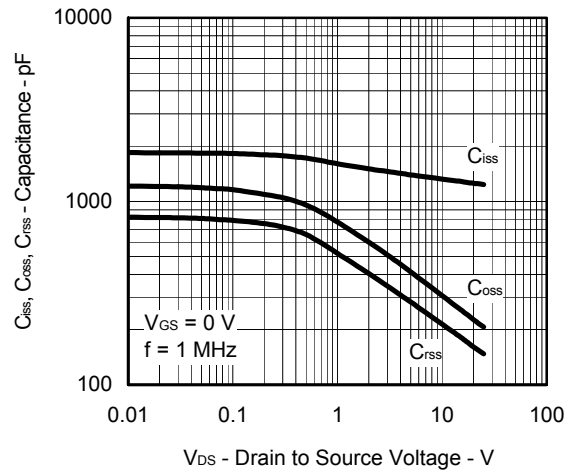
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



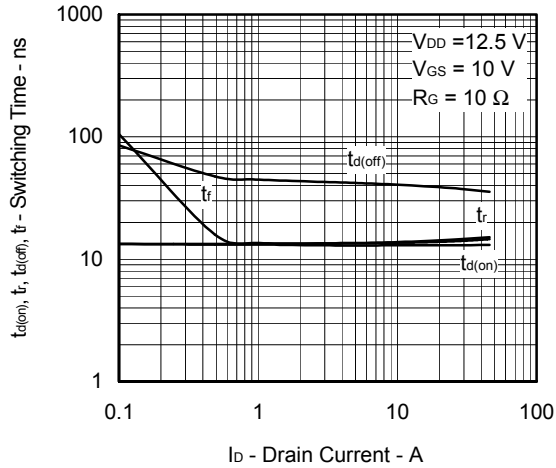
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



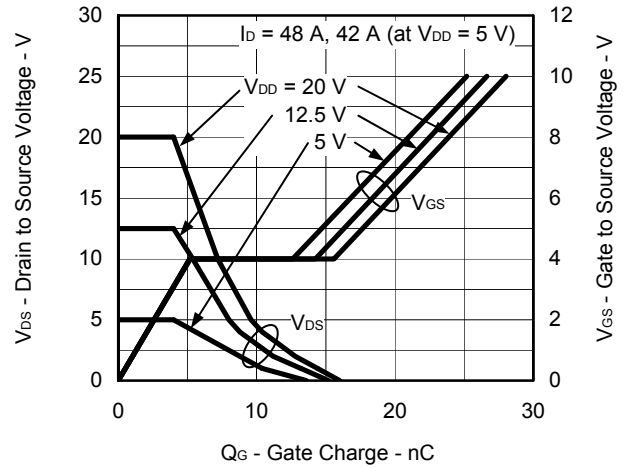
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



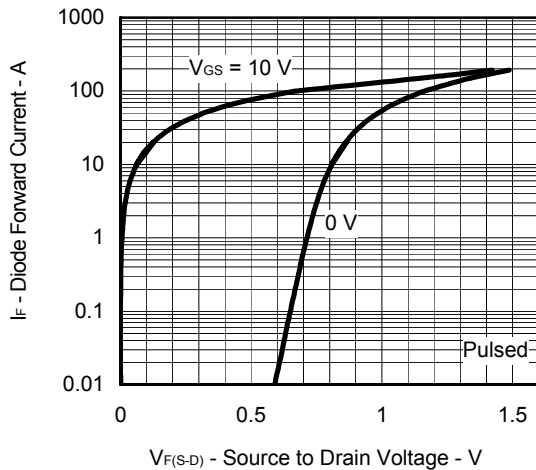
SWITCHING CHARACTERISTICS



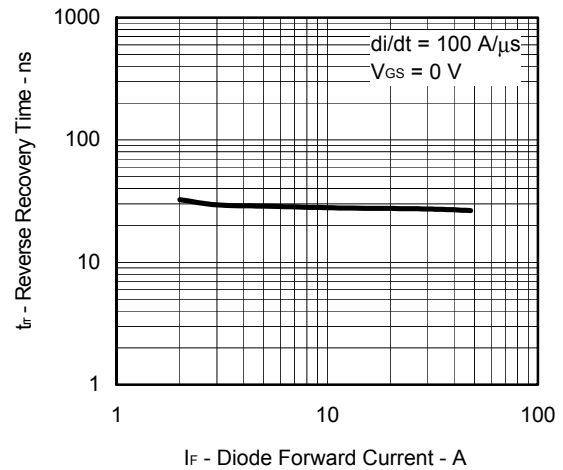
DYNAMIC INPUT/OUTPUT CHARACTERISTICS



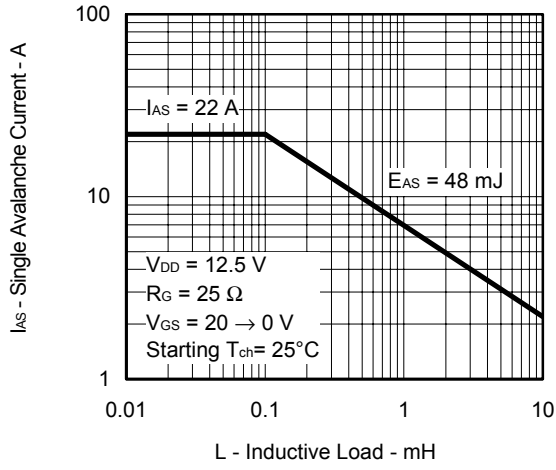
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



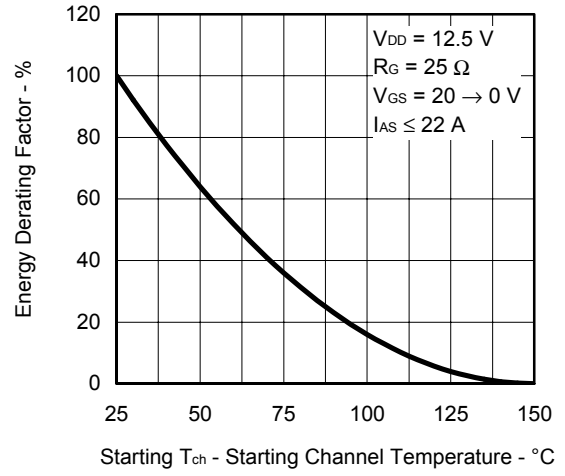
REVERSE RECOVERY TIME vs. DIODE FORWARD CURRENT



SINGLE AVALANCHE CURRENT vs. INDUCTIVE LOAD



SINGLE AVALANCHE ENERGY DERATING FACTOR



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