

2SK2059 L, 2SK2059 S

Silicon N Channel MOS FET

Application

High speed power switching

Features

- Low on-resistance
- High speed switching
- No Secondary Breakdown
- Suitable for Switching regulator, DC – DC converter

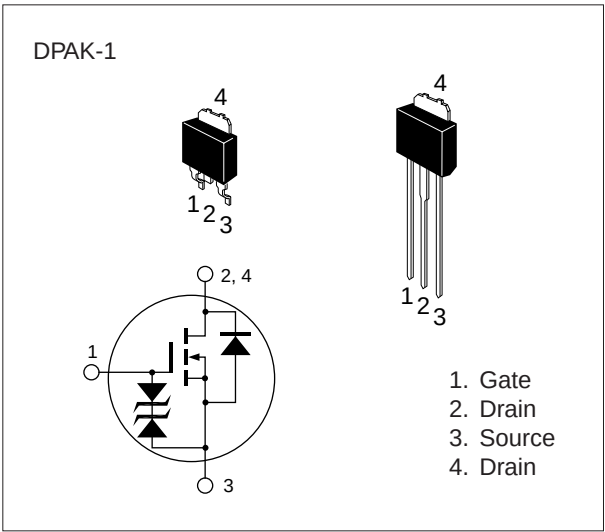


Table 1 Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V _{DSS}	600	V
Gate to source voltage	V _{GSS}	±30	V
Drain current	I _D	3	A
Drain peak current	I _{D(pulse)} *	6	A
Body-drain diode reverse drain current	I _{DR}	3	A
Channel dissipation	P _{ch} **	20	W
Channel temperature	T _{ch}	150	°C
Storage temperature	T _{stg}	–55 to +150	°C

* PW ≤ 10 μs, duty cycle ≤ 1 %

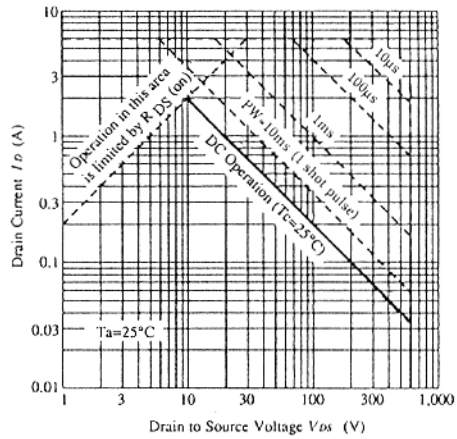
** Value at T_c = 25 °C

Table 2 Electrical Characteristics (Ta = 25°C)

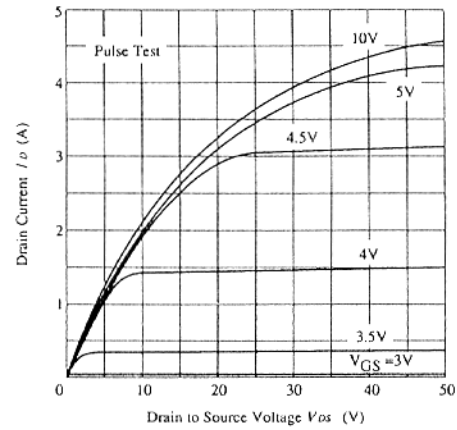
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	600	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	± 30	—	—	V	$I_G = \pm 100 \text{ }\mu\text{A}$, $V_{DS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 25 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	100	μA	$V_{DS} = 500 \text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	2.0	—	3.0	V	$I_D = 1 \text{ mA}$, $V_{DS} = 10 \text{ V}$
Static drain to source on state resistance	$R_{DS(on)}$	—	3.8	5.0	Ω	$I_D = 2 \text{ A}$ $V_{GS} = 10 \text{ V}^*$
Forward transfer admittance	$ y_{fs} $	1.2	2.0	—	S	$I_D = 2 \text{ A}$ $V_{DS} = 10 \text{ V}^*$
Input capacitance	C_{iss}	—	295	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	C_{oss}	—	70	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	12	—	pF	$f = 1 \text{ MHz}$
Turn-on delay time	$t_{d(on)}$	—	8	—	ns	$I_D = 1 \text{ A}$
Rise time	t_r	—	25	—	ns	$V_{GS} = 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	65	—	ns	$R_L = 30 \Omega$
Fall time	t_f	—	30	—	ns	
Body-drain diode forward voltage	V_{DF}	—	0.9	—	V	$I_F = 3 \text{ A}$, $V_{GS} = 0$
Body-drain diode reverse recovery time	t_{rr}	—	220	—	ns	$I_F = 3 \text{ A}$, $V_{GS} = 0$, $diF / dt = 100 \text{ A} / \mu\text{s}$

* Pulse Test

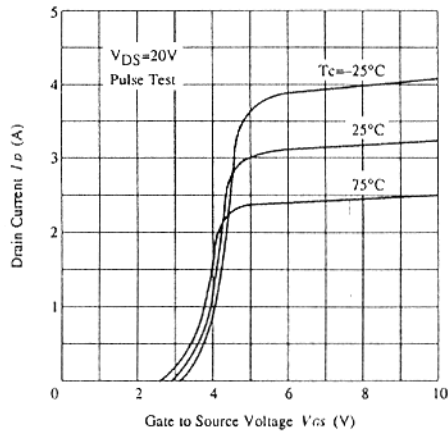
MAXIMUM SAFE OPERATION AREA



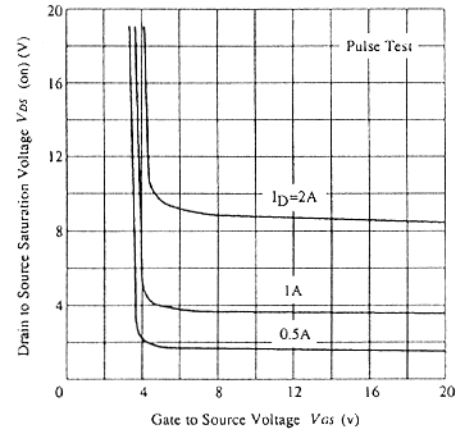
TYPICAL OUTPUT CHARACTERISTICS



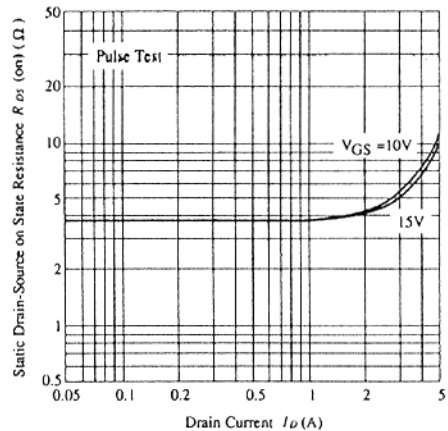
TYPICAL TRANSFER CHARACTERISTICS



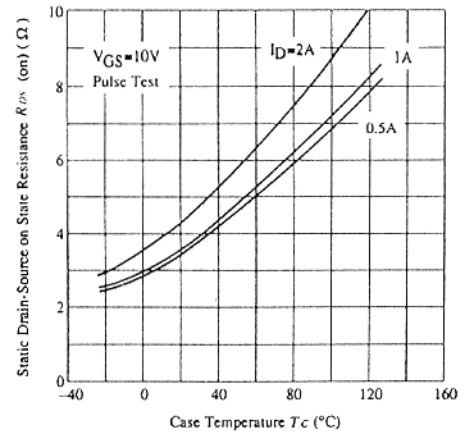
DRAIN-SOURCE SATURATION VOLTAGE VS. GATE-SOURCE VOLTAGE

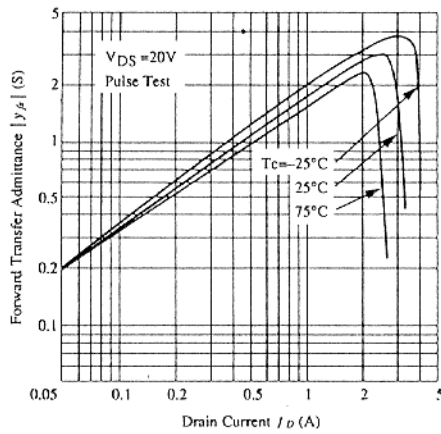
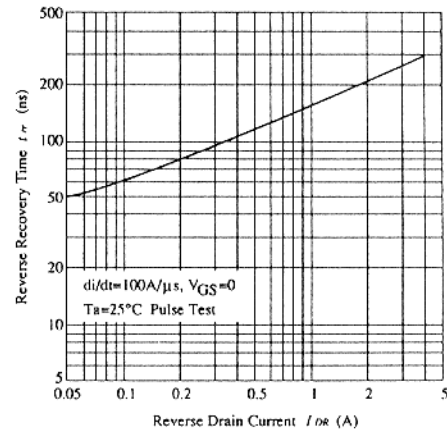
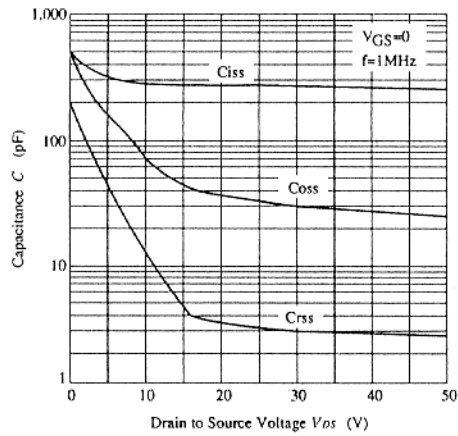
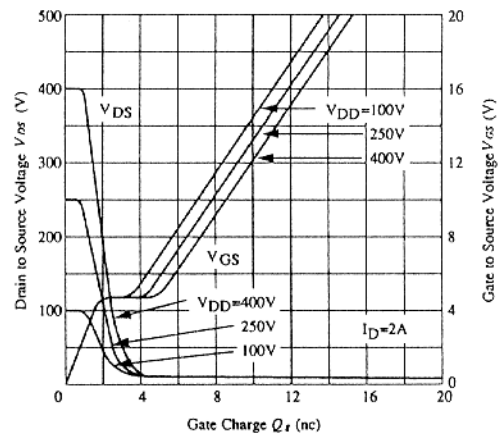
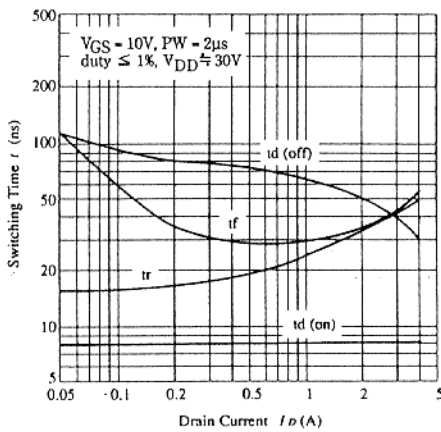
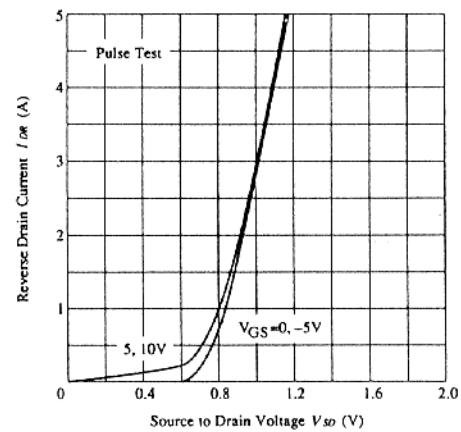


STATIC DRAIN-SOURCE ON STATE RESISTANCE VS. DRAIN CURRENT

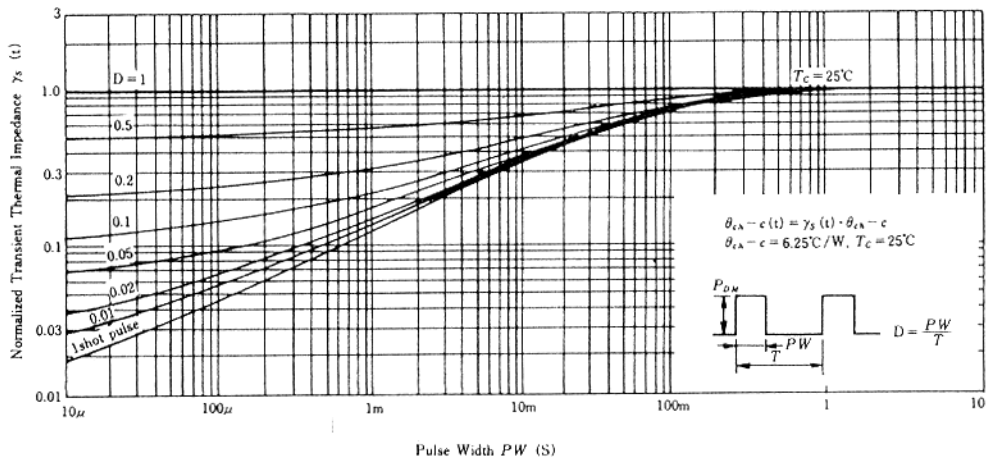


STATIC DRAIN-SOURCE ON STATE RESISTANCE VS. TEMPERATURE

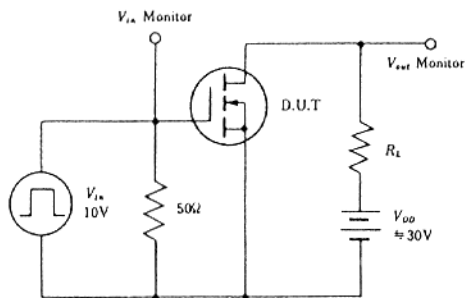


**FORWARD TRANSFER ADMITTANCE
VS. DRAIN CURRENT**

**BODY-DRAIN DIODE REVERSE
RECOVERY TIME**

**TYPICAL CAPACITANCE
VS. DRAIN-SOURCE VOLTAGE**

DYNAMIC INPUT CHARACTERISTICS

SWITCHING CHARACTERISTICS

**REVERSE DRAIN CURRENT VS.
SOURCE TO DRAIN VOLTAGE**


NORMALIZED TRANSIENT THERMAL IMPEDANCE VS. PULSE WIDTH



SWITCHING TIME TEST CIRCUIT



WAVEFORMS

