

# 2SK1838 (L), 2SK1838 (S)

## Silicon N Channel MOS FET

### Application

High speed power switching

### Features

- Low on-resistance
- High speed switching
- Low drive current
- No secondary breakdown
- Suitable for switching regulator, DC-DC converter

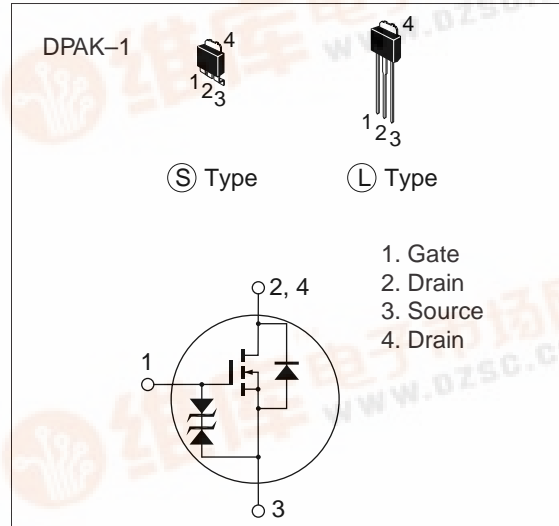


Table 1 Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V <sub>DSS</sub>	250	V
Gate to source voltage	V <sub>GSS</sub>	±30	V
Drain current	I <sub>D</sub>	1	A
Drain peak current	I <sub>D(pulse)</sub> *	2	A
Body-drain diode reverse drain current	I <sub>DR</sub>	1	A
Channel dissipation	P <sub>ch</sub> **	10	W
Channel temperature	T <sub>ch</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	°C

\* PW ≤ 10 μs, duty cycle ≤ 1 %

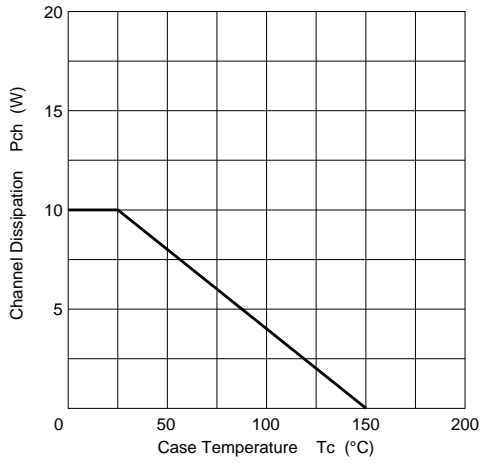
\*\* Value at Tc = 25 °C

**Table 2 Electrical Characteristics** ( $T_a = 25^\circ\text{C}$ )

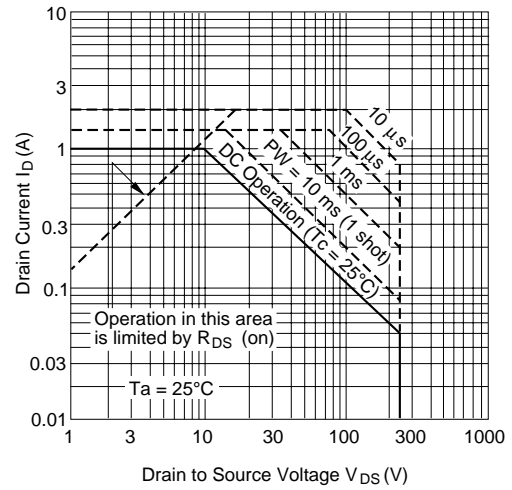
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	250	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	$\pm 30$	—	—	V	$I_G = \pm 100 \mu\text{A}$ , $V_{DS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 25 \text{ V}$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	50	$\mu\text{A}$	$V_{DS} = 200 \text{ V}$ , $V_{GS} = 0$
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	$R_{DS(on)}$	—	5.5	8.0	$\Omega$	$I_D = 0.5 \text{ A}$ $V_{GS} = 10 \text{ V}^*$
Forward transfer admittance	$ y_{fs} $	0.3	0.5	—	S	$I_D = 0.5 \text{ A}$ $V_{DS} = 10 \text{ V}^*$
Input capacitance	$C_{iss}$	—	60	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	$C_{oss}$	—	30	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	$C_{rss}$	—	5	—	pF	$f = 1 \text{ MHz}$
Turn-on delay time	$t_{d(on)}$	—	5	—	ns	$I_D = 0.5 \text{ A}$
Rise time	$t_r$	—	6	—	ns	$V_{GS} = 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	10	—	ns	$R_L = 60 \Omega$
Fall time	$t_f$	—	4.5	—	ns	
Body-drain diode forward voltage	$V_{DF}$	—	0.96	—	V	$I_F = 1 \text{ A}$ , $V_{GS} = 0$
Body-drain diode reverse recovery time	$t_{rr}$	—	160	—	ns	$I_F = 1 \text{ A}$ , $V_{GS} = 0$ , $di_F / dt = 100 \text{ A} / \mu\text{s}$

\* Pulse Test

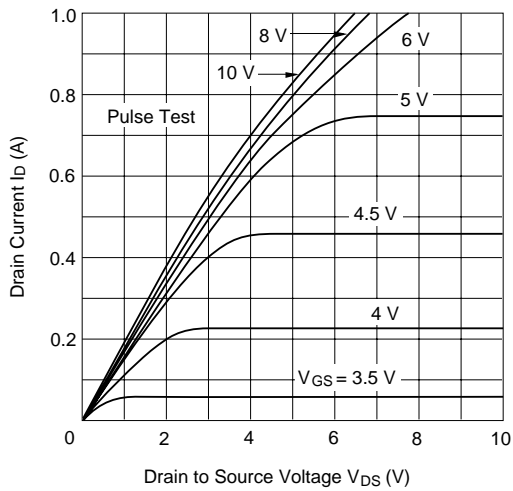
Power vs. Temperature Derating



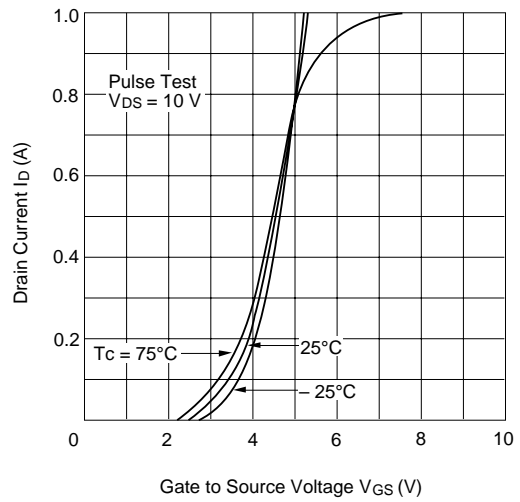
Maximum Safe Operation Area



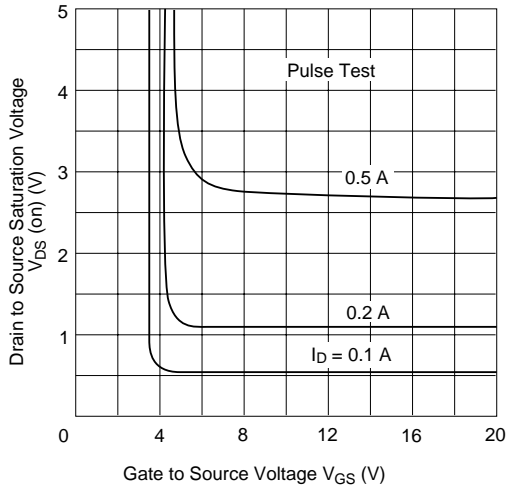
Typical Output Characteristics



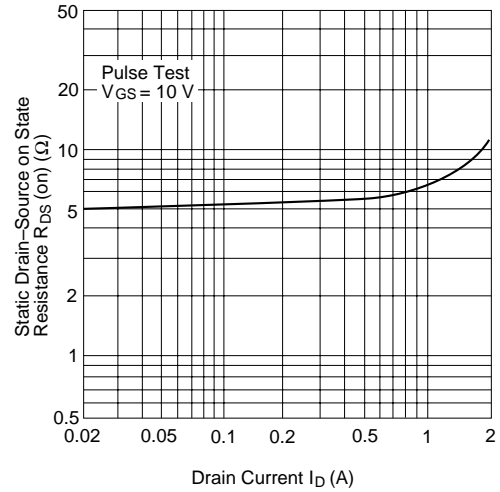
Typical Transfer Characteristics



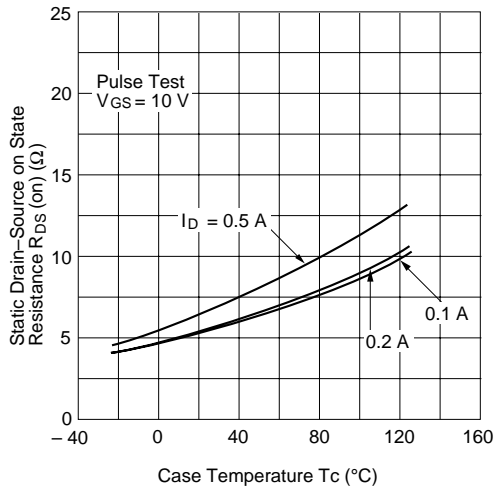
Drain-Source Saturation Voltage vs. Gate-Source Voltage



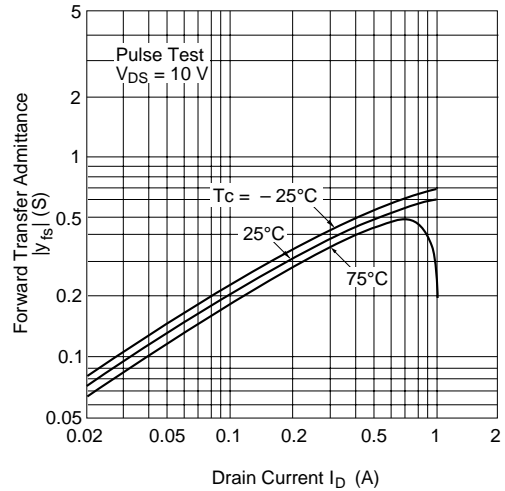
Static Drain-Source on State Resistance vs. Drain Current



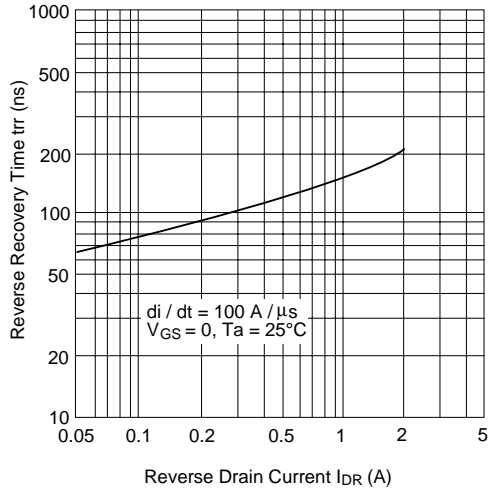
Static Drain-Source on State Resistance vs. Temperature



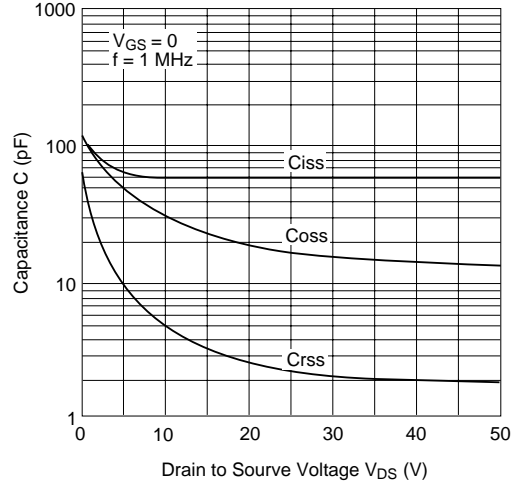
Forward Transfer Admittance vs. Drain Current



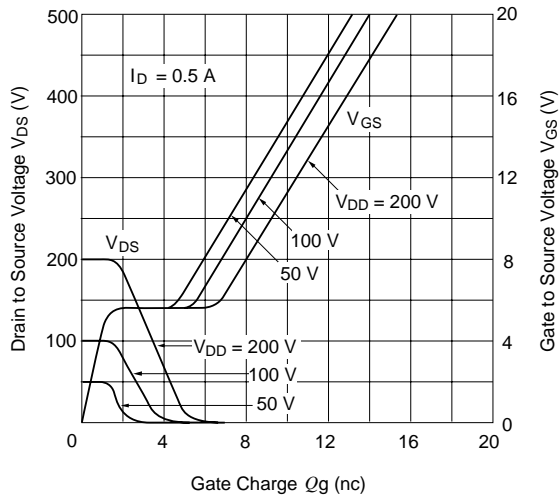
Body-Drain Diode Reverse Recovery Time



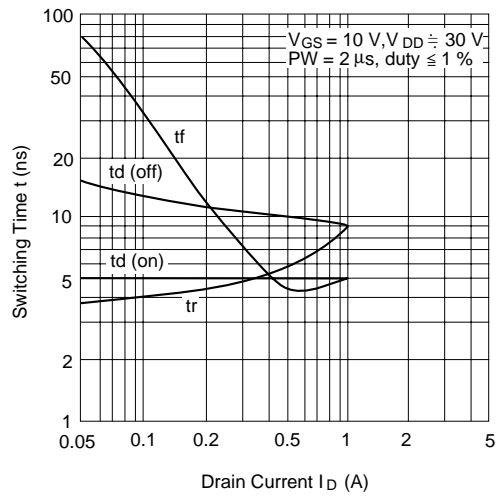
Typical Capacitance vs. Drain-Source Voltage



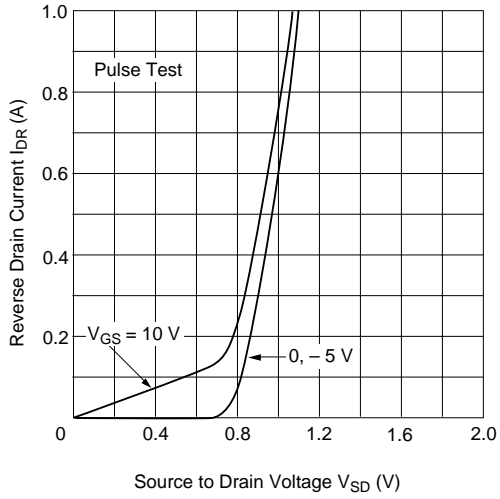
Dynamic Input Characteristics



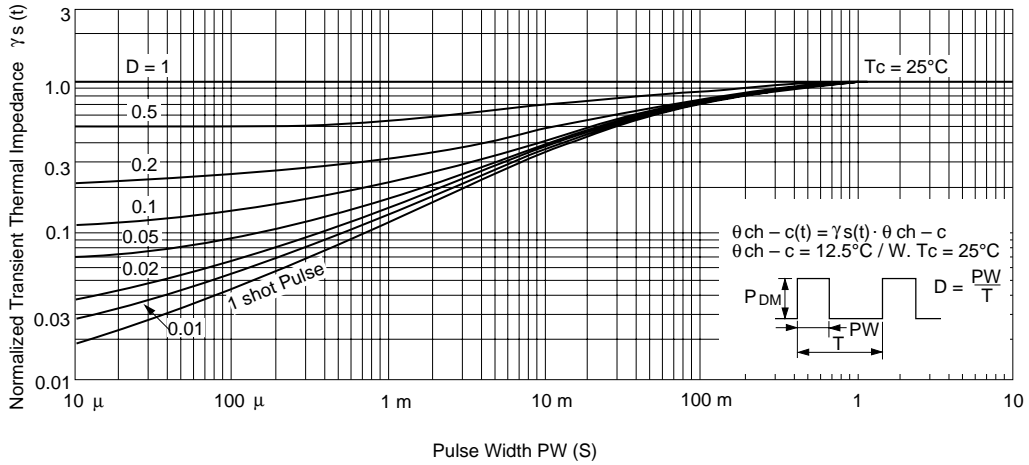
Switching Characteristics



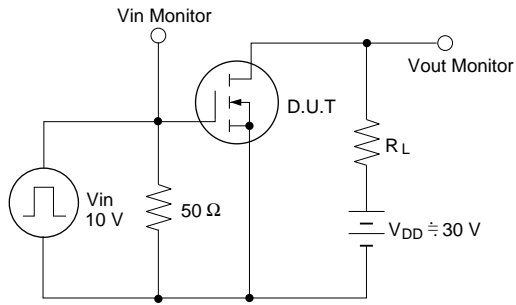
Reverse Drain Current vs. Source to Drain Voltage



Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit



Waveforms

