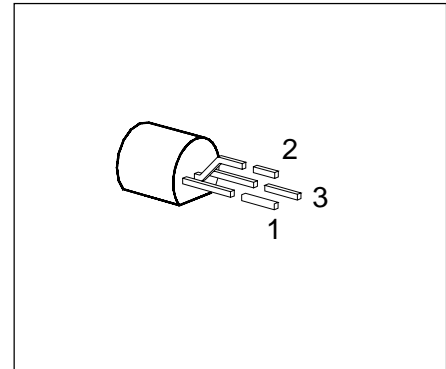


SIEMENS

SIPMOS® Small-Signal Transistor

SP 0610L

- V_{DS} – 60 V
- I_D – 0.18 A
- $R_{DS(on)}$ 10 Ω
- P channel
- Enhancement mode



Type	Ordering Code	Tape and Reel Information	Pin Configuration			Marking	Package
			1	2	3		
SP 0610 L	Q67000-S065	bulk	D	G	S	SP0610L	TO-92

Maximum Ratings

Parameter	Symbol	Values	Unit
Drain-source voltage	V_{DS}	– 60	V
Drain-gate voltage, $R_{GS} = 20 \text{ k}\Omega$	V_{DGR}	– 60	
Gate-source voltage	V_{GS}	± 20	
Continuous drain current, $T_A = 25 \text{ }^\circ\text{C}$	I_D	– 0.18	A
Pulsed drain current, $T_A = 25 \text{ }^\circ\text{C}$	$I_{D \text{ puls}}$	– 0.72	
Max. power dissipation, $T_A = 25 \text{ }^\circ\text{C}$	P_{tot}	0.63	W
Operating and storage temperature range	T_j, T_{stg}	– 55 ... + 150	$^\circ\text{C}$

Thermal resistance, chip-ambient (without heat sink)	R_{thJA}	≤ 200	K/W
	R_{thJSR}	–	
DIN humidity category, DIN 40 040	–	E	–
IEC climatic category, DIN IEC 68-1	–	55/150/56	

Electrical Characteristics

at $T_j = 25\text{ °C}$, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

Static Characteristics

Drain-source breakdown voltage $V_{GS} = 0, I_D = 0.25\text{ mA}$	$V_{(BR)DSS}$	- 60	-	-	V
Gate threshold voltage $V_{GS} = V_{DS}, I_D = 1\text{ mA}$	$V_{GS(th)}$	- 1.0	- 1.5	- 2.0	
Zero gate voltage drain current $V_{DS} = - 60\text{ V}, V_{GS} = 0$ $T_j = 25\text{ °C}$	I_{DSS}	-	- 0.1	- 1	μA
Gate-source leakage current $V_{GS} = - 20\text{ V}, V_{DS} = 0$	I_{GSS}	-	- 1	- 10	nA
Drain-source on-resistance $V_{GS} = - 10\text{ V}, I_D = - 0.5\text{ A}$	$R_{DS(on)}$	-	7	10	Ω

Dynamic Characteristics

Forward transconductance $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}, I_D = - 0.5\text{ A}$	g_{fs}	0.08	0.13	-	S
Input capacitance $V_{GS} = 0, V_{DS} = - 25\text{ V}, f = 1\text{ MHz}$	C_{iss}	-	30	40	pF
Output capacitance $V_{GS} = 0, V_{DS} = - 25\text{ V}, f = 1\text{ MHz}$	C_{oss}	-	17	25	
Reverse transfer capacitance $V_{GS} = 0, V_{DS} = - 25\text{ V}, f = 1\text{ MHz}$	C_{rss}	-	8	12	
Turn-on time t_{on} , ($t_{on} = t_{d(on)} + t_r$) $V_{DD} = - 30\text{ V}, V_{GS} = - 10\text{ V}, R_{GS} = 50\ \Omega,$ $I_D = - 0.27\text{ A}$	$t_{d(on)}$	-	7	10	ns
	t_r	-	12	18	
Turn-off time t_{off} , ($t_{off} = t_{d(off)} + t_f$) $V_{DD} = - 30\text{ V}, V_{GS} = - 10\text{ V}, R_{GS} = 50\ \Omega,$ $I_D = - 0.27\text{ A}$	$t_{d(off)}$	-	10	13	
	t_f	-	20	27	

Electrical Characteristics (cont'd)

at $T_j = 25\text{ }^\circ\text{C}$, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

Reverse Diode

Continuous reverse drain current $T_A = 25\text{ }^\circ\text{C}$	I_S	–	–	– 0.18	A
Pulsed reverse drain current $T_A = 25\text{ }^\circ\text{C}$	I_{SM}	–	–	– 0.72	
Diode forward on-voltage $I_F = -0.18\text{ A}$, $V_{GS} = 0$	V_{SD}	–	– 0.85	– 1.2	V

Package Outline

TO-92

The diagram shows two views of a TO-92 package. The left view is a side profile showing a lead length of 14.5 mm, a lead thickness of 0.4 mm, a lead width of 0.4 mm, a body width of 5.5 mm, a body height of 4.2 mm, and a maximum lead height of 2.5 mm. The right view is a top-down view showing a circular body with a diameter of 5.2 mm, a lead diameter of 1.6 mm, and a lead height of 2.5 mm. The top view also shows three numbered points (1, 2, 3) on the body.

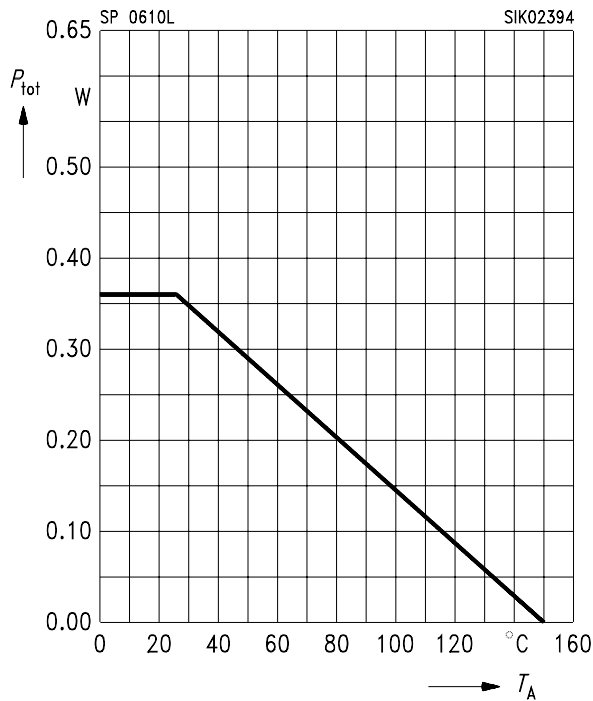
GPT05158

Dimensions in mm

Characteristics

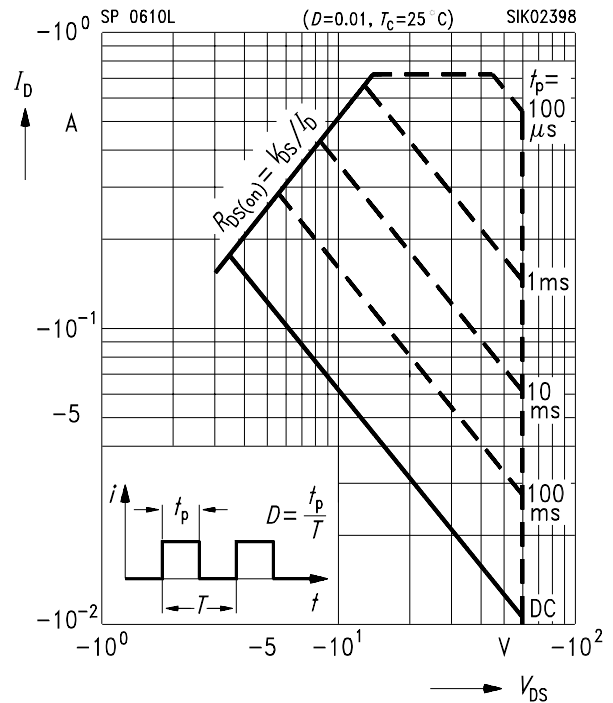
at $T_j = 25^\circ\text{C}$, unless otherwise specified.

Total power dissipation $P_{\text{tot}} = f(T_A)$



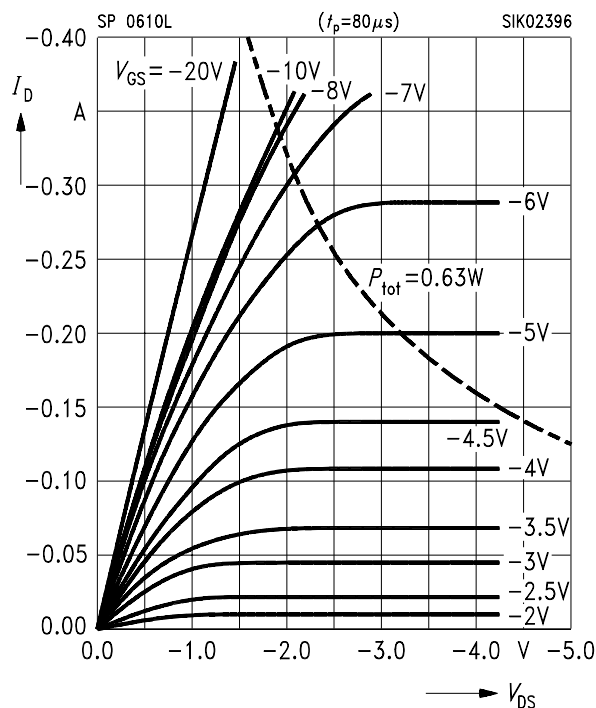
Safe operating area $I_D = f(V_{\text{DS}})$

parameter: $D = 0.01$, $T_C = 25^\circ\text{C}$



Typ. output characteristics $I_D = f(V_{\text{DS}})$

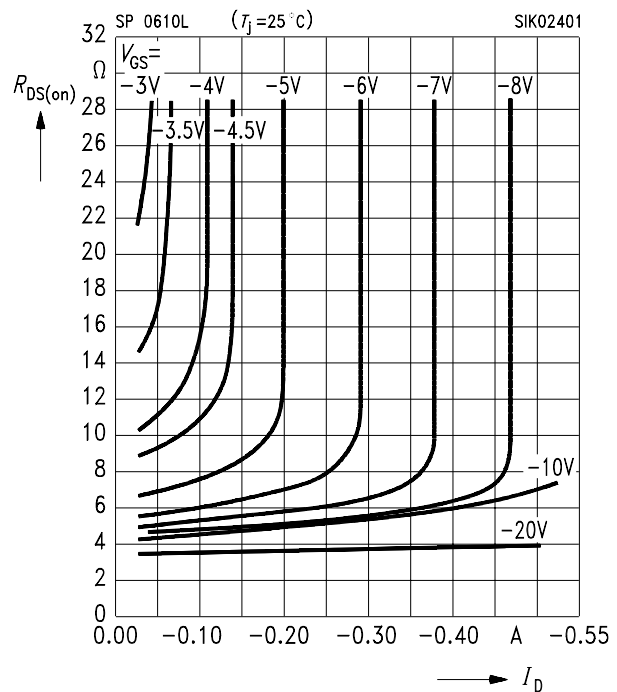
parameter: $t_p = 80 \mu\text{s}$



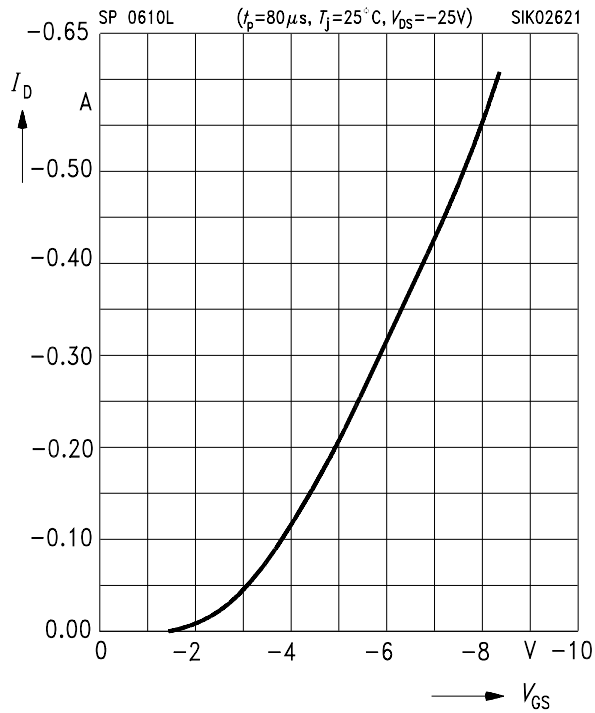
Typ. drain-source on-resistance

$R_{\text{DS(on)}} = f(I_D)$

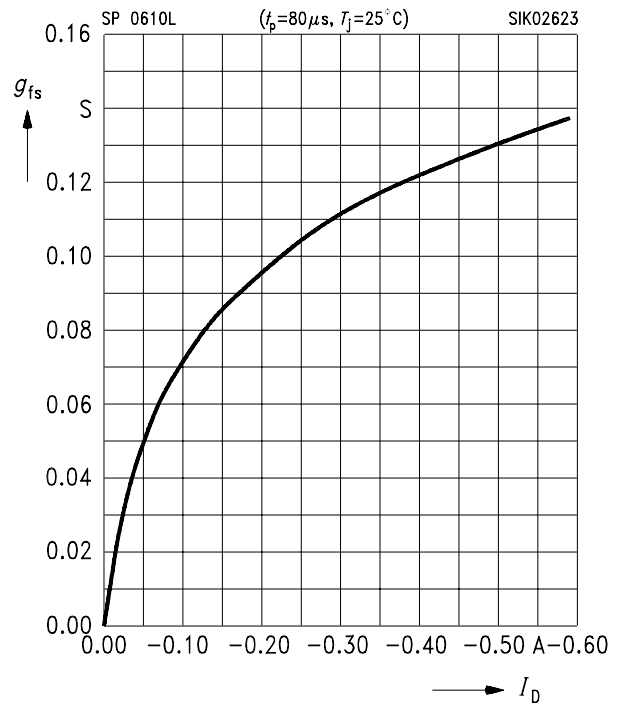
parameter: V_{GS}



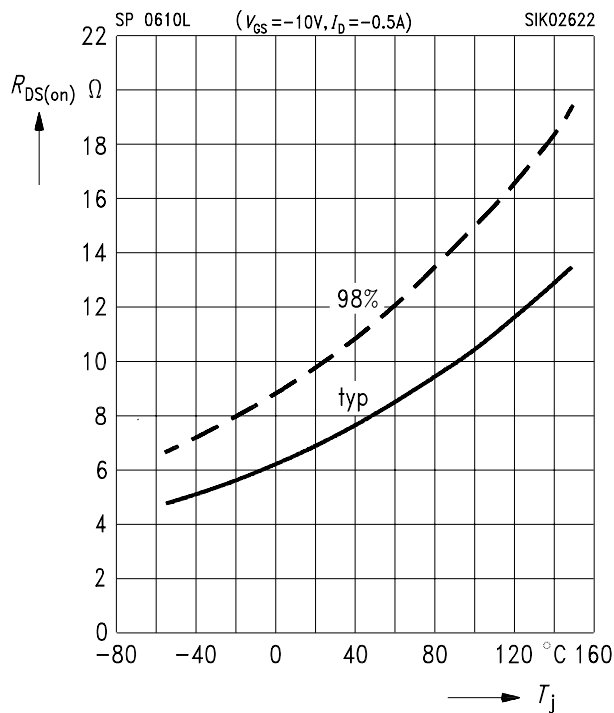
Typ. transfer characteristics $I_D = f(V_{GS})$
 parameter: $t_p = 80 \mu s$, $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$.



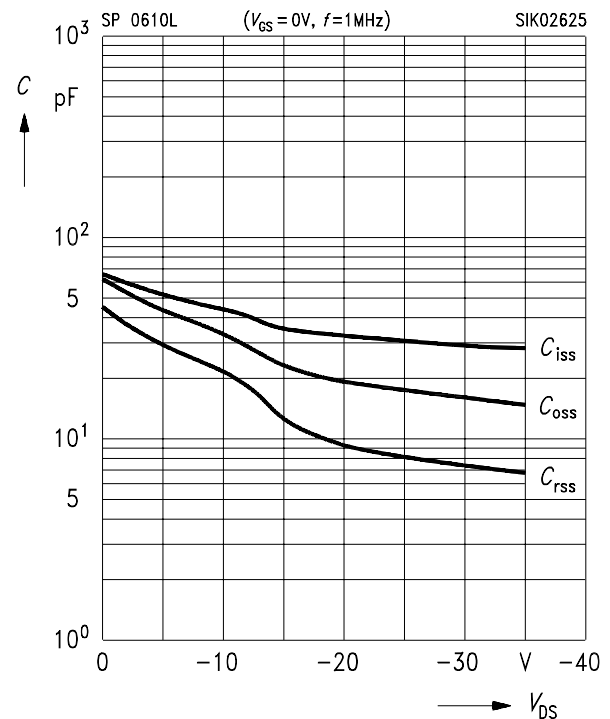
Typ. forward transconductance $g_{fs} = f(I_D)$
 parameter: $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$, $t_p = 80 \mu s$



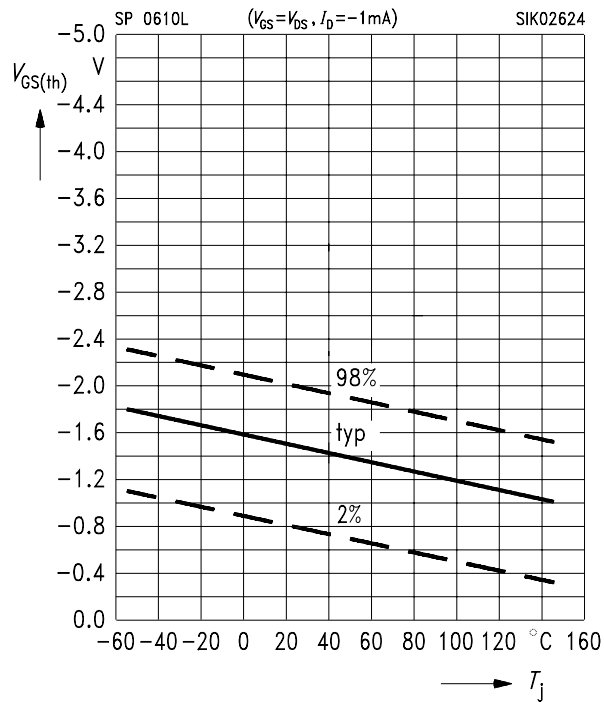
Drain-source on-resistance
 $R_{DS(on)} = f(T_j)$
 parameter: $I_D = 0.5 A$, $V_{GS} = 10 V$, (spread)



Typ. capacitances $C = f(V_{DS})$
 parameter: $V_{GS} = 0V$, $f = 1 MHz$

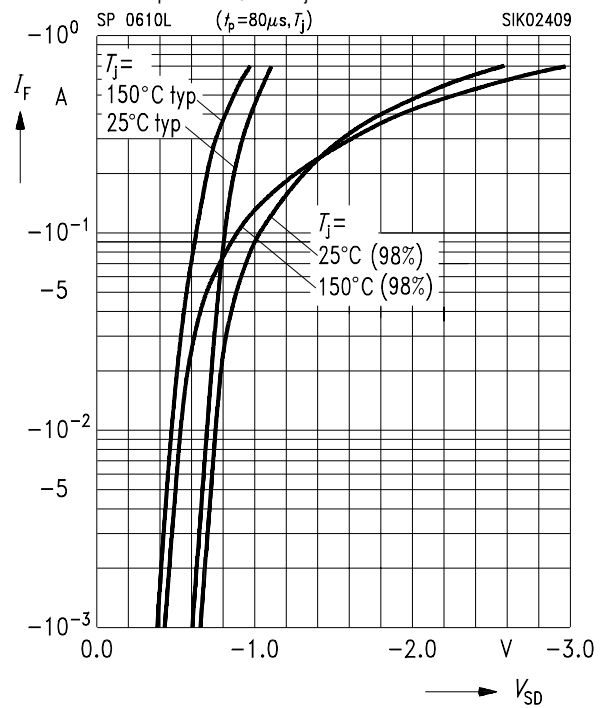


Gate threshold voltage $V_{GS(th)} = f(T_j)$
 parameter: $V_{DS} = V_{GS}$, $I_D = 1 \text{ mA}$, (spread)

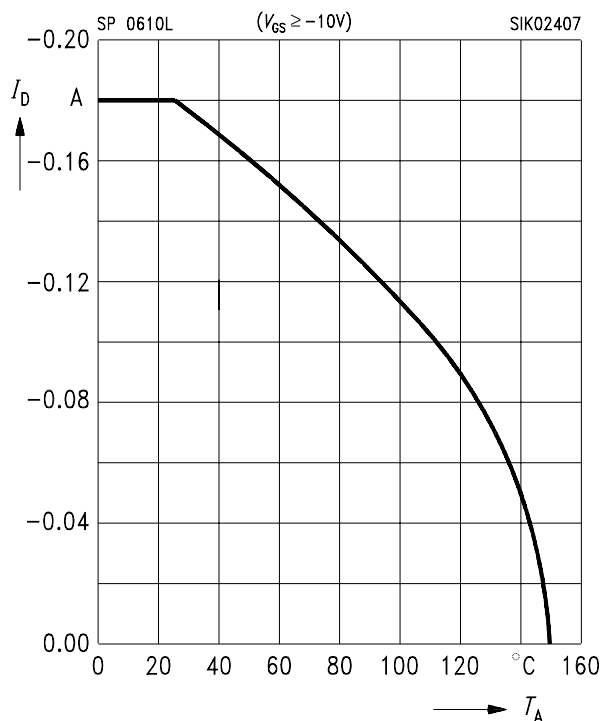


Forward characteristics of reverse diode

$I_F = f(V_{SD})$
 parameter: $t_p = 80 \mu\text{s}$, T_j , (spread)



Drain current $I_D = f(T_A)$
 parameter: $V_{GS} \geq 10 \text{ V}$



Drain-source breakdown voltage

$V_{(BR)DSS} = b \times V_{(BR)DSS} (25^\circ\text{C})$

