

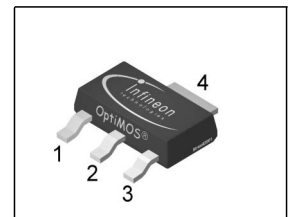
**OptiMOS® Power-Transistor**
**Feature**

- N-Channel
- Enhancement mode
- Logic Level

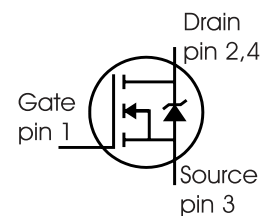
**Product Summary**

$V_{DS}$	55	V
$R_{DS(on)}$	33	m $\Omega$
$I_D$	5.2	A

SOT 223



Type	Package	Ordering Code	Marking
BSP603S2L	SOT 223	Q67060-S7213	2N603L


**Maximum Ratings**, at  $T_j = 25\text{ °C}$ , unless otherwise specified

Parameter	Symbol	Value	Unit
Continuous drain current	$I_D$		A
$T_A = 25\text{ °C}$		5.2	
$T_A = 70\text{ °C}$		4.1	
Pulsed drain current	$I_{D\text{ puls}}$	21	
$T_A = 25\text{ °C}$			
Gate source voltage	$V_{GS}$	$\pm 20$	V
Power dissipation	$P_{tot}$	1.8	W
$T_A = 25\text{ °C}$			
Operating and storage temperature	$T_j, T_{stg}$	-55... +150	$\text{°C}$
IEC climatic category; DIN IEC 68-1		55/150/00	

**Thermal Characteristics**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Characteristics</b>					
Thermal resistance, junction - soldering point (Pin 4)	$R_{thJS}$	-	15	20	K/W
Thermal resistance, chip to ambient air: @ min. footprint	$R_{thJA}$	-	-	120	
@ 6 cm <sup>2</sup> cooling area <sup>1)</sup>		-	-	70	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Static Characteristics</b>					
Drain-source breakdown voltage $V_{GS}=0V, I_D=1mA$	$V_{(BR)DSS}$	55	-	-	V
Gate threshold voltage, $V_{GS} = V_{DS}$ $I_D=50\mu A$	$V_{GS(th)}$	1.2	1.6	2	
Zero gate voltage drain current $V_{DS}=55V, V_{GS}=0V, T_j=25^\circ C$ $V_{DS}=55V, V_{GS}=0V, T_j=150^\circ C$	$I_{DSS}$	-	0.1	1	$\mu A$
Gate-source leakage current $V_{GS}=20V, V_{DS}=0V$	$I_{GSS}$	-	10	100	
Drain-source on-state resistance $V_{GS}=4.5V, I_D=2.6A$	$R_{DS(on)}$	-	27	40	m $\Omega$
Drain-source on-state resistance $V_{GS}=10V, I_D=2.6A$	$R_{DS(on)}$	-	23	33	

<sup>1)</sup>Device on 40mm\*40mm\*1.5mm epoxy PCB FR4 with 6cm<sup>2</sup> (one layer, 70  $\mu m$  thick) copper area for drain connection. PCB is vertical without blown air.

**Electrical Characteristics**

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

**Dynamic Characteristics**

Transconductance	$g_{fs}$	$V_{DS} \geq 2 \cdot I_D \cdot R_{DS(on)max}$ , $I_D = 5.2$	8.9	17.8	-	S
Input capacitance	$C_{iss}$	$V_{GS} = 0V$ , $V_{DS} = 25V$ , $f = 1MHz$	-	1034	1390	pF
Output capacitance	$C_{oss}$		-	244	325	
Reverse transfer capacitance	$C_{rss}$		-	75	110	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 30V$ , $V_{GS} = 4.5V$ , $I_D = 5.2A$ , $R_G = 5.6\Omega$	-	10.8	16	ns
Rise time	$t_r$	$V_{DD} = 30V$ , $V_{GS} = 4.5V$ ,	-	16	24	
Turn-off delay time	$t_{d(off)}$	$I_D = 5.2mA$ ,	-	28	40	
Fall time	$t_f$	$R_G = 5.6\Omega$	-	15	23	

**Gate Charge Characteristics**

Gate to source charge	$Q_{gs}$	$V_{DD} = 44V$ , $I_D = 5.2A$	-	3.5	4.6	nC
Gate to drain charge	$Q_{gd}$		-	10.6	16	
Gate charge total	$Q_g$	$V_{DD} = 44V$ , $I_D = 5.2A$ , $V_{GS} = 0$ to $10V$	-	31	42	
Gate plateau voltage	$V_{(plateau)}$	$V_{DD} = 44V$ , $I_D = 5.2A$	-	3	-	V

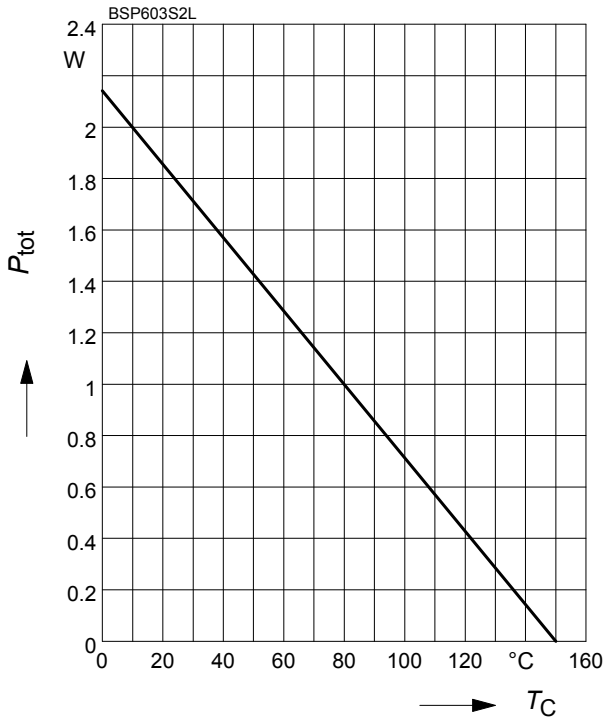
**Reverse Diode**

Inverse diode continuous forward current	$I_S$	$T_A = 25^\circ C$	-	-	5.2	A
Inv. diode direct current, pulsed	$I_{SM}$		-	-	21	
Inverse diode forward voltage	$V_{SD}$	$V_{GS} = 0V$ , $I_F = 5.2A$	-	0.8	1.1	V
Reverse recovery time	$t_{rr}$	$V_R = 30V$ , $I_F = I_S$ ,	-	46	58	ns
Reverse recovery charge	$Q_{rr}$	$di_F/dt = 100A/\mu s$	-	44	55	

**1 Power dissipation**

$P_{tot} = f(T_C)$

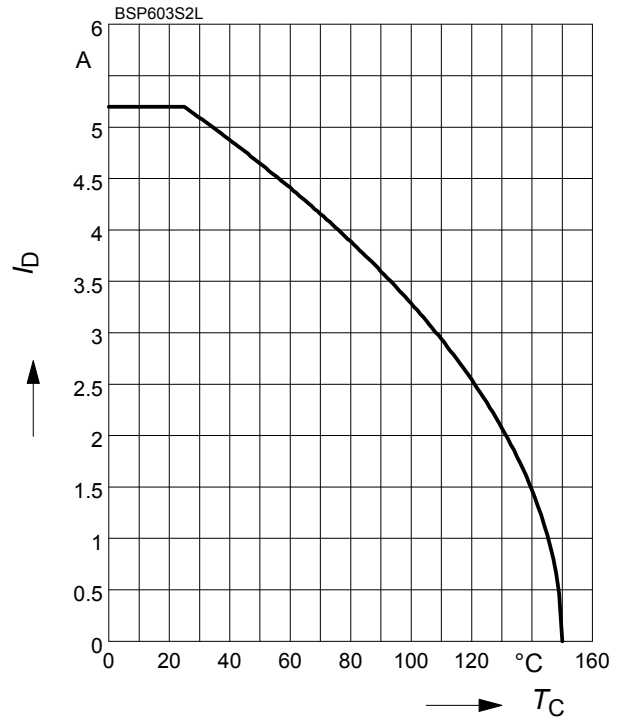
parameter:  $V_{GS} \geq 4\text{ V}$



**2 Drain current**

$I_D = f(T_C)$

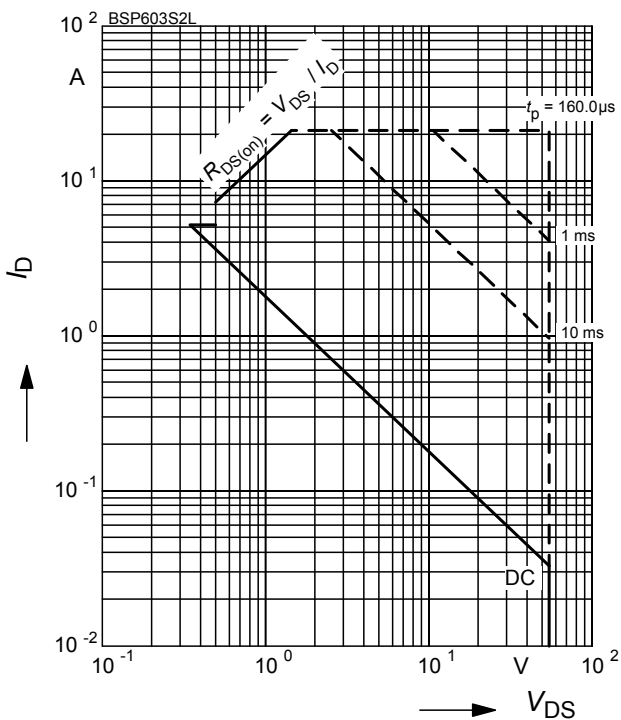
parameter:  $V_{GS} \geq 10\text{ V}$



**3 Safe operating area**

$I_D = f(V_{DS})$

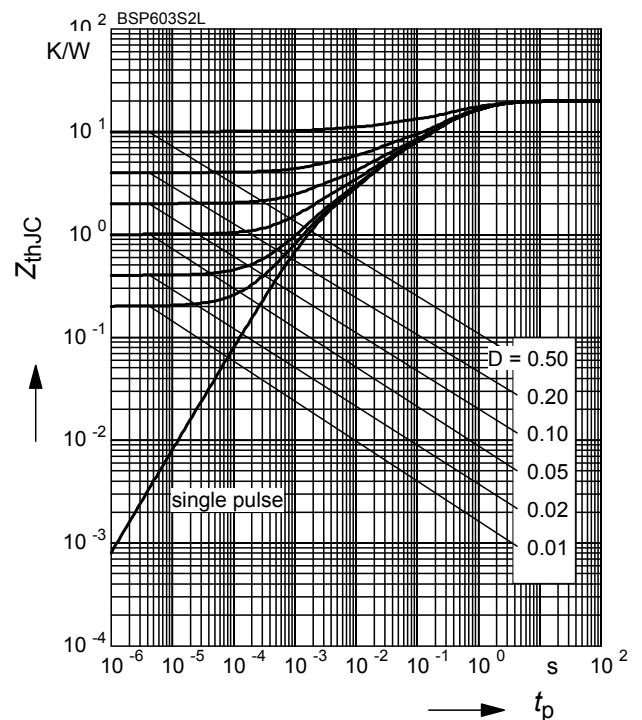
parameter:  $D = 0, T_C = \text{--}$



**4 Max. transient thermal impedance**

$Z_{thJC} = f(t_p)$

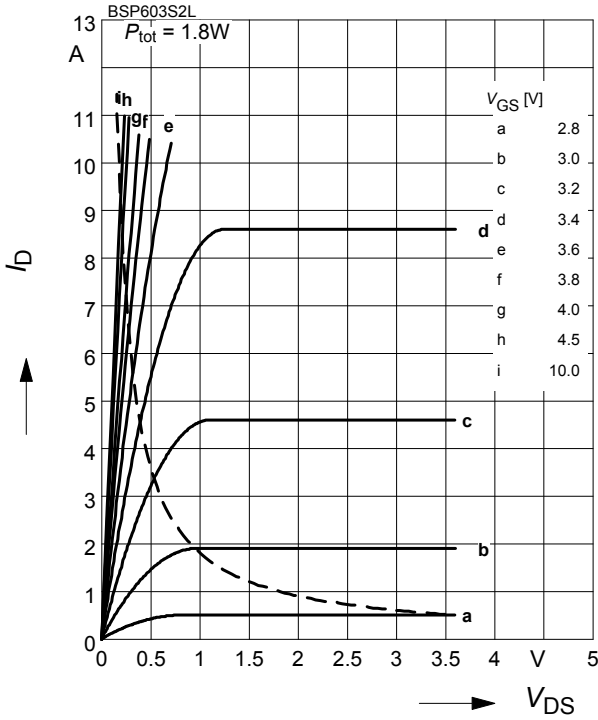
parameter:  $D = t_p/T$



**5 Typ. output characteristic**

$I_D = f(V_{DS}); T_j = 25^\circ\text{C}$

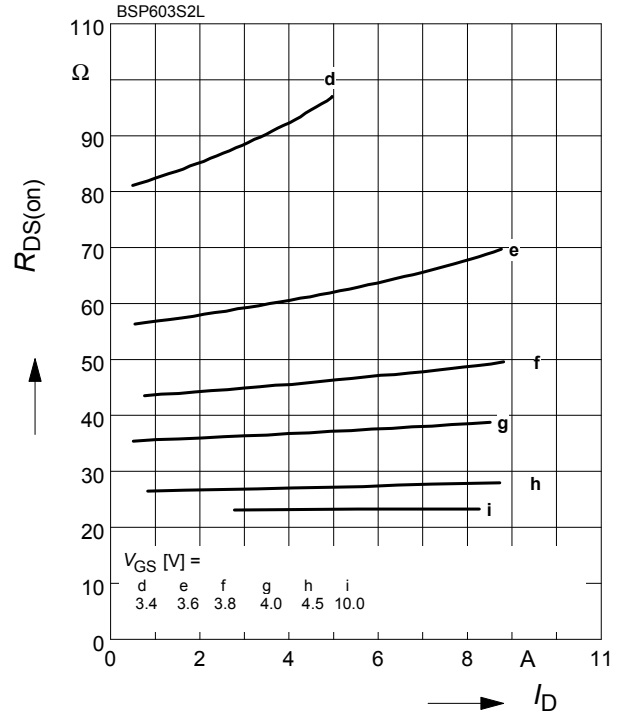
parameter:  $t_p = 80 \mu\text{s}$



**6 Typ. drain-source on resistance**

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

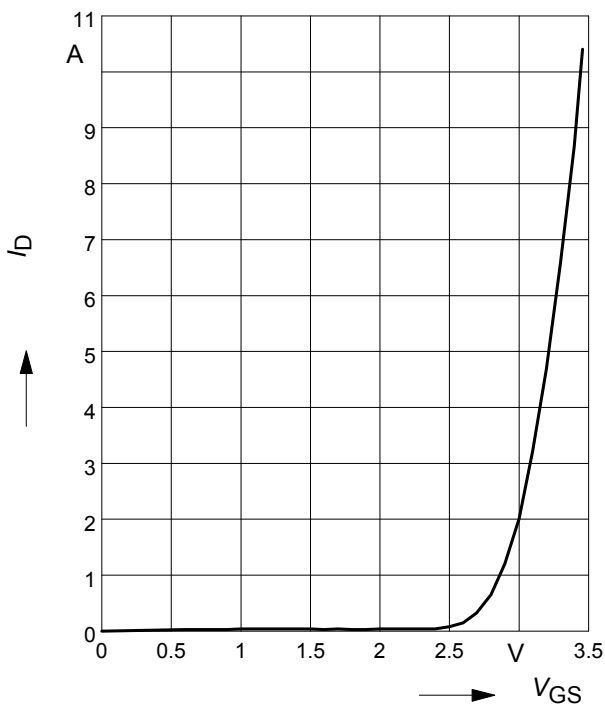
parameter:  $V_{GS}$



**7 Typ. transfer characteristics**

$I_D = f(V_{GS}); V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$

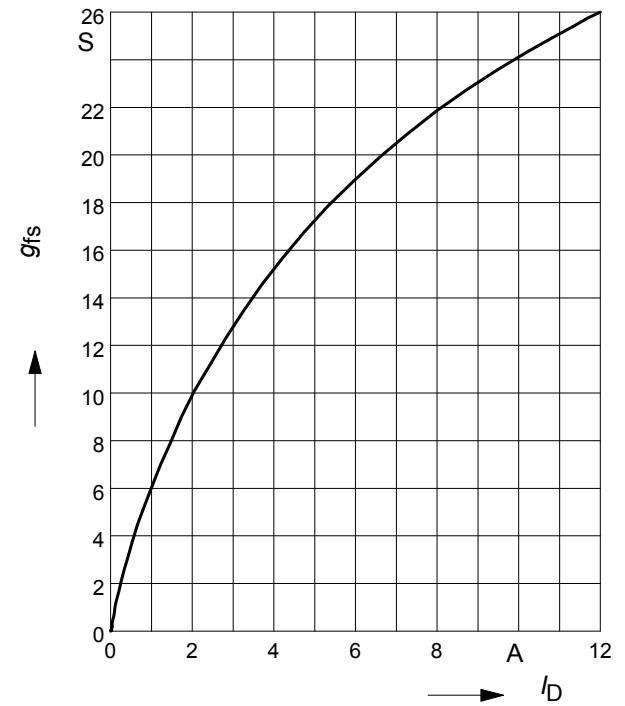
parameter:  $t_p = 80 \mu\text{s}$



**8 Typ. forward transconductance**

$g_{fs} = f(I_D); T_j = 25^\circ\text{C}$

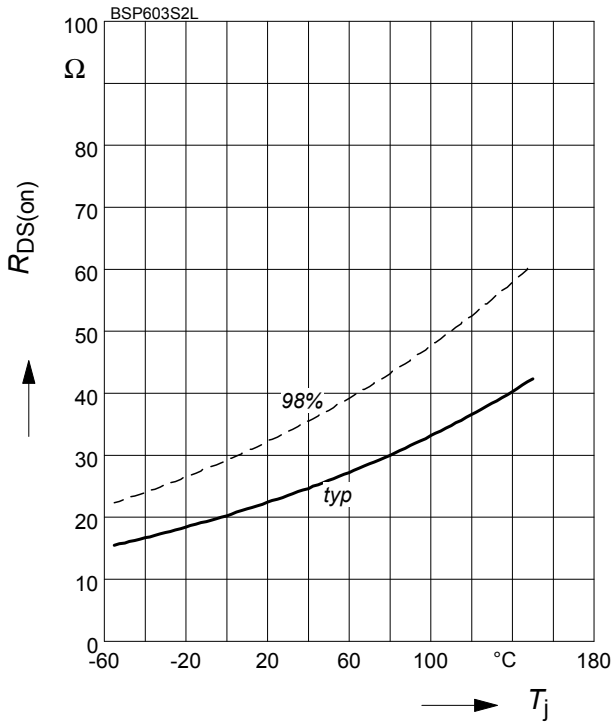
parameter:  $g_{fs}$



**9 Drain-source on-state resistance**

$$R_{DS(on)} = f(T_j)$$

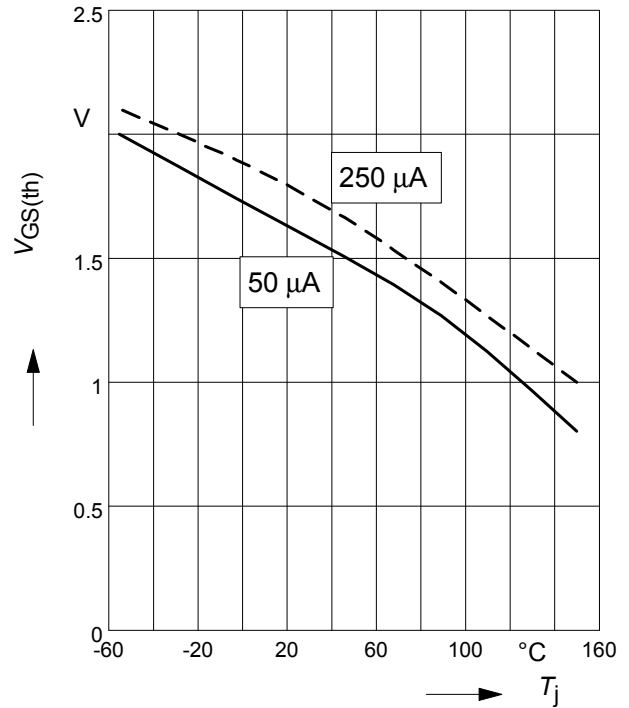
parameter :  $I_D = 2.6 \text{ A}$ ,  $V_{GS} = 10 \text{ V}$



**10 Typ. gate threshold voltage**

$$V_{GS(th)} = f(T_j)$$

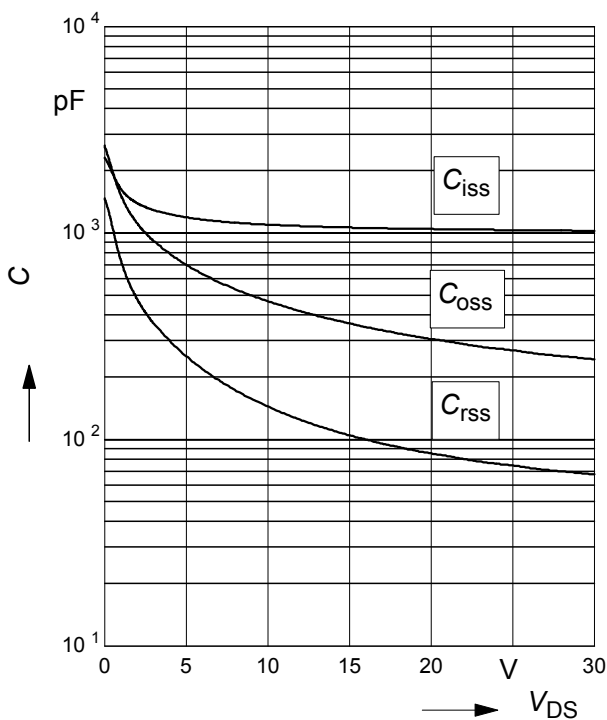
parameter:  $V_{GS} = V_{DS}$



**11 Typ. capacitances**

$$C = f(V_{DS})$$

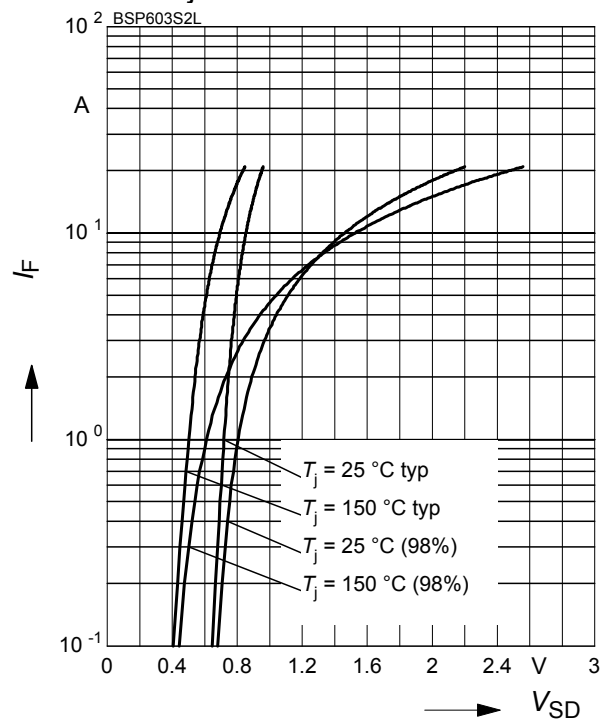
parameter:  $V_{GS}=0\text{V}$ ,  $f=1 \text{ MHz}$



**12 Forward character. of reverse diode**

$$I_F = f(V_{SD})$$

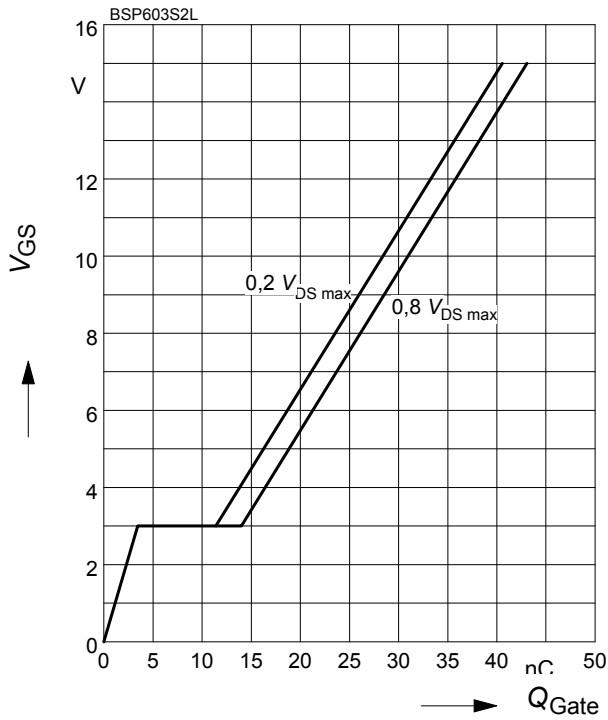
parameter:  $T_j$ ,  $t_p = 80 \mu\text{s}$



**13 Typ. gate charge**

$V_{GS} = f(Q_{Gate})$

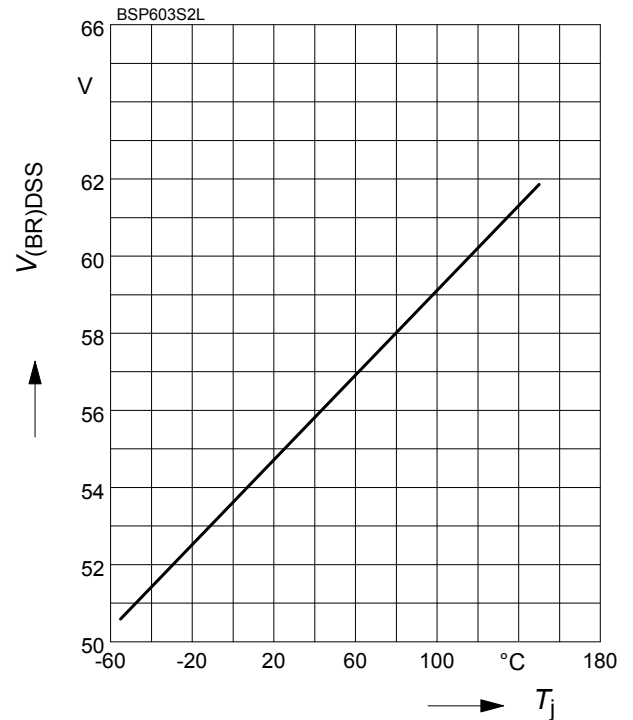
parameter:  $I_D = 5.2 \text{ A pulsed}$



**14 Drain-source breakdown voltage**

$V_{(BR)DSS} = f(T_j)$

parameter:  $I_D = 10 \text{ mA}$



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