N-CHANNEL FETS

Silicon symmetrical n-channel junction field-effect transistors in TO-18 metal envelopes with the gate connected to the case. The transistors are intended for switching applications. The devices have the feature: low 'on' resistance at zero gate voltage.

QUICK REFERENCE DATA

Drain-source voltage	$\pm V_{DS}$	max.		40		V
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.		350		mW
			BSV78	**BSV79**	**BSV80**	
Drain current V_{DS} = 15 V; V_{GS} = 0	I_{DSS}	>	50	20	10	mA
Gate-source cut-off voltage I_D = 1 nA; V_{GS} = 15 V	$-V_{(P)GS}$	>	3.75	2.0	1.0	V
		<	11	7.0	5.0	V
Drain-source resistance (on) at f = 1 kHz I_D = 0; V_{GS} = 0	$r_{ds\ on}$	<	25	40	60	Ω
Feedback capacitance at f = 1 MHz V_{DS} = 0; $-V_{GS}$ = 10 V	C_{rs}	<	5	5	5	pF
Turn-on time	t_{on}	<	10	18	30	ns
Turn-off time	t_{off}	<	10	16	32	ns

MECHANICAL DATA

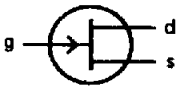
Dimensions in mm

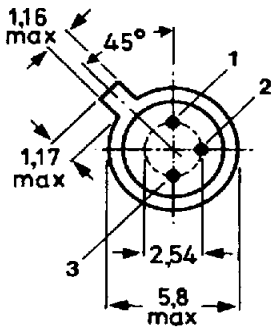
Fig. 1 TO-18.

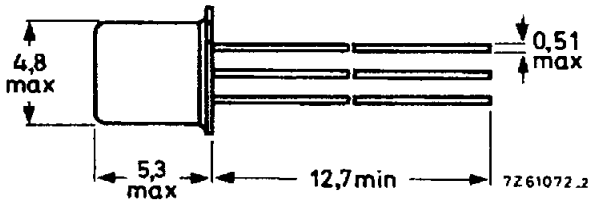
Gate connected to case

Pinning

1 = source
2 = drain
3 = gate







Note: Drain and source are interchangeable.

Accessories: 56246 (distance disc).

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Drain-source voltage	$\pm V_{DS}$	max.	40	V
Drain-gate voltage (open source)	V_{DGO}	max.	40	V
Gate-source voltage (open drain)	$-V_{GSO}$	max.	40	V
Forward gate current	I_G	max.	50	mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	350	mW
Storage temperature range	T_{stg}	−65 to +	175	°C
Operating junction temperature	T_j	max.	175	°C

THERMAL RESISTANCE

From junction to ambient in free air	$R_{th\ j\text{-}a}$	=	430	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

			BSV78	BSV79	BSV80	
Gate cut-off currents						
$-V_{GS}$ = 20 V; V_{DS} = 0	$-I_{GSS}$	<		0.25		nA
$-V_{GS}$ = 20 V; V_{DS} = 0; T_j = 150 °C	$-I_{GSS}$	<		0.5		μA
Drain cut-off current						
V_{DS} = 15 V; $-V_{GS}$ = 12 V	I_{DSX}	<		0.25		nA
V_{DS} = 15 V; $-V_{GS}$ = 12 V; T_j = 150 °C	I_{DSX}	<		0.5		μA
Drain current						
V_{DS} = 15 V; V_{GS} = 0	I_{DSS}	>	50	20	10	mA
Gate-source cut-off voltage						
I_D = 1 nA; V_{DS} = 15 V	$-V_{(P)GS}$	>	3.75	2.0	1.0	V
		<	11	7.0	5.0	V
Gate-source voltage						
I_D = 1.5 μA; V_{DS} = 15 V	$-V_{GS}$	>	3.5	1.75	0.75	V
		<	10	6.0	4.0	V
Drain-source voltage (on)						
I_D = 20 mA; V_{GS} = 0	V_{DSon}	<	500			mV
I_D = 10 mA; V_{GS} = 0	V_{DSon}	<		400		mV
I_D = 5 mA; V_{GS} = 0	V_{DSon}	<			325	mV
Drain-source resistance (on) at f = 1 kHz						
I_D = 0; V_{GS} = 0	$r_{ds\ on}$	<	25	40	60	Ω
y parameters at f = 1 MHz (common source)						
$-V_{GS}$ = 10 V; V_{DS} = 0						
Input capacitance	C_{is}	<	10	10	10	pF
Feedback capacitance	C_{rs}	<	5	5	5	pF

Switching times (see Fig. 2)

Turn-on time when switched from
$-V_{GSoff}$ = 11 V to I_{Don} = 20 mA; V_{DD} = 10 V (BSV78)
$-V_{GSoff}$ = 7 V to I_{Don} = 10 mA; V_{DD} = 10 V (BSV79)
$-V_{GSoff}$ = 5 V to I_{Don} = 5 mA; V_{DD} = 10 V (BSV80)

		BSV78	BSV79	BSV80
delay time	t_d <	5	10	10 ns
rise time	t_r <	5	8	20 ns
turn-on time	t_{on} <	10	18	30 ns

Turn-off time when switched from
I_{Don} = 20 mA to $-V_{GSMoff}$ = 11 V; V_{DD} = 10 V (BSV78)
I_{Don} = 10 mA to $-V_{GSMoff}$ = 7 V; V_{DD} = 10 V (BSV79)
I_{Don} = 5 mA to $-V_{GSMoff}$ = 5 V; V_{DD} = 10 V (BSV80)

fall time	t_f <	6	11	24 ns
storage time	t_s <	4	5	8 ns
turn-off time	t_{off} <	10	16	32 ns

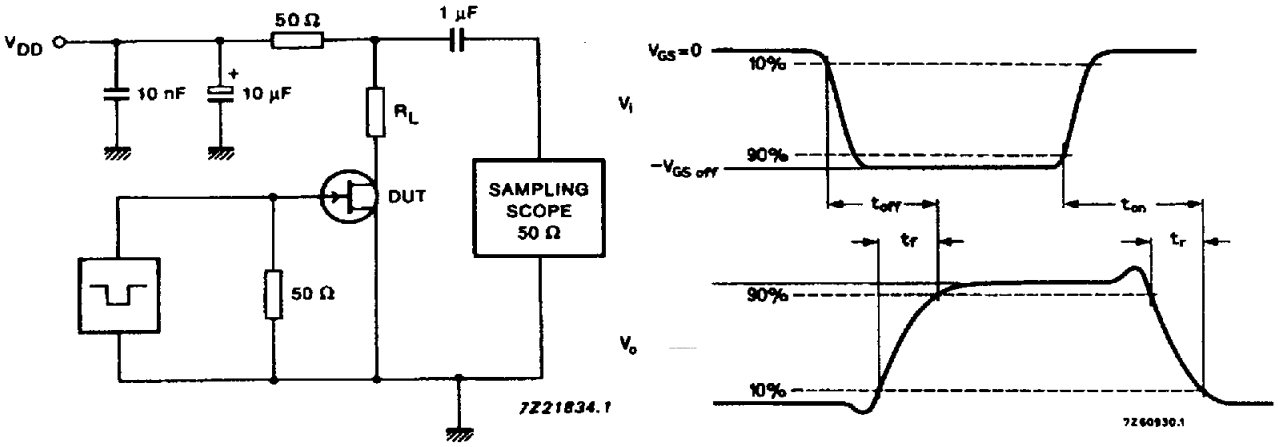
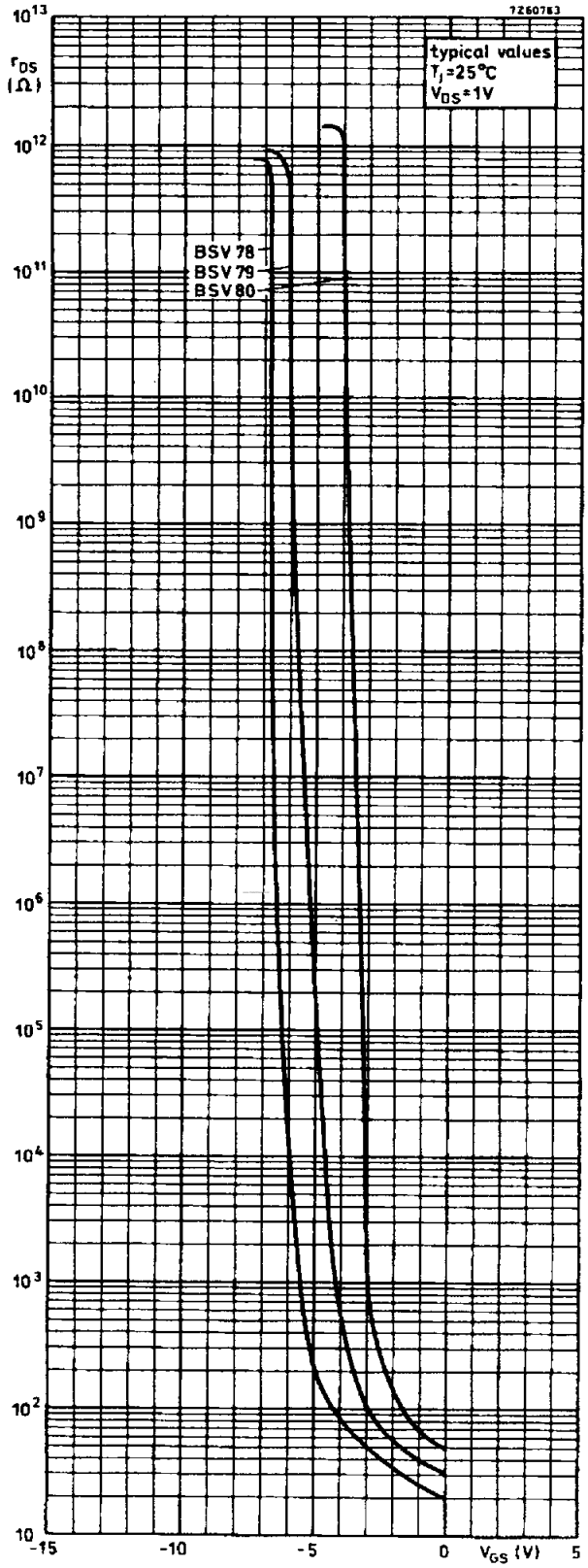


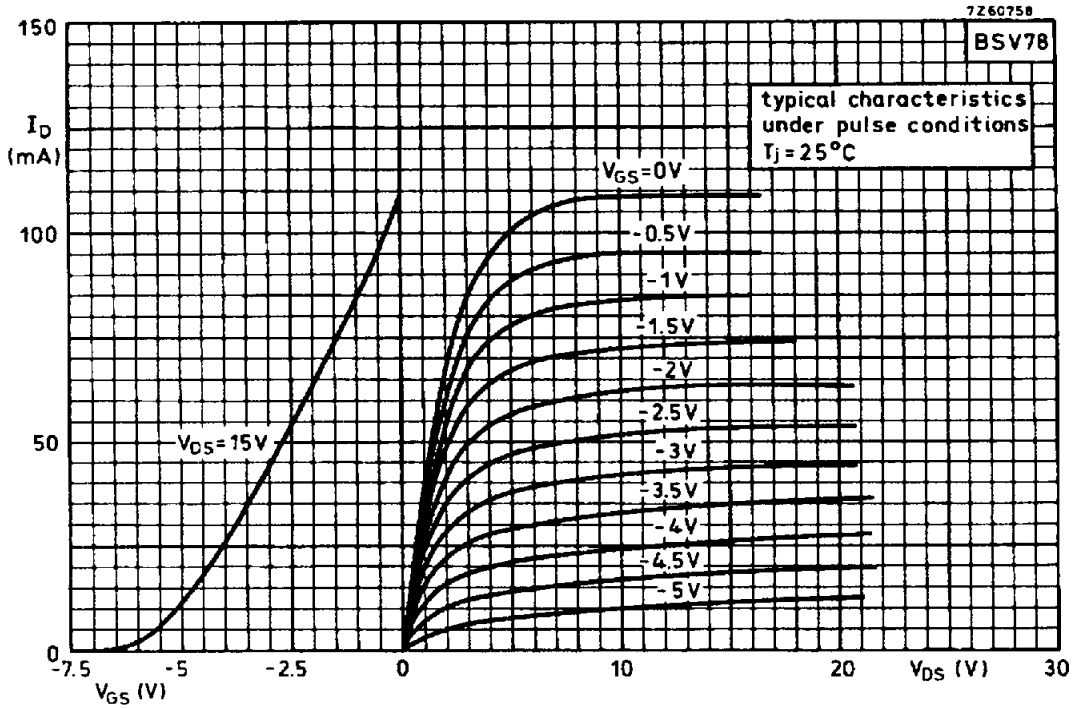
Fig. 2 Switching times test circuit and input and output waveforms.

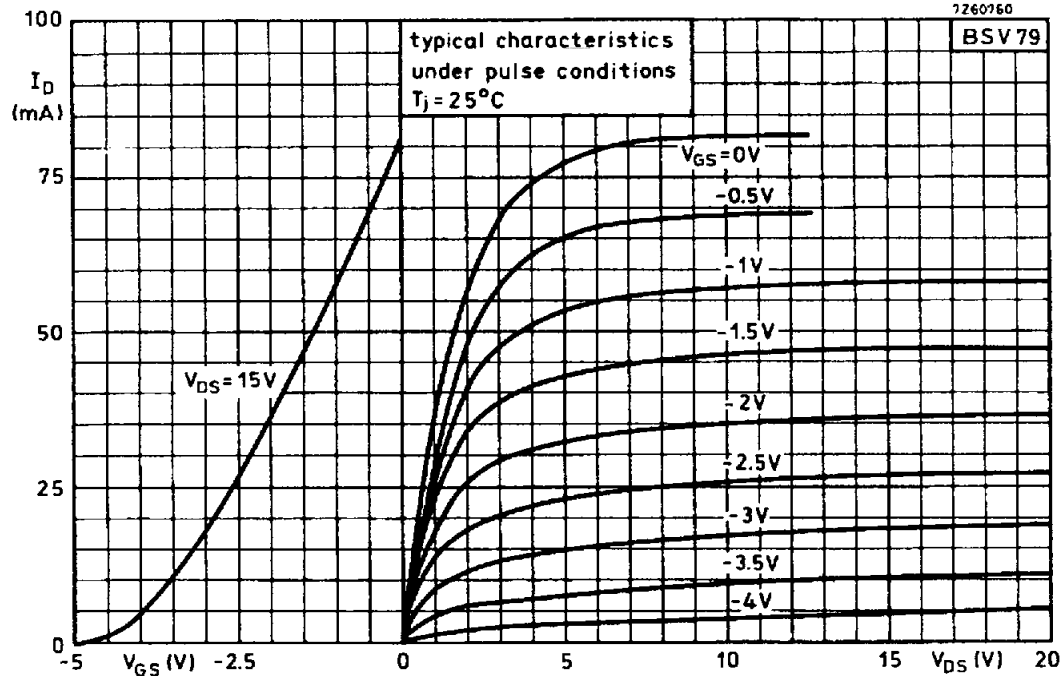
	BSV78	BSV79	BSV80
R_L =	424	909	1885 Ω

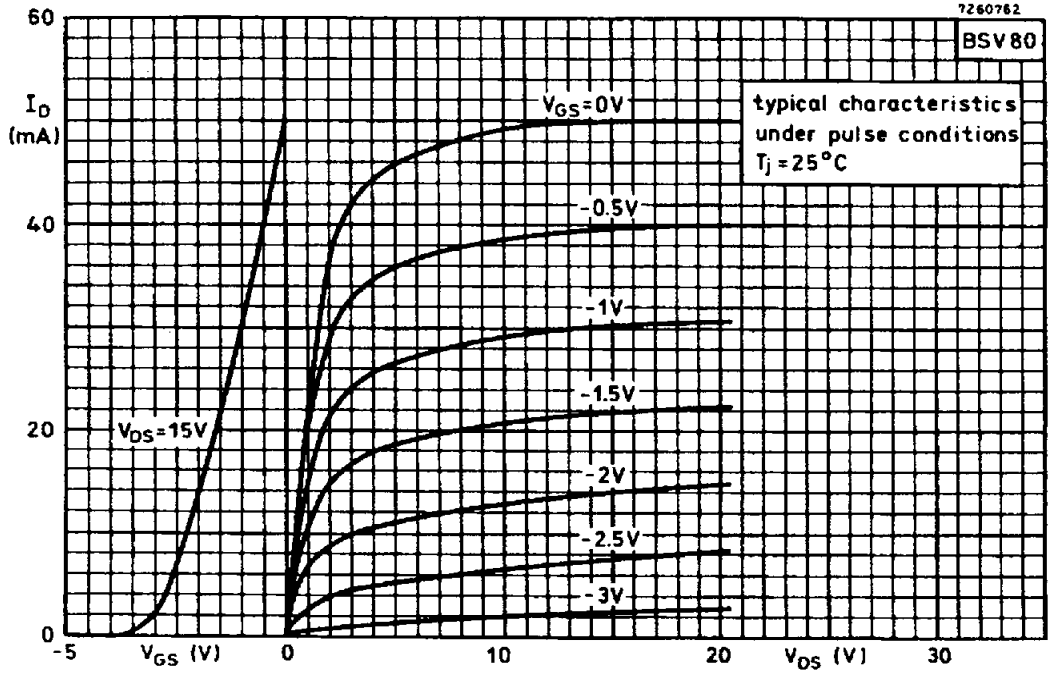
Pulse generator:
R_i = 50 Ω
t_r < 0.5 ns
t_f < 5 ns

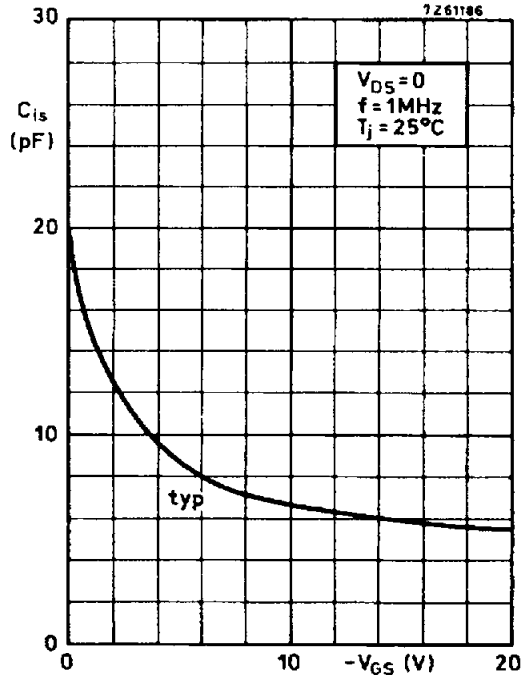
Oscilloscope:
R_i = 50 Ω
t_r < 1 ns
t_f < 1 ns

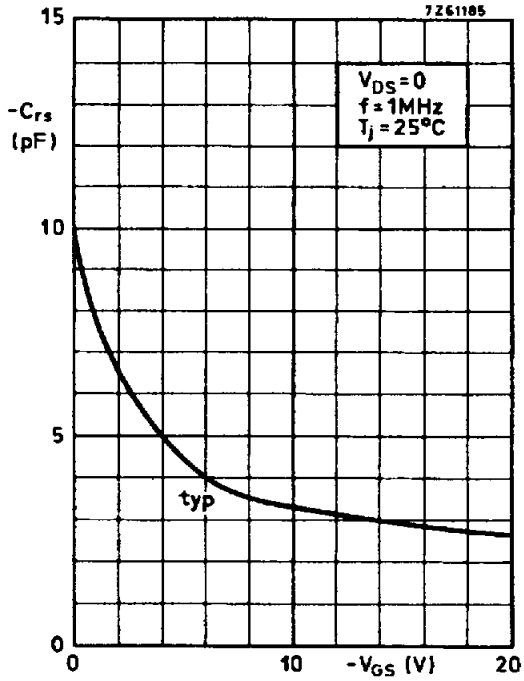

7Z60763
typical values
T_j=25°C
V_{DS}=1V
r_{DS} (Ω)
10^{13}
10^{12}
10^{11}
10^{10}
10^{9}
10^{8}
10^{7}
10^{6}
10^{5}
10^{4}
10^{3}
10^{2}
10
BSV 78
BSV 79
BSV 80
-15
-10
-5
0
V_{GS} (V)
5

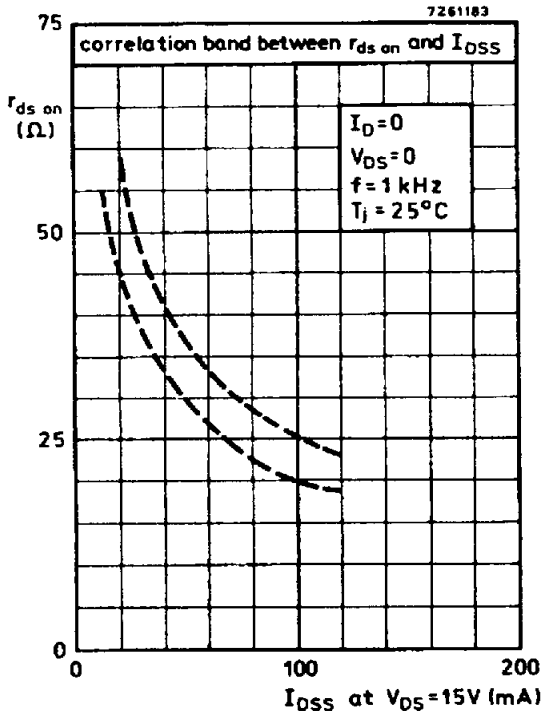

7Z60758
BSV78
typical characteristics
under pulse conditions
$T_j = 25°C$
I_D (mA)
150
100
50
0
V_{GS}=0V
-0.5V
-1V
-1.5V
-2V
-2.5V
-3V
-3.5V
-4V
-4.5V
-5V
V_{DS}=15V
-7.5
-5
-2.5
0
10
20
30
V_{GS} (V)
V_{DS} (V)

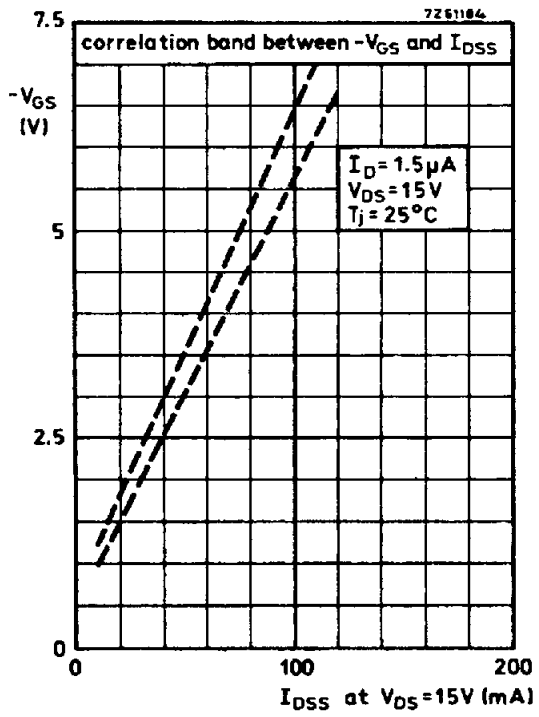

7Z60760
BSV79
typical characteristics
under pulse conditions
$T_j = 25°C$
I_D (mA)
100
75
50
25
0
V_{GS}=0V
-0.5V
-1V
-1.5V
-2V
-2.5V
-3V
-3.5V
-4V
V_{DS}=15V
-5
V_{GS} (V)
-2.5
0
5
10
15
20
V_{DS} (V)


7260762
BSV80
typical characteristics
under pulse conditions
T_j = 25 °C
I_D (mA)
V_{GS} = 0V
-0.5V
-1V
-1.5V
-2V
-2.5V
-3V
V_{DS} = 15V
60
40
20
0
-5
V_{GS} (V)
0
10
20
V_{DS} (V)
30


7261186
V_{DS} = 0
f = 1MHz
T_j = 25°C
C_{is} (pF)
typ
30
20
10
0
0
10
$-V_{GS}$ (V)
20


7261185
V_{DS} = 0
f = 1MHz
T_j = 25°C
$-C_{rs}$ (pF)
typ
15
10
5
0
0
10
$-V_{GS}$ (V)
20


7Z61183
correlation band between $r_{ds\ on}$ and I_{DSS}
I_D=0
V_{DS}=0
f=1 kHz
T_j=25°C
$r_{ds\ on}$ (Ω)
75
50
25
0
0
100
200
I_{DSS} at V_{DS}=15V (mA)


7Z61184
correlation band between $-V_{GS}$ and I_{DSS}
I_D=1.5 µA
V_{DS}=15V
T_j=25°C
$-V_{GS}$ (V)
7.5
5
2.5
0
0
100
200
I_{DSS} at V_{DS}=15V (mA)