シリコンNチャネル接合形電界効果トランジスタ
SILICON N-CHANNEL JUNCTION FIELD EFFECT TRANSISTOR

2SK 11
2SK 12
2SK 15

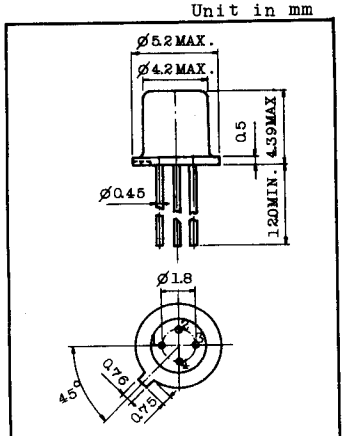
通信工業用
INDUSTRIAL APPLICATIONS

- ○ 低周波増幅用
- ○ 低雑音増幅用 (2SK15)
- ○ DC, AC高入力抵抗回路用
- ○ チョッパ増幅用
- ○ 差動増幅用
- ○ スイッチング回路用
- ○ Low Frequency Amplifier, High Input Impedance Circuit, Chopper Amplifier, Differential Amplifier and Switching Circuit Applications.
- ○ Low Noise Amplifier Applications (2SK15)

- 高入力抵抗です；
  I_{GSS}=−1.0nA (Max.) (2SK11)
  I_{GSS}=−0.1nA (Max.) (2SK12, 2SK15)
- 相互コンダクタンスが高い；
  g_m=700～3200μ℧ (2SK11)
  g_m=800～3200μ℧ (2SK12, 2SK15)
- 低雑音です；
  NF=3dB (f=1kHz, R_g=1MΩ) (Max.) (2SK12)
  NF=3dB (f=1kHz, R_g=10kΩ) (Max.) (2SK15)
  NF=10dB (f=120Hz, R_g=10kΩ) (Max.) (2SK15)

ペアー用の標準品として特性の良くそろったものを2個を1組としたものがあります。(ペアー用標準品名欄参照)
Matched Pairs are Available (Reffer to Page 1d)

Unit in mm



1. SOURCE
2. GATE
3. DRAIN
4. SHIELD

JEDEC	TO-17
EIAJ	TC-4, TB-6C
TOSHIBA	2-4A1A

最大定格 MAXIMUM RATINGS (Ta=25℃)

CHARACTERISTIC	SYMBOL	RATING	UNIT
ゲート・ドレイン間電圧	V_{GDS}	−20	V
ゲート電流	I_G	10	mA
許容損失	P_D	100	mW
接合温度	T_j	150	℃
保存温度	T_{stg}	−65～150	℃

電気的特性 ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
ゲート漏れ電流	2SK11	I_{GSS}	$V_{GS}=-10V$	—	—	−1.0	nA
	2SK12 2SK15		$V_{DS}=0$	—	—	−0.1	
ゲート・ドレイン間降伏電圧		$V_{(BR)GDS}$	$V_{DS}=0$ $I_G=-0.1mA$	−20	—	—	V
ドレイン電流	(Note1) 2SK11	I_{DSS}	$V_{DS}=10V$	0.3	—	6.5	〃
	(Note2) 2SK12 (Note3) 2SK15		$V_{GS}=0$	0.45	—	5.0	
ピンチオフ電圧	(Note1) 2SK11	V_P	$V_{DS}=10V$	−0.5	—	−6.0	V
	(Note2) 2SK12		$I_D=0.1\mu A$	−0.65	—	−4.5	
	(Note3) 2SK15			−0.65		−5.0	
相互コンダクタンス	(Note1) 2SK11	g_m	$V_{DS}=10V$ $V_{GS}=0$ $f=1KHz$	700	—	3200	μ℧
	(Note2) 2SK12 (Note3) 2SK15			800	—	3200	
ゲート容量		C_G	$V_{GS}=-10V$ $V_{DS}=0$ $f=1MHz$	—	3.0	5.0	pF
雑音電圧	2SK12	V_N	$V_{DS}=10V$ $I_D=0.45mA$ $R_g=1M\Omega$ $\Delta f=10Hz\sim10kHz$	—	—	16	μV
	2SK15	$V_{N(P-P)}$	$V_{DS}=5V$ $I_D=0.45mA$ $R_g=10k\Omega$ $\Delta f=5Hz\sim50Hz$	—	—	4	
雑音指数	2SK12	NF	$V_{DS}=10V$ $I_D=0.45mA$ $R_g=1M\Omega$ $f=1kHz$	—	—	3	〃 dB
	2SK15	NF(1)	$V_{DS}=10V$ $I_D=0.45mA$ $R_g=10k\Omega$ $f=1kHz$	—	—	3	
		NF(2)	$V_{DS}=10V$ $I_D=0.45mA$ $R_g=10k\Omega$ $f=120Hz$	—	—	10	

(Note 1) 2SK11は I_{DSS}, V_P および g_m により下表のように分類し，現品表示してあります。
According to the value of I_{DSS}, V_P and g_m, the 2SK11 is classified as follows.

CLASSIFICATION	SYMBOL	I_{DSS} (mA)		V_P (V)		g_m (μU)	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
2SK11-R	R	0.3	1.0	−0.5	−2.0	700	2300
2SK11-O	O	0.8	2.5	−0.8	−3.5	1000	3000
2SK11-Y	Y	2.0	6.5	−1.4	−6.0	1300	3200

(Note 2) 2SK12は I_{DSS}, V_P および g_m により下表のように分類し，現品表示してあります。
According to the value of I_{DSS}, V_P and g_m, the 2SK12 is classified as follows.

CLASSIFICATION	SYMBOL	I_{DSS} (mA)		V_P (V)		g_m (μU)	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
2SK12-R	R	0.45	0.9	−0.65	−1.6	800	1900
2SK12-O	O	0.8	1.6	−0.9	−2.2	1000	2300
2SK12-Y	Y	1.4	2.8	−1.2	−3.0	1300	3000
2SK12-GR	GR	2.5	5.0	−1.7	−4.5	1600	3200

(Note 3) 2SK15は I_{DSS}, V_P および g_m により下表のように分類し，現品表示してあります。
According to the value of I_{DSS}, V_P and g_m, the 2SK15 is classified as follows.

CLASSIFICATION	SYMBOL	I_{DSS} (mA)		V_P (V)		g_m (μU)	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
2SK15-R	R	0.45	0.9	−0.65	−1.8	800	1900
2SK15-O	O	0.8	1.6	−0.9	−2.5	1000	2300
2SK15-Y	Y	1.4	2.8	−1.3	−3.5	1300	3000
2SK15-GR	GR	2.5	5.0	−1.8	−5.0	1600	3200

ペアー用標準品種名 STANDARD MATCHED PAIR FETs

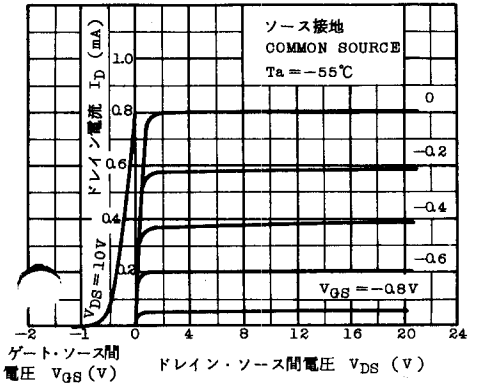
2SK12-R ⓟ	2SK15-R ⓟ
2SK12-O ⓟ	2SK15-O ⓟ
2SK12-Y ⓟ	2SK15-Y ⓟ
2SK12-GR ⓟ	2SK15-GR ⓟ

ペア－特性 MATCHED PAIR CHARACTERISTICS (Ta = 25°C)

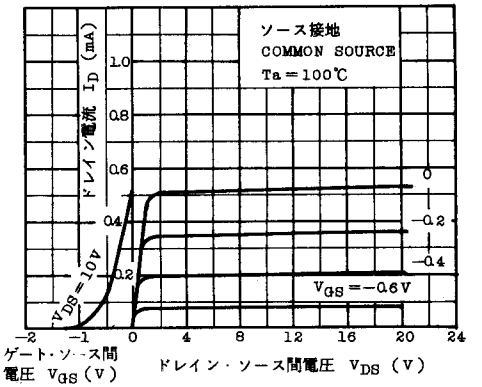
CHARACTERISTIC	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UN.
ドレイン電流差	ΔI_{DSS}	V_{DS} = 10V V_{GS} = 0	—	—	10	%
ゲート・ソース間電圧差	ΔV_{GS}	V_{DG} = 10V I_D = 0.3mA	—	—	20	mV

その他の電気的特性は2SK12, 2SK15一般品と同じです。
Other Characteristics are same as 2SK12, 2SK15.

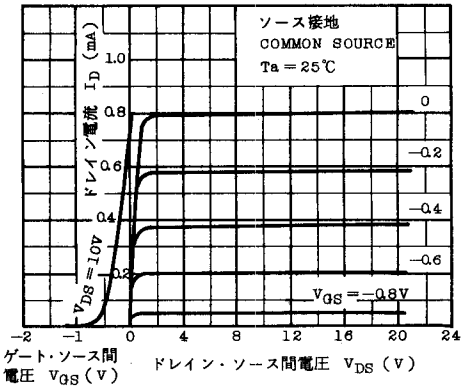
2SK11-R, 2SK12-R, 2SK15-R
STATIC CHARACTERISTICS



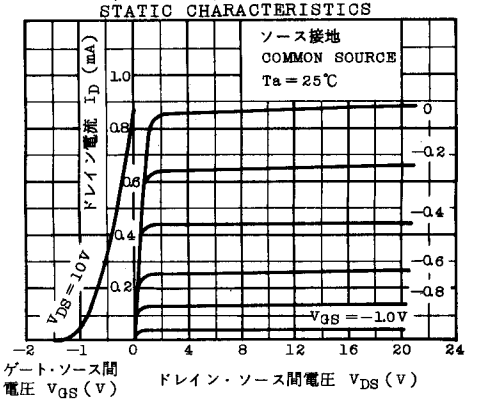
2SK11-R, 2SK12-R, 2SK15-R
STATIC CHARACTERISTICS



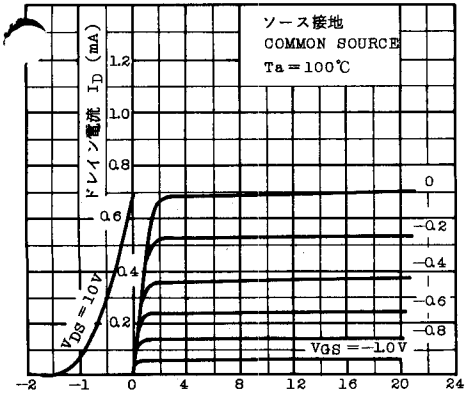
2SK11-R, 2SK12-R, 2SK15-R
STATIC CHARACTERISTICS



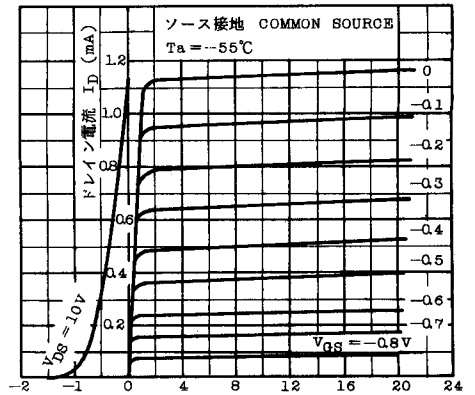
2SK11-O, 2SK12-O, 2SK15-O
STATIC CHARACTERISTICS



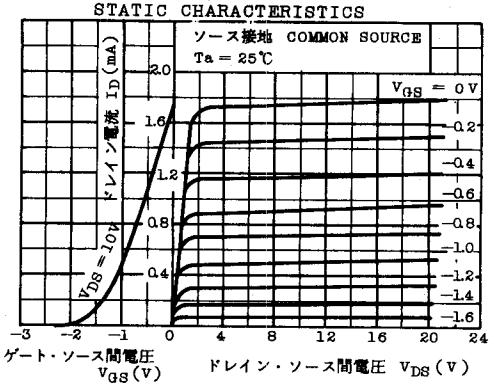
2SK11-O, 2SK12-O, 2SK15-O
STATIC CHARACTERISTICS



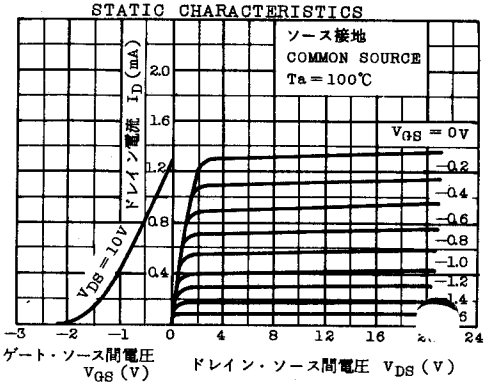
2SK11-O, 2SK12-O, 2SK15-O
STATIC CHARACTERISTICS



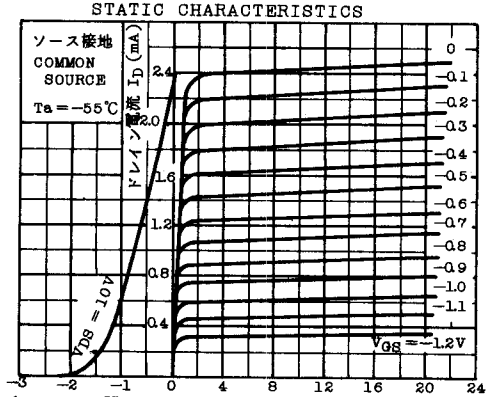
2SK11-O, 2SK12-Y, 2SK15-Y
STATIC CHARACTERISTICS



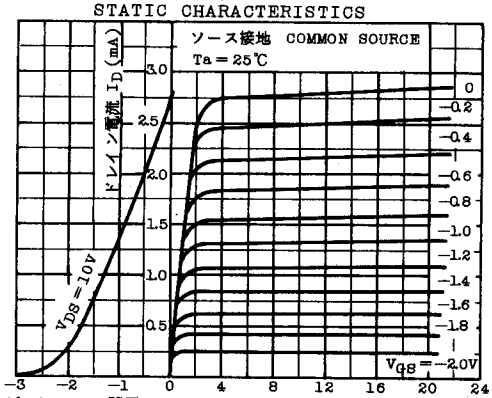
2SK11-O, 2SK12-Y, 2SK15-Y
STATIC CHARACTERISTICS



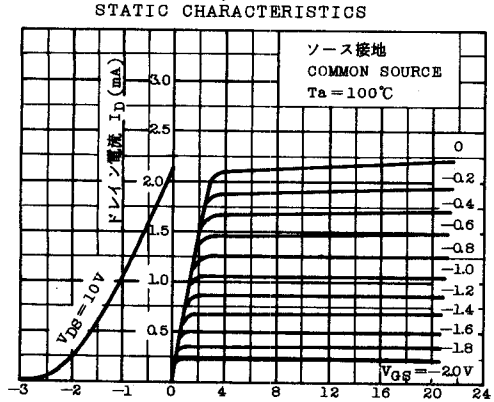
2SK11-O, 2SK12-Y, 2SK15-Y
STATIC CHARACTERISTICS



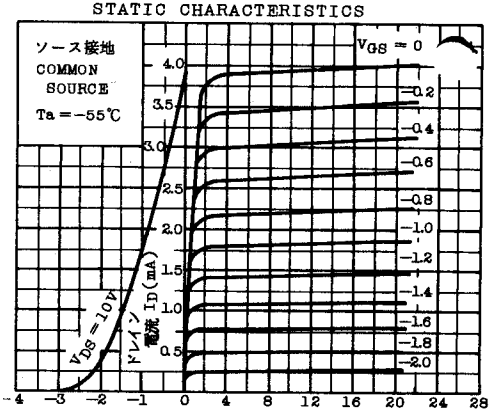
2SK11-Y, 2SK12-GR, 2SK15-GR
STATIC CHARACTERISTICS



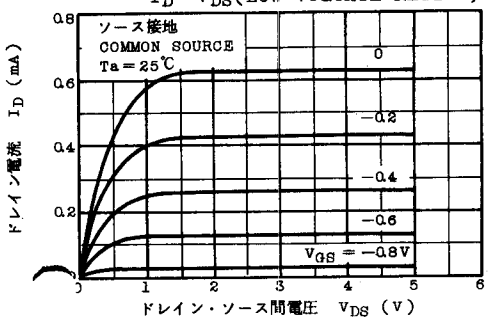
2SK11-Y, 2SK12-GR, 2SK15-GR
STATIC CHARACTERISTICS



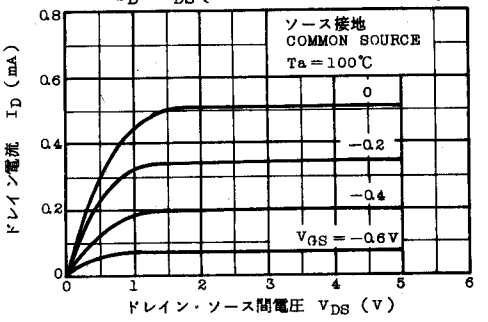
2SK11-Y, 2SK12-GR, 2SK15-GR
STATIC CHARACTERISTICS



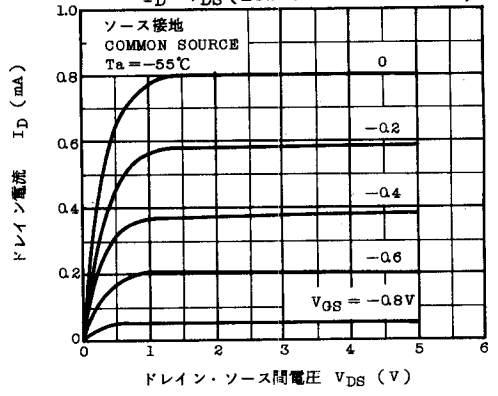
2SK11-R, 2SK12-R, 2SK15-R
$I_D - V_{DS}$ (LOW VOLTAGE REGION)



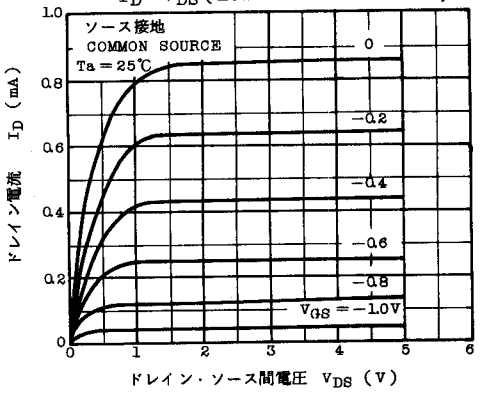
2SK11-R, 2SK12-R, 2SK15-R
$I_D - V_{DS}$ (LOW VOLTAGE REGION)



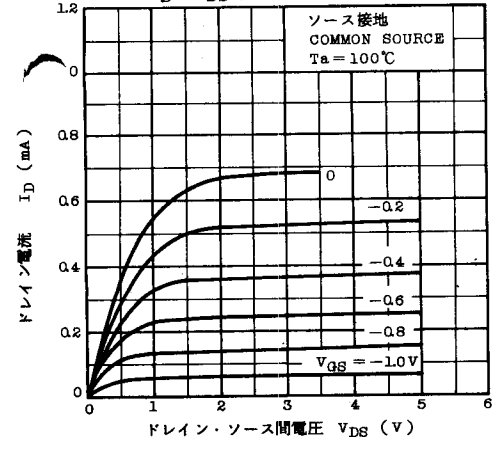
2SK11-R, 2SK12-R, 2SK15-R
$I_D - V_{DS}$ (LOW VOLTAGE REGION)



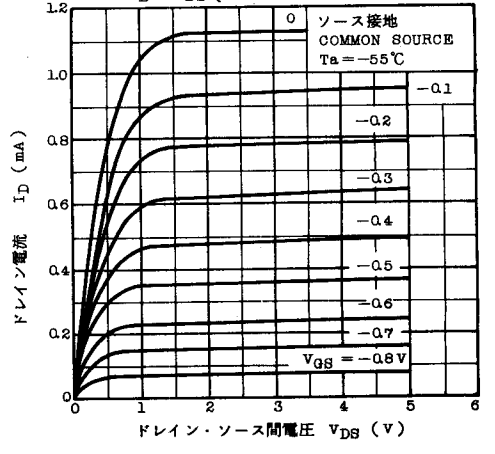
2SK11-O, 2SK12-O, 2SK15-O
$I_D - V_{DS}$ (LOW VOLTAGE REGION)



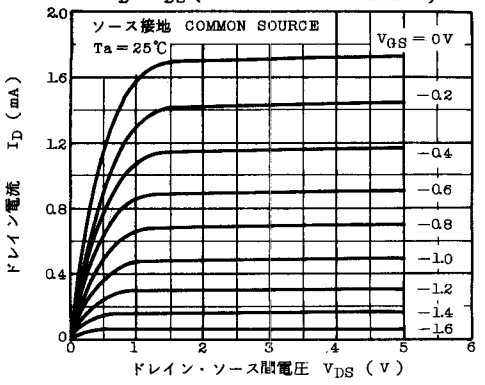
2SK11-O, 2SK12-O, 2SK15-O
$I_D - V_{DS}$ (LOW VOLTAGE REGION)



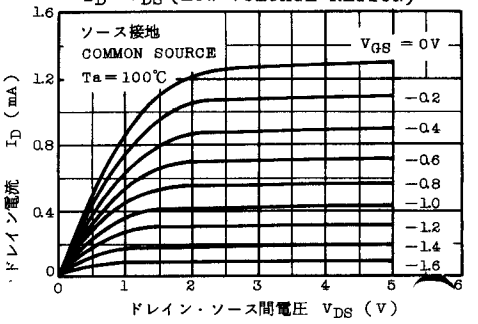
2SK11-O, 2SK12-O, 2SK15-O
$I_D - V_{DS}$ (LOW VOLTAGE REGION)



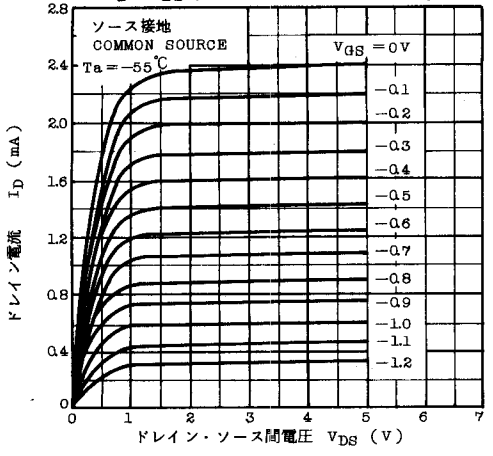
2SK11-O, 2SK12-Y, 2SK15-Y
$I_D - V_{DS}$ (LOW VOLTAGE REGION)



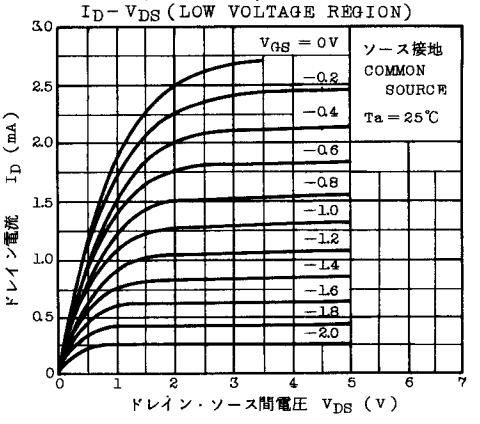
2SK11-O, 2SK12-Y, 2SK15-Y
$I_D - V_{DS}$ (LOW VOLTAGE REGION)



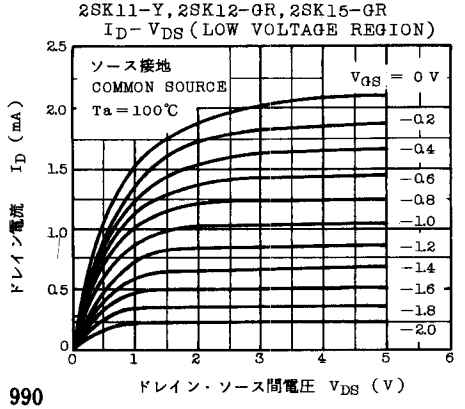
2SK11-O, 2SK12-Y, 2SK15-Y
$I_D - V_{DS}$ (LOW VOLTAGE REGION)



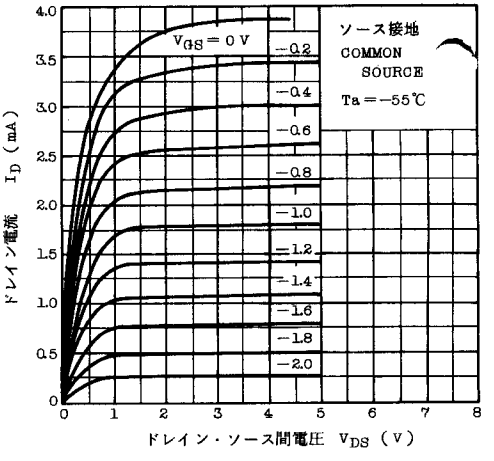
2SK11-Y, 2SK12-GR, 2SK15-GR
$I_D - V_{DS}$ (LOW VOLTAGE REGION)



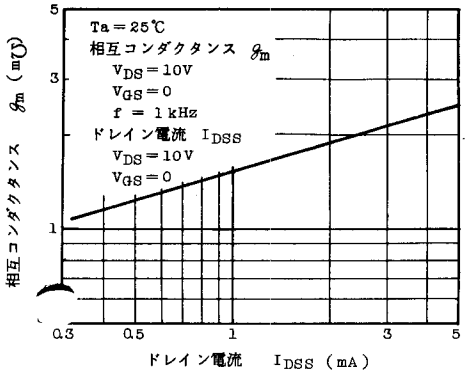
2SK11-Y, 2SK12-GR, 2SK15-GR
$I_D - V_{DS}$ (LOW VOLTAGE REGION)



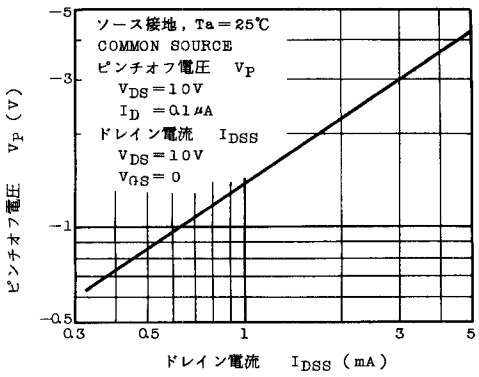
2SK11-Y, 2SK12-GR, 2SK15-GR
$I_D - V_{DS}$ (LOW VOLTAGE REGION)



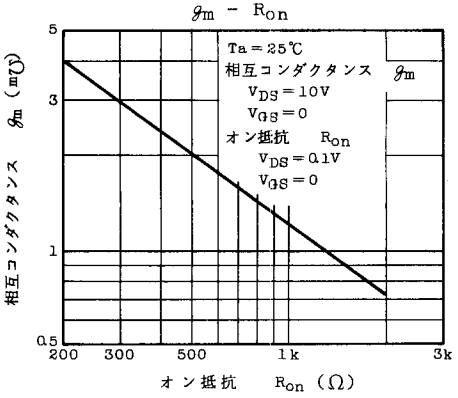
g_m – I_{DSS}



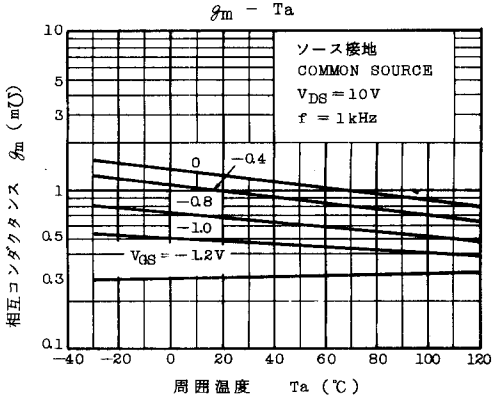
V_P – I_{DSS}



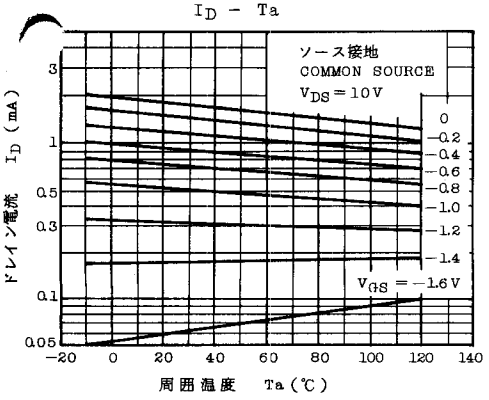
g_m – R_{on}



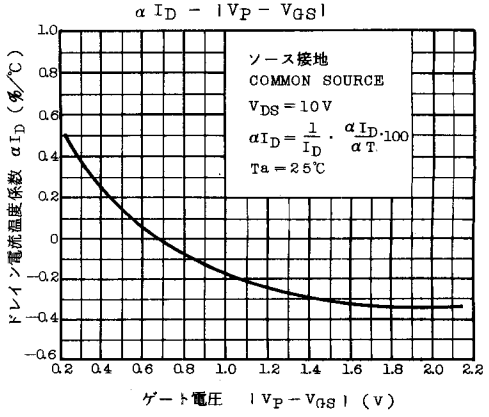
g_m – Ta

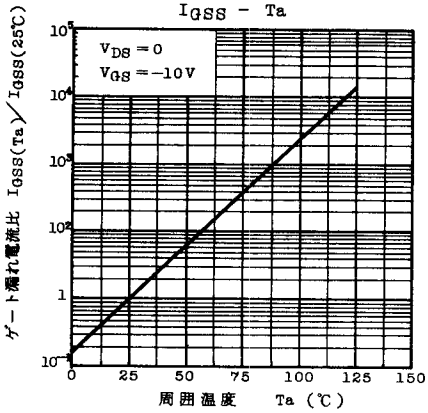


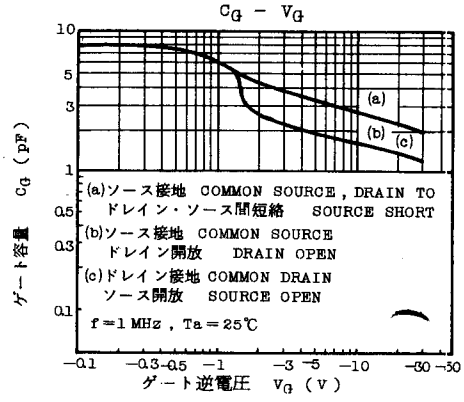
I_D – Ta

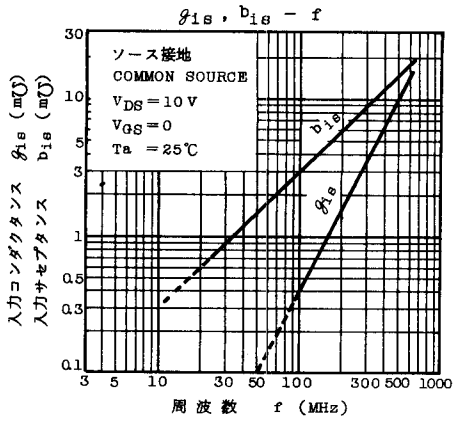


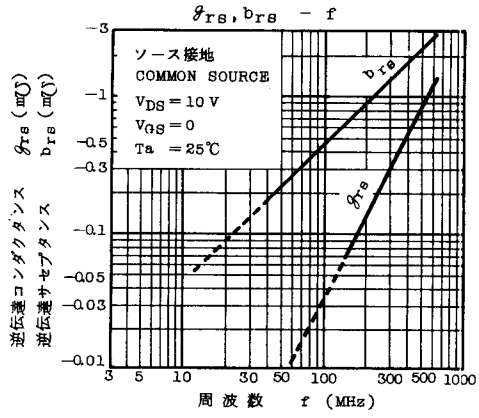
αI_D – $|V_P - V_{GS}|$

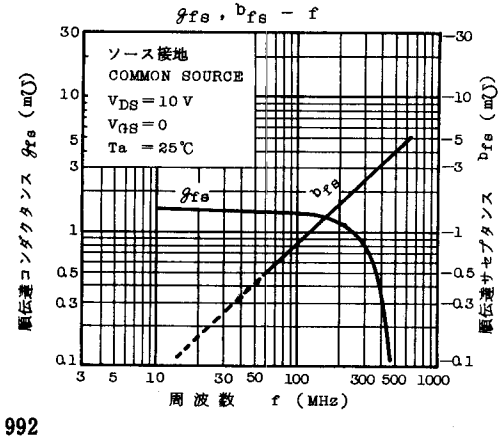


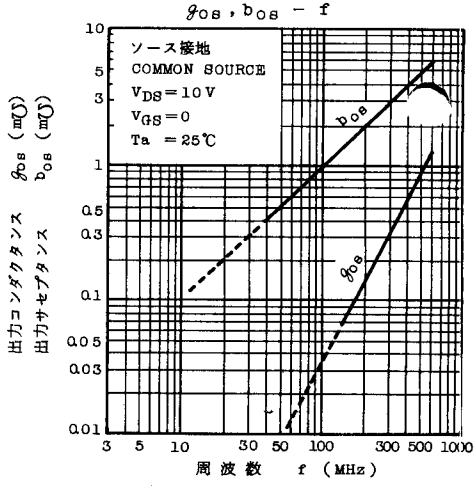

I_{GSS} - Ta
V_{DS} = 0
V_{GS} = −10 V
ゲート漏れ電流比 $I_{GSS(Ta)}/I_{GSS(25℃)}$
周囲温度 Ta (℃)


C_G - V_G
(a)ソース接地 COMMON SOURCE, DRAIN TO
ドレイン・ソース間短絡 SOURCE SHORT
(b)ソース接地 COMMON SOURCE
ドレイン開放 DRAIN OPEN
(c)ドレイン接地 COMMON DRAIN
ソース開放 SOURCE OPEN
f = 1 MHz, Ta = 25℃
ゲート容量 C_G (pF)
ゲート逆電圧 V_G (V)

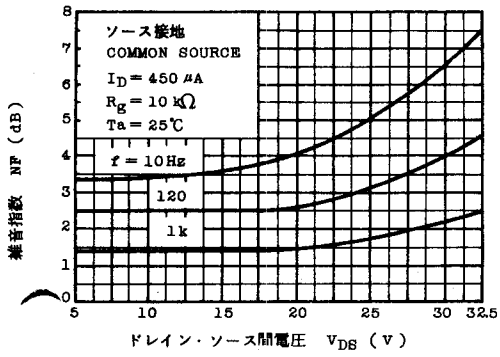

g_{is}, b_{is} - f
ソース接地
COMMON SOURCE
V_{DS} = 10 V
V_{GS} = 0
Ta = 25℃
入力コンダクタンス g_{is} (m℧)
入力サセプタンス b_{is} (m℧)
周波数 f (MHz)


g_{rs}, b_{rs} - f
ソース接地
COMMON SOURCE
V_{DS} = 10 V
V_{GS} = 0
Ta = 25℃
逆伝達コンダクタンス g_{rs} (m℧)
逆伝達サセプタンス b_{rs} (m℧)
周波数 f (MHz)

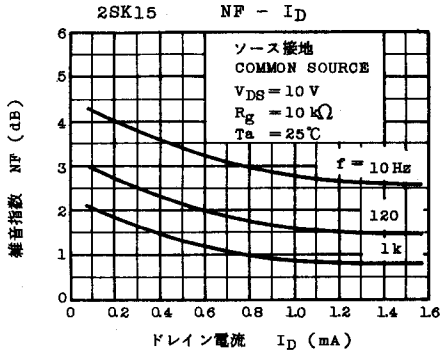

g_{fs}, b_{fs} - f
ソース接地
COMMON SOURCE
V_{DS} = 10 V
V_{GS} = 0
Ta = 25℃
順伝達コンダクタンス g_{fs} (m℧)
順伝達サセプタンス b_{fs} (m℧)
周波数 f (MHz)


g_{os}, b_{os} - f
ソース接地
COMMON SOURCE
V_{DS} = 10 V
V_{GS} = 0
Ta = 25℃
出力コンダクタンス g_{os} (m℧)
出力サセプタンス b_{os} (m℧)
周波数 f (MHz)

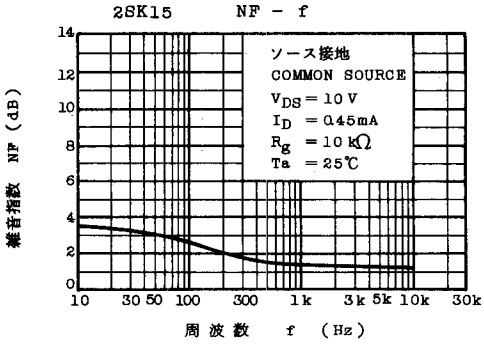
2SK15　　NF – V_{DS}



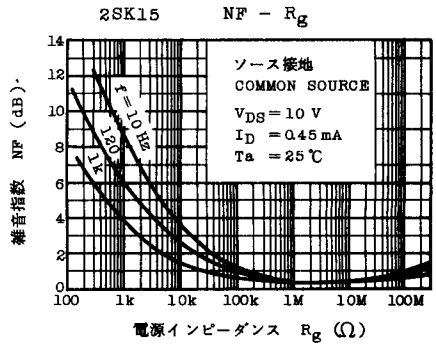
2SK15　　NF – I_D



2SK15　　NF – f



2SK15　　NF – R_g



P_D – Ta