1.4 S-Series for Power Amplifiers

A power MOSFET is excellent as an output stage because its high input impedance neatly separates the output current amplification stage from the input voltage gain stage. This simplifies the input voltage gain stage, so low cost components may be used and no pre-driver stage is necessary.

Bipolar Transistors may at first seem more suited to power amplifiers than MOSFETs as their transconductance is nearly forty times larger. However, negative feedback can be used to make any difference negligible. In addition, higher power output stages can easily be designed just by connecting extra power MOSFETs in parallel. This flexibility arises from the positive temperature coefficient of the power MOSFET, which gives the transistor the ability to share current.

The combination of these features has made the S-Series MOSFETs very popular with the manufacturers of high power amplifiers. Some design engineers have claimed that this series gives their amplifiers an excellent **"Sound Quality"** not achievable with other MOSFETs. Unfortunately, this is one parameter Hitachi has found difficult to characterise.

Table 3 : S-Series Typical Characteristics

Package	Type Number		Absolute Maximum Ratings				Electrical Characteristics (typ.)						
	N-Ch	P-Ch	V_{DSS} (V)	V_{GSS} (V)	I_D (A)	Pch ** (W)	$R_{DS(on)}$ (Ω) typ.	$R_{DS(on)}$ (Ω) max.	[Yfs] (S) ***	ton (ns)	toff (ns)	Ciss (pF)	fc (MHz)
TO-220AB	2SK213	2SJ75	140 *	± 15	0.5	30	8/10	-	0.15/0.1	20	30	90/120	40/30
	2SK214	2SJ77	160 *										
	2SK215	2SJ78	180 *										
	2SK408/409	-	180 *	± 20	2	30	7	9	0.3	-	-	100	200
	2SK216	2SJ79	200 *	± 15	0.5	30	8/10	-	0.15/0.1	20	30	90/120	40/30
TO-126	2SK619	-	70	± 9/-6	0.3	10	-	50	0.13	-	-	10	-
	2SK1197	-	100	± 9	0.5	20	-	50	0.15	-	-	10	-
TO-3	2SK133	2SJ48	120 *	± 14	7	100	1	1.7	1	180/230	60/110	600/900	3/2
	2SK134	2SJ49	140 *										
	2SK135	2SJ50	160 *										
	2SK175	2SJ55	180 *	± 20	8	125	1	1.7	1	250/230	90/120	800/1200	2/1
	2SK176	2SJ56	200 *										
	2SK176	2SJ56(H)	200							60	200		
	2SK220	-	160	± 20	8	100	1	1.5	0.9	25	45	600	50
	2SK221	-	200										
	2SK258	-	250		8	125	0.8	1.1	1.3	25	140	800	7
	2SK259	-	350		5	125	2.5	3	1	25	140	800	7
	2SK260	-	400										
TO-3P-FM	2SK1056	2SJ160	120 *	± 15	7	100	1	1.7	1	180/230	60/110	600/900	3/2
	2SK1057	2SJ161	140 *										
	2SK1058	2SJ162	160 *										
RFPAK	2SK317	-	180	± 20	8	120	0.95	1.25	1.25	-	-	600	300
	2SK318	-			4	70	1.9	2.5	0.6			300	
	2SK410	-			8	120	1.2	1.5	1.25	-	-	440	350

Notes :
* : V_{DSX}
** : Value at Tc = 25°C
*** : Test conditions : $V_{DS} > I_D R_{DS(on)}$, $I_D = {}^1/_2\, I_D$ max (DC)
(H) : Specially manufactured for communications industry