

Title (en)  
Liquid crystal display apparatus.

Title (de)  
Flüssigkristallanzeigevorrichtung.

Title (fr)  
Dispositif d'affichage à cristaux liquides.

Publication  
**EP 0631394 A1 19941228 (EN)**

Application  
**EP 94304204 A 19940610**

Priority  
JP 15382393 A 19930624

Abstract (en)  
A multi-gradation thin-film liquid crystal display (TFT/LCD) includes a data line driver which does not cause an increase in the chip area, (i.e., which is constituted of a smaller number of circuit elements). Power supplies having respective reference potentials Va and Vb corresponding to at least two different gradations, and switches SWa and SWb for selectively supplying the respective potentials to a data line, are provided in a driver IC for driving the data lines of a TFT/LCD panel. If an output potential corresponding to an arbitrary gradation between the two predetermined gradations is denoted by Vc, the output potential Vc is supplied to the data line by being turned on and off the switches SWa and SWb alternately at a predetermined cycle in a ratio in which the potential Vc proportionally divides the potentials Va and Vb. Therefore, the output potential corresponding to an arbitrary gradation between the two predetermined gradations can be obtained simply by properly changing the ratio of turning the two switches on and off. <IMAGE>

IPC 1-7  
**H03M 1/82**; **G09G 3/36**

IPC 8 full level  
**G02F 1/133** (2006.01); **G02F 1/136** (2006.01); **G02F 1/1368** (2006.01); **G09G 3/36** (2006.01); **G09G 3/20** (2006.01)

CPC (source: EP KR)  
**G09G 3/3611** (2013.01 - KR); **G09G 3/3688** (2013.01 - EP); **G09G 3/3696** (2013.01 - KR); **G09G 3/2011** (2013.01 - EP);  
**G09G 3/2014** (2013.01 - EP); **G09G 2310/0248** (2013.01 - KR); **G09G 2310/027** (2013.01 - EP); **G09G 2320/066** (2013.01 - KR)

Citation (search report)  
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