**Figure 2—source data 1. Statistics**

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| **Panel** | **Comparison**  | **Mean & SEM** | **Test** | **Statistic** | **p-value** | **Correction** |
| I | Figure vs. Ground – Contrast(22 units from 3 mice) | n.a. (too many comparisons) | Permutation test of clustered LME: *Normalized rate ~ stimulus + (1|mouse) + (1|session) + (1|unit)* | F(1, 61) | <0.05 from 70-99 ms | Clustered LME-statistic, see Methods section |
| Figure vs. Ground – Orientation(49 units from 5 mice) | n.a. (too many comparisons) | Permuation test of clustered LME: *Normalized rate ~ stimulus + (1|mouse) + (1|session) + (1|unit)* | F(1, 96) | <0.05 from 83-130 ms | Clustered LME-statistic, see Methods section |
| Figure vs. Ground – Phase(32 units from 5 mice) | n.a. (too many comparisons) | Permutation test of Clustered LME: *Normalized rate ~ stimulus + (1|mouse) + (1|session) + (1|unit)* | F(1, 62) | No significant clusters | Clustered LME-statistic, see Methods section |
| J | Onset modulation - Contrast | 67 ms | Curve fitting |  |  |  |
| Onset modulation - Orientation | 75 ms | Curve fitting |  |  |  |

**Figure 2—figure supplement 1**

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| **Panel** | **Comparison**  | **Mean & SEM** | **Test** | **Statistic** | **p-value** | **Correction** |
| D | d-prime for - Hit vs. Error - Orientation vs. Phase(5/5 and 8/8 units for orientation hit/error and phase hit/error, respectively) | Orientation Hit: 0.671 ± 0.429Orientation Error: -0.353 ± 0.496Phase Hit: 0.607 ± 0.439Phase Error: -0.398 ± 0.491 | LME:*dprime ~ 1 + Response + Task* | **Main:**Resp.: F(1,19) = 4.645Task: F(1,19) = 0.014**Post Hoc:** Resp. (Orientation) T(7) = 1.569Resp. (Phase)T(111) = 1.480 | **Main :**0.044\*0.906**Post-Hoc :**0.1610.167 | None  |
| E | Variance of depth of visual vs. MS cells Difference in depth of visual vs. MS cells(99 and 8 units for visual and MS cells, respectively) | Visual: 338 ± 190 um (SD)Multisensory: 416 ± 92 um (SD) | Two-sample F-test, two-tailedMann-Whitney U-test, two-tailed | F(7, 98) = 0.231 Z = 1.352 | 0.0460.177 | NoneNone |
| F | Correlation of eye speed with neural activity vs. correlation coefficient of zero | Coefficients: -0.025 ± 0.031 | One-sample t-test, two-tailed | T(3) = -0.789 | 0.488 | None |